DACH Capital Market Study

December 31, 2019

Analysis of cost of capital parameters and multiples for the capital markets of Germany, Austria and Switzerland

Volume 6, February 2020

powered by finexpert *and* JKU JOHANNES KEPLER UNIVERSITÄT LINZ

Overview

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1 Preface & people

DACH Capital Market Study
Preface

Dear business partners and friends of ValueTrust,

We are pleased to release our sixth edition of the **ValueTrust DACH**[1] **Capital Market Study** powered by finexpert and JKU. The study was elaborated by ValueTrust Financial Advisors SE (ValueTrust) in cooperation with finexpert and the Institute of Auditing and Sustainability Accounting at the Johannes Kepler University Linz JKU. With this study, we provide a data compilation of the **capital market parameters** that enables an enterprise valuation in Germany, Austria and Switzerland. It has the purpose to serve as an assistant and data source as well as to show trends of the analyzed parameters.

In this study, we analyze the relevant parameters to calculate the costs of capital based on the Capital Asset Pricing Model **(risk-free rate, market risk premium and beta)**. Additionally, we determine **implied as well as historical market and sector returns**. Moreover, this study includes capital structure-adjusted implied sector returns, which serve as an indicator for the **unlevered cost of equity**. The **relevered cost of equity** can be calculated by adapting the company specific debt situation to the **unlevered cost of equity**. This procedure serves as an alternative to the CAPM.

Furthermore, we provide an analysis of empirical (ex-post) costs of equity in the form of **total shareholder returns** which consist of capital gains and dividends. The total shareholder returns can be used as a plausibility check of the implied (ex-ante) returns. Lastly, **trading multiples** frame the end of this study.

We examine the before mentioned parameters for the **German, Austrian and Swiss capital market** (in form of the CDAX[2], WBI[3] and SPI[4]). These indices have been merged into **twelve** finexpert **sector indices** (so-called "super sectors") Banking, Insurance, Financial Services, Real Estate, Basic Materials, Consumer Goods, Telecommunication, Industrials, Consumer Service, Pharma & Healthcare, Information Technology and Utilities.

Historical data has been compiled between the reference dates **December 31, 2013 and December 31, 2019** and will be **updated semi-annually**, with the objective that **historical**, as well as **current data**, can be consulted at the same time. Hence, we can understand changes in time, which allows to track the performance of all three capital markets. Additionally, further knowledge and information for financial decision making is provided at www.finexpert.info.

The analyzed cost of capital data is **accessible online** at www.firmvaluation.center by entering the reference date, the relevant sector and country.

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1) D (Germany), A (Austria), CH (Switzerland). 2) German Composite DAX Index. 3) Vienna Stock Index. 4) Swiss Performance Index.

DACH Capital Market Study
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DACH Capital Market Study
Disclaimer

This study presents an empirical analysis which serves the purpose of illustrating the cost of capital of Germany's, Austria's, and Switzerland's capital markets. Nevertheless, the available information and the corresponding exemplifications do not allow a complete presentation of a proper derivation of costs of capital. Furthermore, the market participant must consider that the company specific costs of capital can vary widely due to individual corporate situations.

The listed information is not specified to anyone and, consequently, it cannot be directed to an individual or juristic person. Although we are always endeavored to present information that is reliable, accurate, and current, we cannot guarantee that the data is applicable to valuation in the present as well as in the future. The same applies to our underlying data from the data provider S&P Capital IQ.

We recommend a self-contained, technical, and detailed analysis of the specific situation and we dissuade from acting based on the provided information only.

ValueTrust and its co-authors do not assume any liability for the up-to-datedness, completeness or accuracy of this study or its contents.

2 Executive summary

Executive Summary (1/2)

Risk-free rate	▪ Following a risk-free rate of 0.60% in the German market in June 30, 2019, the risk-free rate decreased to slightly negative numbers in October 2019 and recovered to 0.18% as of December 31, 2019. ▪ After a short period of negative risk-free rates, the Austrian risk-free rate increased to 0.34% as of December 31, 2019, hence reaching a level comparably to June 30, 2019 where the Austrian risk-free rate amounted to 0.33%. ▪ The Swiss risk-free rate recorded a decrease from 0.16% to -0.20% during the period from June 30, 2019 to December 31, 2019, hence, showing a comparable trend as Germany and Austria.	Chapter 3
Market returns and market risk premium	▪ Across the analyzed markets we observed stagnation or minor decreases in the implied market returns. This is mainly due to a slight increase in market capitalization of the analyzed companies caused by overall bullish tendencies of stock markets in the second half of 2019. ▪ The implied annual market return (ex-ante) of the German market decreased slightly from 8.5% as of June 30, 2019 to 8.3% as of December 31, 2019, with an implied market risk premium of 7.9% and 8.1%, respectively. ▪ The implied market return of the Austrian market decreased from 9.5% as of June 30, 2019 to 9.2% as of December 31, 2019. The implied market risk premium amounts to 8.9% as of December 31, 2019, slightly lower than the 9.2% as of June 30, 2019. ▪ The implied market return of the Swiss market is the lowest with 7.3% as of December 31, 2019 and nearly unchanged from 7.2% as of June 30, 2019. The implied market risk premium increased from 7.0% to 7.5%. ▪ The annual total shareholder return of the Swiss market as of December 31, 2019 is 30.2% and, hence, outperforms the strong German (25.5%) and Austrian (20.5%) markets. When looking at the past 25 years, we observe average historical market returns between 7.1% p.a. and 10.8% p.a. for the three markets.	Chapter 4
Betas	▪ Companies within the Pharma & Healthcare sector show the highest unlevered sector specific betas with the arithmetic mean standing at 0.91 for the five-year period ending December 31, 2019, while Real Estate has the lowest unlevered beta (0.45) over the same period. ▪ The levered sector specific betas are the highest for the Financial Services sector for the five-year period (arithmetic mean) as of December 31, 2019. If we consider the two-year period, the Basic Materials sector shows the highest levered beta, followed by Industrials. The Real Estate sector has the lowest levered betas over both time horizons, followed by Utilities.	Chapter 6

Executive Summary (2/2)

Sector returns (p.a.)

- The levered implied sector returns are in the range of 5.6% and 8.6%, the unlevered implied sector returns are between 3.3% and 6.2% as of December 31, 2019.
- The ex-ante analysis of implied sector returns reveals that unlevered implied sector returns are the highest for companies in the Pharma & Healthcare sector at 6.2% (levered 7.2%).
- The ex-post analysis of historical sector returns based on total shareholder returns highlights that companies in the Financial Services sector realized high total shareholder returns at 29.1% in the six-year and 24.5% in the three-year average. Similarly, the Information Technology sector showed high returns at 21.6% in the six-year and 23.8% in the three-year average. The lowest historical returns of the sectors were realized by the Banking sector at 2.1% in the six-year average and by the Telecommunication sector at 1.9% in the three-year average.

Chapter 7

Trading Multiples

- As of December 31, 2019, the medians of the EV/Revenue, EV/EBIT, P/E and EqV/BV-Multiples for the most sectors are higher than six months ago.
- The Real Estate sector has by far the highest median Revenue-Multiples compared to all other sectors: the median of the Revenue-Multiples amounts to 13.4x (LTM) and 16.0x (1yf). Opposed to that, the Consumer Goods and Industrials sectors show the lowest median Revenue-Multiples with values of 1.1x (LTM) and 1.3x (1yf).
- The Pharma & Healthcare sector represent the highest EqV/BV-Multiple with a median of 3.3x as of December 31, 2019. On the other hand, the Banking sector shows the lowest EqV/BV-Multiple with a median of only 0.9x.

Chapter 8

3 Risk-free rate

Risk-Free Rate
Background & approach

The **risk-free rate** is a return available on a security that the market generally regards as free of default risk. It serves as an input parameter for the **CAPM** and to determine the risk-adequate cost of capital.

The risk-free rate is a yield, which is obtained from **long-term government bonds** of countries with top notch rating. By using interest rate data of different maturities, a **yield curve** can be estimated for fictitious zero-coupon bonds (spot rates) for a period of up to 30 years. Therefore, the German Central Bank (Deutsche Bundesbank) and the Swiss National Bank (Schweizer Nationalbank) publish – on a daily basis – the parameters needed to determine the yield curve using the **Svensson method**. Based on the respective yield curve, a **uniform risk-free rate** is derived under the assumption of present value equivalence to an infinite time horizon.

The **German bonds** are internationally classified as **almost risk-free securities** due to their AAA rating according to S&P. As a result, the **Austrian** Chamber of Public Accountants and Tax Consultants also recommends deriving the risk-free rate from the yield curve using the parameters published by the German Central Bank.[1)] Likewise, bonds issued by **Switzerland** enjoy a AAA rating and are also considered risk-free according to the Swiss National Bank.[2)] Hence, a similar approach as for Germany and Austria is in our view appropriate for Switzerland with Swiss parameters.[3)]

To compute the risk-free rate for a specific reference date, the **Institute of Public Auditors** (Institut der Wirtschaftsprüfer, **IDW**) in Germany recommends using an **average value** deduced from the daily yield curves of the **past three months** (IDW S 1).

On the contrary, the **Austrian Expert Opinion (KFS/BW 1)** on company valuation recommends to derive the risk-free rate in line with the evaluated company's cash flow profile from the yield curve that is valid for the **reference date (reference date principle)**. Thus, the KFS/BW 1 and its counterpart, the IDW S 1, differ from each other. Consequently, in the following analyses, we depict the **yield curve** for Germany following IDW S 1 while for Austria we adhere to the recommendations of KFS/BW 1.

For **Switzerland**, there is no generally accepted scheme to determine the risk-free rate. The most widely used risk-free rates in valuation practice are the yield of a **10-year Swiss government bond** as of the reference date as well as the **yield derived from the 3-month average of the daily yield curves** (in accordance with IDW S 1).

Additionally, we illustrate the monthly development of the risk-free rates since December 2013 for all three capital markets.

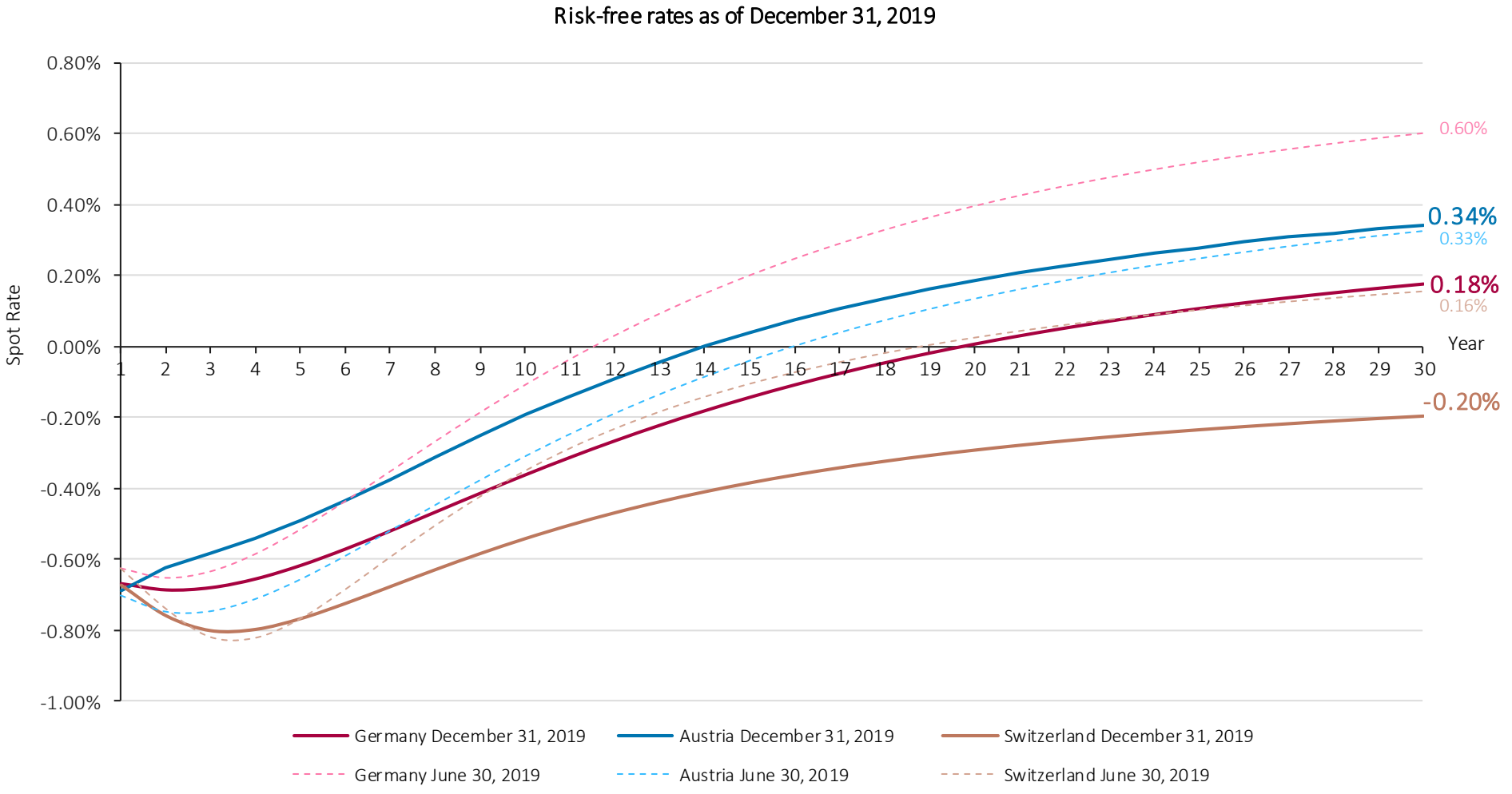
1) www.bundesbank.de.

2) Swiss National Bank – Zinssätze und Renditen, p.11.

3) ibid., p.13.

Risk-Free Rate – DACH

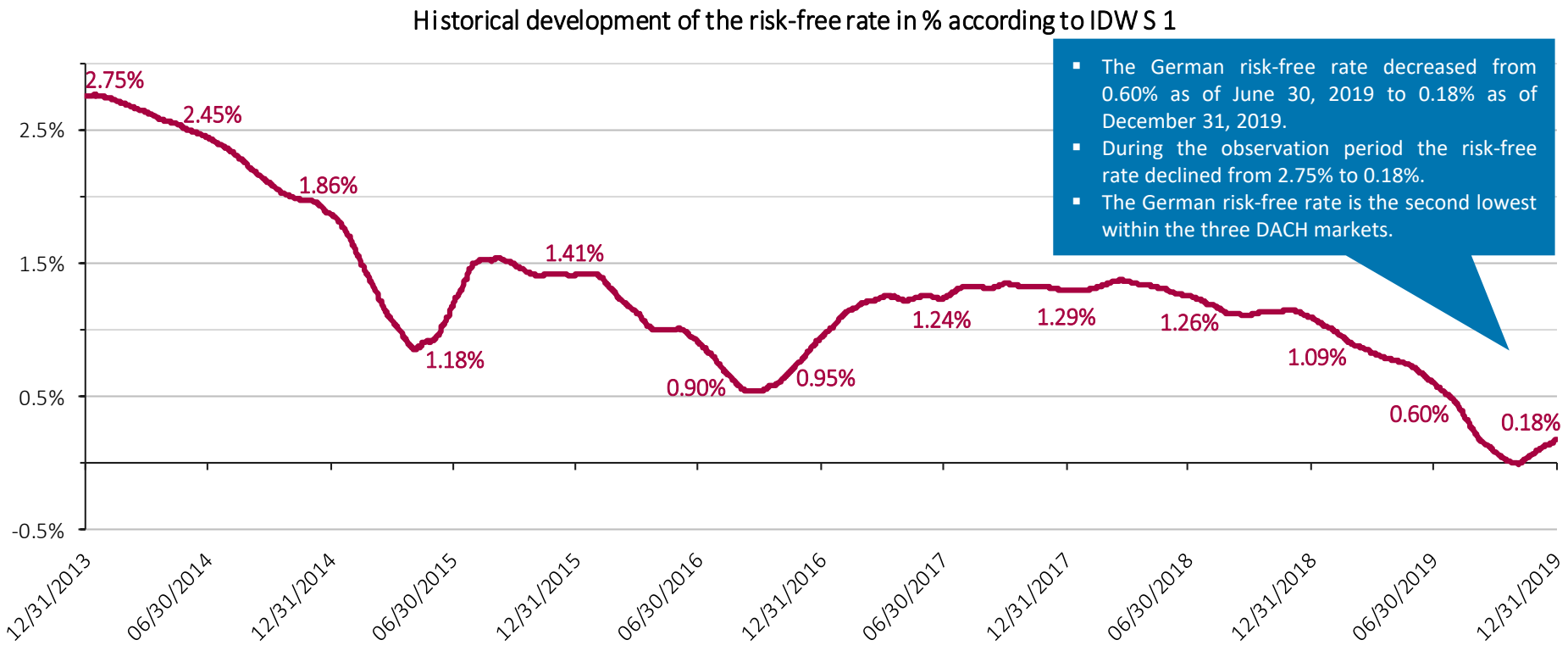
Determination according to country specific recommendations
Interest rate curve based on long-term bonds (Svensson method)



Risk-Free Rate – Germany

Determination following IDW S 1

Historical development of the risk-free rate (Svensson method) since 2013



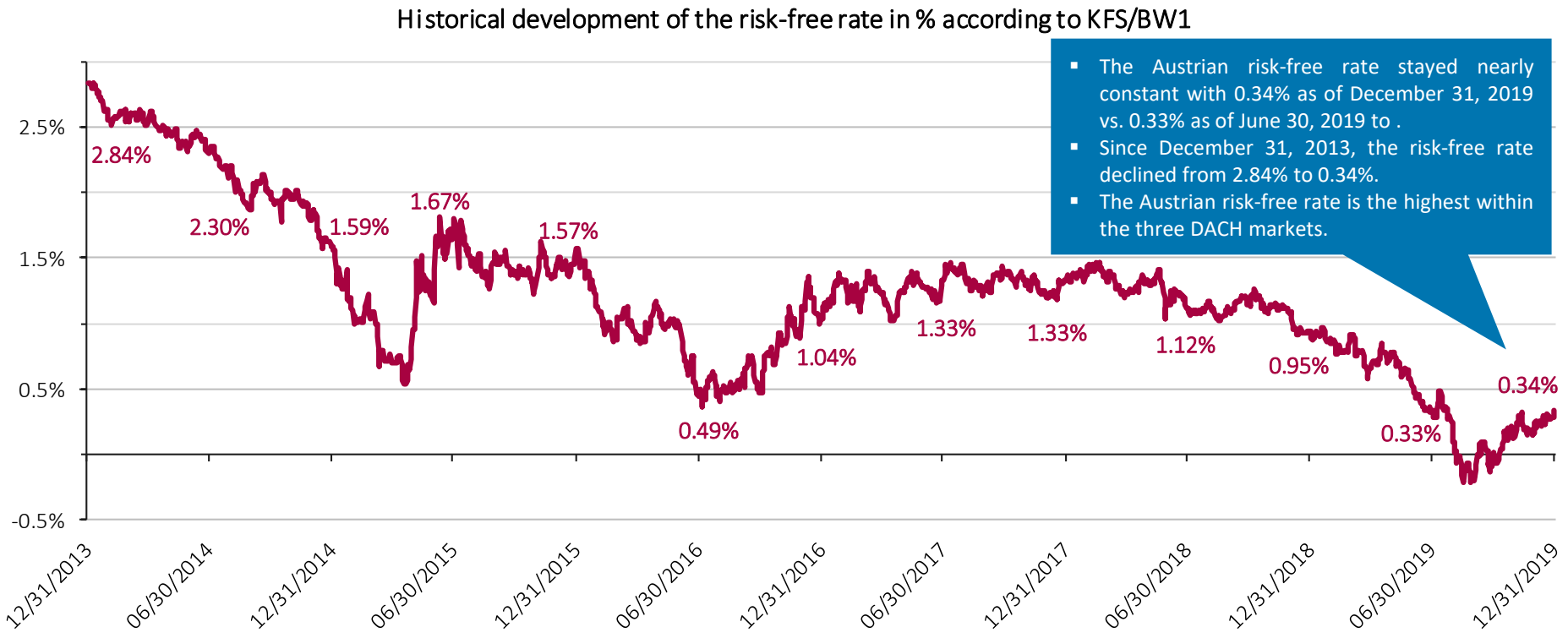
Risk-free rate	January	February	March	April	May	June	July	August	September	October	November	December
2019	1.00%	0.90%	0.83%	0.77%	0.72%	0.60%	0.47%	0.22%	0.09%	0.00%	0.09%	0.18%
2018	1.30%	1.34%	1.36%	1.34%	1.29%	1.26%	1.19%	1.13%	1.11%	1.14%	1.15%	1.09%
2017	1.10%	1.20%	1.25%	1.22%	1.25%	1.24%	1.32%	1.32%	1.35%	1.33%	1.32%	1.29%
2016	1.42%	1.26%	1.12%	1.00%	1.01%	0.90%	0.74%	0.57%	0.54%	0.62%	0.77%	0.95%
2015	1.64%	1.36%	1.07%	0.86%	0.92%	1.18%	1.50%	1.53%	1.49%	1.41%	1.42%	1.41%
2014	2.74%	2.69%	2.63%	2.56%	2.50%	2.45%	2.35%	2.22%	2.10%	2.00%	1.97%	1.86%
2013	2.37%	2.42%	2.42%	2.36%	2.32%	2.37%	2.44%	2.54%	2.63%	2.72%	2.76%	2.75%

Note: Interest rate as of reference date using 3-month average yield curves in accordance with IDW S 1.

Risk-Free Rate – Austria

Determination following KFS/BW 1

Historical development of the risk-free rate (Svensson method) since 2013



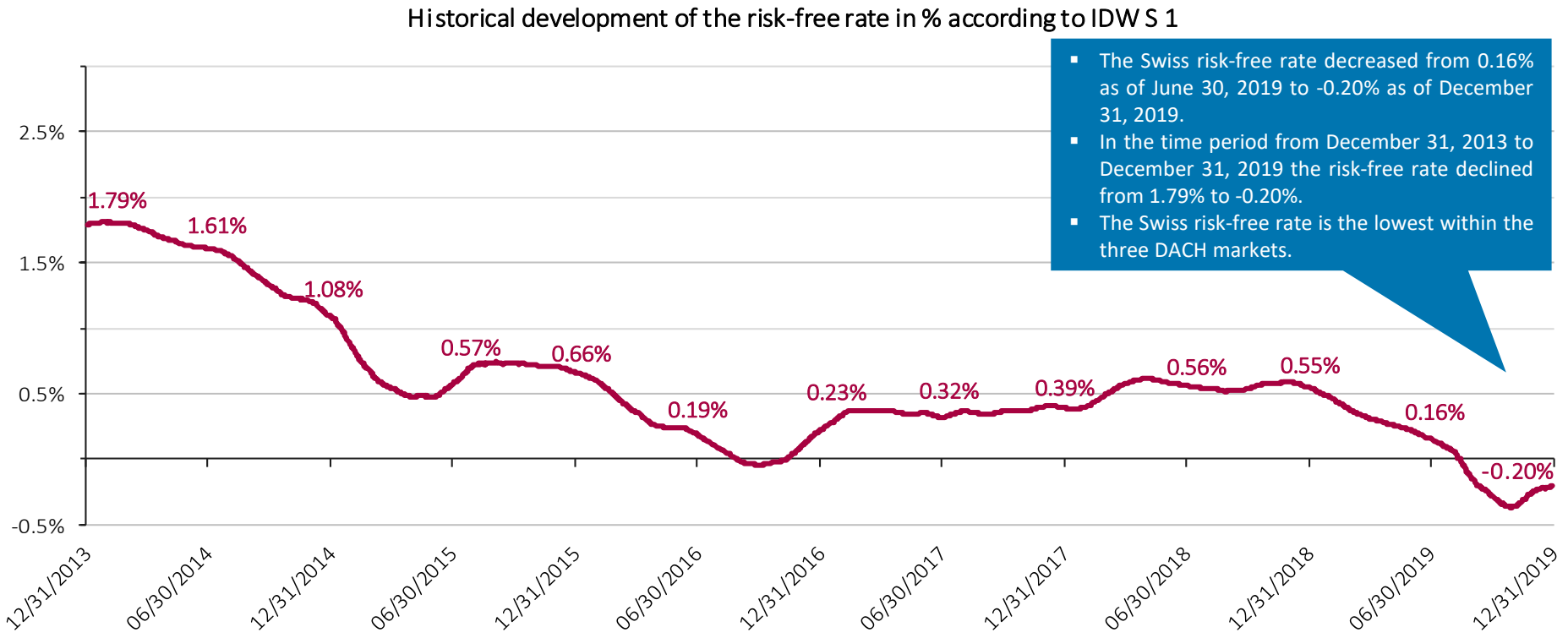
Risk-free rate	January	February	March	April	May	June	July	August	September	October	November	December
2019	0.84%	0.86%	0.65%	0.78%	0.52%	0.33%	0.24%	-0.17%	-0.03%	0.13%	0.16%	0.34%
2018	1.37%	1.36%	1.23%	1.30%	1.17%	1.12%	1.15%	1.09%	1.15%	1.12%	1.08%	0.95%
2017	1.33%	1.13%	1.24%	1.25%	1.29%	1.33%	1.45%	1.25%	1.38%	1.33%	1.25%	1.33%
2016	1.13%	0.88%	0.91%	1.13%	1.02%	0.49%	0.45%	0.50%	0.48%	0.90%	0.89%	1.04%
2015	1.10%	1.08%	0.71%	0.96%	1.18%	1.67%	1.47%	1.46%	1.39%	1.29%	1.38%	1.57%
2014	2.55%	2.57%	2.55%	2.49%	2.36%	2.30%	2.15%	1.87%	2.00%	1.95%	1.79%	1.59%
2013	2.43%	2.37%	2.27%	2.17%	2.41%	2.53%	2.54%	2.70%	2.65%	2.69%	2.70%	2.84%

Note: Interest rate calculated using the daily yield curve in accordance with KFS/BW 1 (no 3-month average).

Risk-Free Rate – Switzerland

Determination following IDW S 1

Historical development of the risk-free rate (Svensson method) since 2013



Risk-free rate	January	February	March	April	May	June	July	August	September	October	November	December
2019	0.47%	0.38%	0.31%	0.27%	0.22%	0.16%	0.07%	-0.15%	-0.28%	-0.36%	-0.25%	-0.20%
2018	0.40%	0.48%	0.58%	0.62%	0.59%	0.56%	0.53%	0.52%	0.54%	0.58%	0.59%	0.55%
2017	0.33%	0.37%	0.37%	0.35%	0.36%	0.32%	0.36%	0.35%	0.37%	0.37%	0.40%	0.39%
2016	0.60%	0.49%	0.36%	0.26%	0.25%	0.19%	0.09%	-0.01%	-0.04%	-0.02%	0.08%	0.23%
2015	0.85%	0.66%	0.54%	0.47%	0.47%	0.57%	0.72%	0.74%	0.73%	0.72%	0.71%	0.66%
2014	1.81%	1.80%	1.75%	1.68%	1.63%	1.61%	1.56%	1.44%	1.33%	1.24%	1.20%	1.08%
2013	1.16%	1.24%	1.31%	1.31%	1.28%	1.33%	1.46%	1.62%	1.72%	1.77%	1.78%	1.79%

Note: Interest rate as of reference date using 3-month average yield curves in accordance with IDW S 1.

4 Market returns and market risk premium

a. Implied returns (ex-ante analysis)

Implied Market Returns and Market Premium
Background & approach

The **future-oriented** computation of **implied market returns** and **market risk premiums** is based on profit estimates for public companies and return calculations. This approach is called ex-ante analysis and allows to calculate the "**implied cost of capital**". It is to be distinguished from the **ex-post analysis**.

Particularly, the **ex-ante method** offers an **alternative** to the **ex-post approach** of calculating the costs of capital by means of the regression analysis through the **CAPM**. The ex-ante analysis method seeks costs of capital which represent the **return expectations of market participants**. Moreover, it is supposed that the estimates of financial analysts reflect the expectations of the capital market.

The concept of **implied cost of capital** gained in momentum recently. For example, it was recognized by the German *Fachausschuss für Unternehmensbewertung* "**FAUB**".[1)] It is acknowledged that implied cost of capital capture the **current capital market situation** and are thus able to reflect the effects of the current **low interest rate environment**.

Furthermore, recent **court rulings** with regards to appraisal proceedings appreciate the use of **implied cost of capital** as they are **forward-looking**.[2)] As of the **reference date**, it offers a more insightful perspective in comparison to the exclusive use of ex-post data.

For the following analysis, we use – simplified to annually – the formula of the Residual Income Valuation Model by *Babbel*:[3)]

$$r_t = \frac{NI_{t+1}}{MC_t} + \left(1 - \frac{BV_t}{MC_t}\right) * g$$

with:

r_t = Cost of equity at period t

NI_{t+1} = Expected net income in the following period t+1

MC_t = Market capitalization at period t

BV_t = Book value of equity at period t

g = Projected growth rate

Through dissolving the models to achieve the cost of capital, we obtain the implied return on equity.[4)] Since *Babbel's* model does not need any explicit assumptions, except for the growth rate, it turns out to be **robust**. We source all data (i.e. the expected annual net income, the market capitalizations, and the company's book value of equity, etc.) of the analyzed companies from the data supplier S&P Capital IQ. Additionally, we apply the European Central Bank target inflation rate of **2.0% as a typified growth rate**.

Henceforth, we determine the **implied market returns** for the entire DAX, ATX and SMI. We consider these indices as a valid approximation for the total markets.[5)] The results build the starting points for the calculations of the **implied market risk premiums** of the three capital markets.

1) cf. Castedello/Jonas/Schieszl/Lenckner, Die Marktrisikoprämie im Niedrigzinsumfeld – Hintergrund und Erläuterung der Empfehlung des FAUB (WPg, 13/2018, p. 806-825).

2) cf. Ruling of the regional court Cologne 02/2018.

3) cf. Babbel, Challenging Stock Prices: Stock prices und implied growth expectations, in: Corporate Finance, N. 9, 2015, p. 316-323, in particular p. 319.

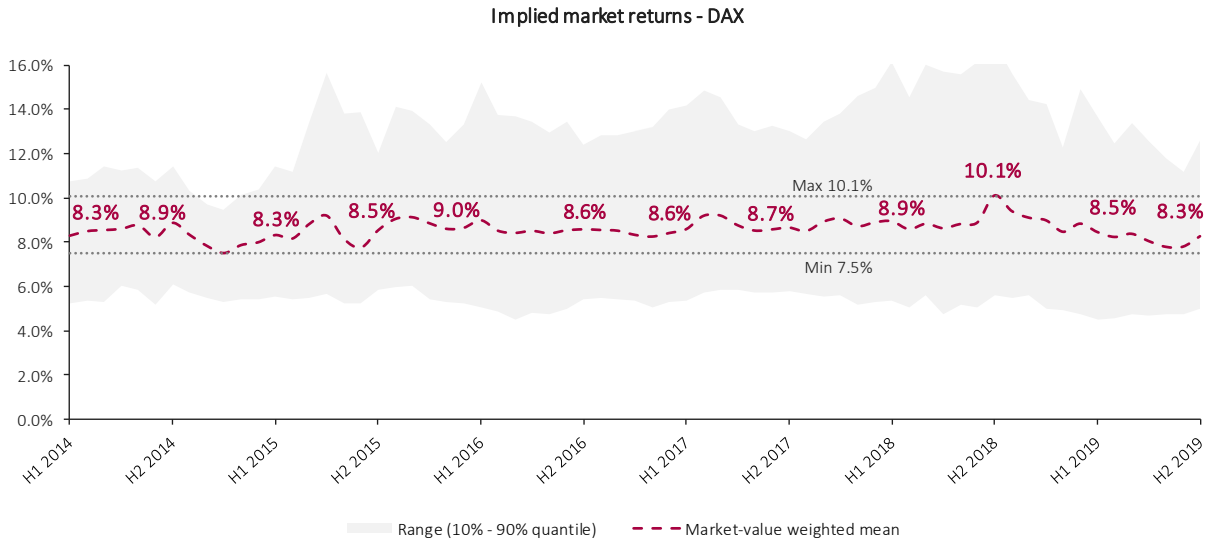
4) cf. Reese, 2007, Estimation of the costs of capital for evaluation purposes; Aders/Aschauer/Dollinger, Die implizite Marktrisikoprämie am österreichischen Kapitalmarkt (RWZ, 6/2016, p. 195-202).

5) Approx. 75% of the total market capitalization (CDAX, WBI, SPI) is covered.

Implied Market Returns
German market – DAX

Implied market returns - DAX

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	2.9%	5.1%	5.3%	5.2%	3.3%	3.4%	2.6%	4.2%	1.0%	2.7%	0.4%	-0.9%
Lower quantile	5.2%	6.1%	5.6%	5.9%	5.0%	5.4%	5.3%	5.8%	5.4%	5.6%	4.5%	5.0%
Median	7.7%	7.8%	7.0%	7.9%	7.6%	7.6%	7.7%	8.0%	7.9%	9.1%	7.8%	7.7%
Arithmetic mean	7.6%	8.3%	7.9%	8.4%	8.7%	8.3%	8.4%	8.4%	8.8%	10.0%	8.3%	8.2%
Market-value weighted mean	**8.3%**	**8.9%**	**8.3%**	**8.5%**	**9.0%**	**8.6%**	**8.6%**	**8.7%**	**8.9%**	**10.1%**	**8.5%**	**8.3%**
Upper quantile	10.7%	11.4%	11.4%	12.0%	15.2%	12.4%	14.3%	13.0%	16.1%	17.5%	13.6%	12.6%
Maximum	11.9%	14.7%	17.0%	18.3%	24.2%	16.3%	16.7%	15.2%	21.5%	20.1%	18.3%	20.0%
Market-value weighted debt	167.5%	175.2%	154.5%	153.6%	200.8%	150.0%	137.0%	123.9%	123.2%	132.3%	124.9%	125.3%



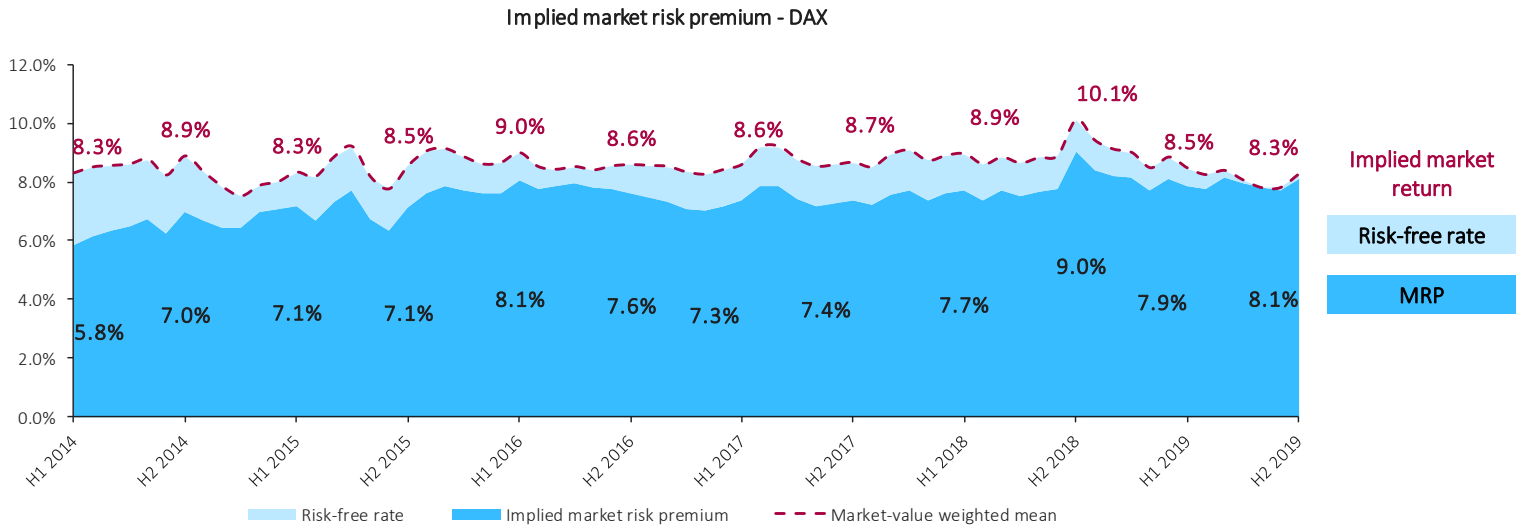
- The implied market return of the German market shows a slightly lower market-value weighted mean of 8.3% as of December 31, 2019 vs. 8.5% as of June 30, 2019.
- Since June 30, 2014, the implied market return fluctuated between 7.5% and 10.1%.
- In comparison to the Swiss market, the German market showed a higher return as of December 31, 2019, while it is lower than the implied Austrian market return.

Implied Market Risk Premium
German market – DAX

Knowing the **implied market return** and the daily measured risk-free rate (cf. slide 12 in this study) of the German capital market, we can determine the **implied market risk premium**.

From June 30, 2014 to December 31, 2019 the **implied market returns** were within the range of **8.3% to 10.1%** (cf. slide 18 in this study). Subtracting the risk-free rate from the implied market return, we derive an **implied market risk premium** within the range of **5.8% to 9.0%.**

The **implied market return stands at 8.3%** as of the reference date December 31, 2019. Taking the **risk-free rate of 0.18%** (cf. slide 13) into account, we determine an **implied market risk premium of 8.1%**. Due to the significant decline of the aggregate market capitalization of the DAX companies in the second half of 2018, the implied market return reached its peak in December 2018. Starting in January 2019 the implied market return normalized to levels seen in the past years due to somewhat lower analyst earnings forecasts and an increased market capitalization of the DAX companies. However, it is important to take also the analysis of historical returns into account when determining the appropriate market risk premium.

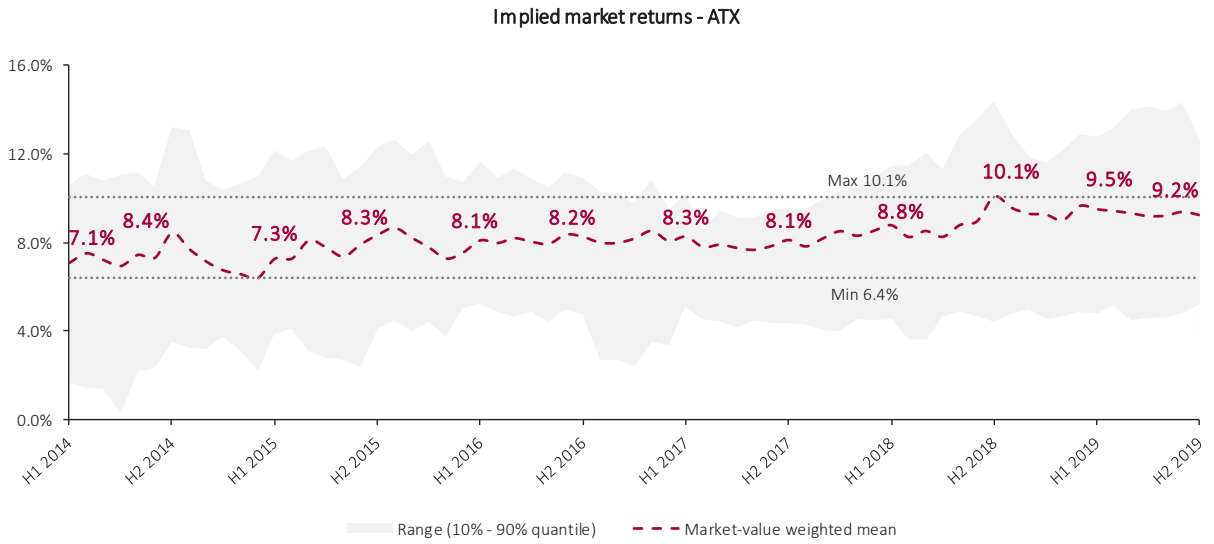


	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
Market-value weighted mean	8.3%	8.9%	8.3%	8.5%	9.0%	8.6%	8.6%	8.7%	8.9%	10.1%	8.5%	8.3%
Risk-free rate	2.5%	1.9%	1.2%	1.4%	0.9%	1.0%	1.2%	1.3%	1.3%	1.1%	0.6%	0.2%
Implied market risk premium - DAX	**5.8%**	**7.0%**	**7.1%**	**7.1%**	**8.1%**	**7.6%**	**7.3%**	**7.4%**	**7.7%**	**9.0%**	**7.9%**	**8.1%**

Implied Market Returns
Austrian market – ATX

Implied market returns - ATX

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0.2%	2.0%	2.0%	3.6%	1.6%	2.1%	1.1%	4.0%	2.8%	4.3%	4.5%	3.8%
Lower quantile	1.6%	3.5%	3.9%	4.1%	5.2%	4.7%	5.1%	4.4%	4.6%	4.4%	4.8%	5.2%
Median	6.4%	7.2%	6.9%	7.7%	8.4%	7.7%	7.7%	7.7%	7.7%	9.8%	9.1%	7.9%
Arithmetic mean	6.4%	7.8%	6.9%	8.0%	8.1%	7.9%	7.5%	7.5%	7.7%	9.6%	9.0%	8.3%
Market-value weighted mean	**7.1%**	**8.4%**	**7.3%**	**8.3%**	**8.1%**	**8.2%**	**8.3%**	**8.1%**	**8.8%**	**10.1%**	**9.5%**	**9.2%**
Upper quantile	10.6%	13.2%	12.1%	12.3%	11.7%	10.9%	10.1%	9.5%	11.5%	14.4%	12.8%	12.6%
Maximum	10.7%	14.4%	13.4%	13.6%	12.3%	11.2%	13.0%	10.3%	12.3%	14.9%	15.1%	14.6%
Market-value weighted debt	136.6%	177.3%	141.8%	149.9%	147.7%	122.7%	101.0%	86.7%	92.3%	99.9%	101.2%	103.8%



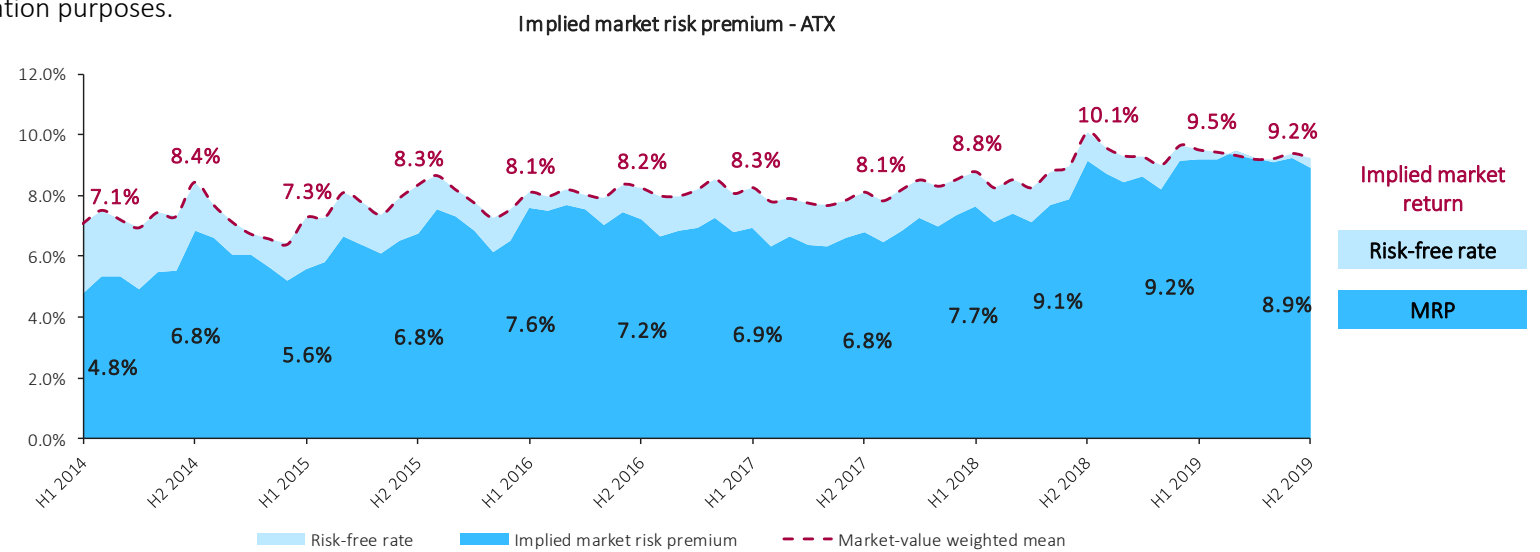
- The implied market return of the Austrian market decreased from 9.5% as of June 30, 2019 to 9.2% as of December 31, 2019 (market-value weighted mean).
- Since June 30, 2014, it fluctuated between 6.4% and 10.1%.
- The Austrian market represents a higher implied return than the German market as of December 31, 2019, while also being significantly above the Swiss one.

Implied Market Risk Premium
Austrian market – ATX

Knowing the **implied market return** and the daily measured risk-free rate (cf. slide 12 in this study) of the Austrian capital market, we can determine the **implied market risk premium**.

From June 30, 2014 to December 31, 2019 the **implied market returns** were within the range of **7.1% to 10.1%** (cf. slide 20 in this study). Subtracting the risk-free rate from the implied market return, we derive a **market risk premium** within the range of **4.8% to 9.2%**.

The **implied market return is at 9.2%** as of the reference date December 31, 2019. Taking the **risk-free rate of 0.34%** (cf. slide 14) into account, we determine an **implied market risk premium of 8.9%**. Due to the significant decline of the aggregate market capitalization of the ATX companies in the second half of 2018, the implied market return reached its peak in December 2018. Starting in January 2019 the implied market return decreased due to somewhat lower analyst earnings forecasts and a slightly increased market capitalization of the ATX companies. However, the implied market return remains high compared to levels observed in the past and it should be noted that it is important to take into account the analysis of historical returns when determining the appropriate market risk premium for valuation purposes.

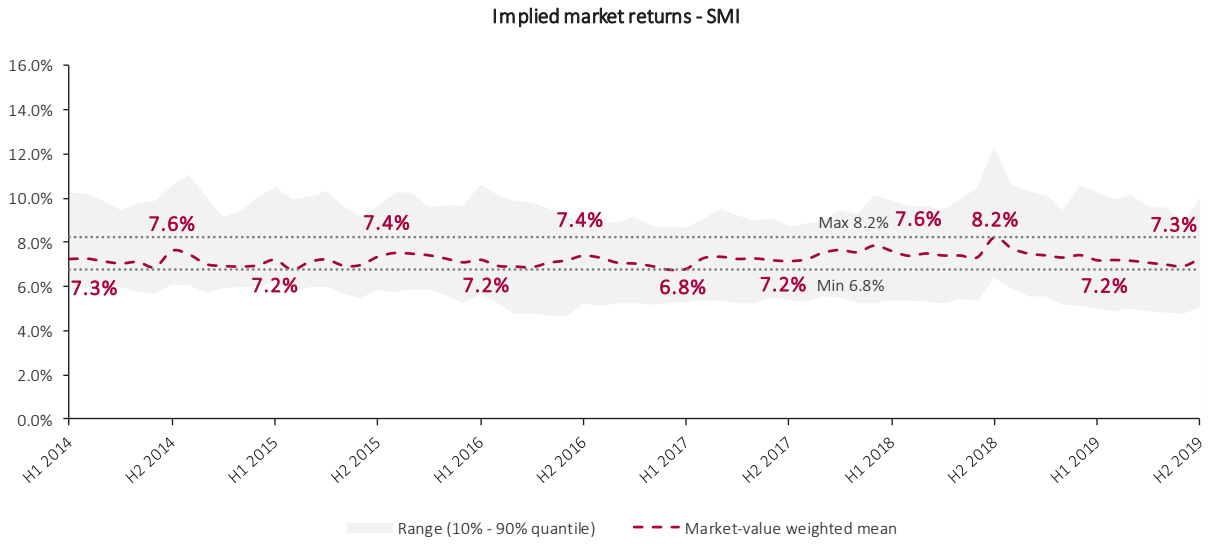


	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
Market-value weighted mean	7.1%	8.4%	7.3%	8.3%	8.1%	8.2%	8.3%	8.1%	8.8%	10.1%	9.5%	9.2%
Risk-free rate	2.3%	1.6%	1.7%	1.6%	0.5%	1.0%	1.3%	1.3%	1.1%	0.9%	0.3%	0.3%
Implied market risk premium - ATX	**4.8%**	**6.8%**	**5.6%**	**6.8%**	**7.6%**	**7.2%**	**6.9%**	**6.8%**	**7.7%**	**9.1%**	**9.2%**	**8.9%**

Implied Market Returns
Swiss market – SMI

Implied market returns - SMI

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	5.8%	5.7%	6.0%	5.4%	5.2%	4.5%	5.0%	5.4%	5.3%	5.9%	3.6%	4.2%
Lower quantile	5.9%	6.1%	6.2%	5.9%	5.7%	5.3%	5.3%	5.4%	5.4%	6.4%	5.0%	5.0%
Median	7.4%	7.9%	7.3%	7.7%	7.2%	7.4%	6.3%	7.0%	7.8%	8.1%	7.1%	7.1%
Arithmetic mean	7.5%	7.9%	7.6%	7.6%	7.5%	7.2%	6.8%	7.0%	7.6%	8.7%	7.1%	7.1%
Market-value weighted mean	**7.3%**	**7.6%**	**7.2%**	**7.4%**	**7.2%**	**7.4%**	**6.8%**	**7.2%**	**7.6%**	**8.2%**	**7.2%**	**7.3%**
Upper quantile	10.2%	10.6%	10.5%	9.6%	10.6%	9.1%	8.6%	8.7%	9.9%	12.4%	10.2%	10.0%
Maximum	10.4%	11.0%	10.6%	10.1%	11.0%	9.4%	8.7%	9.1%	10.8%	12.7%	10.3%	10.7%
Market-value weighted debt	81.0%	85.7%	78.3%	74.1%	87.7%	79.4%	71.3%	68.7%	73.3%	73.9%	63.0%	60.9%



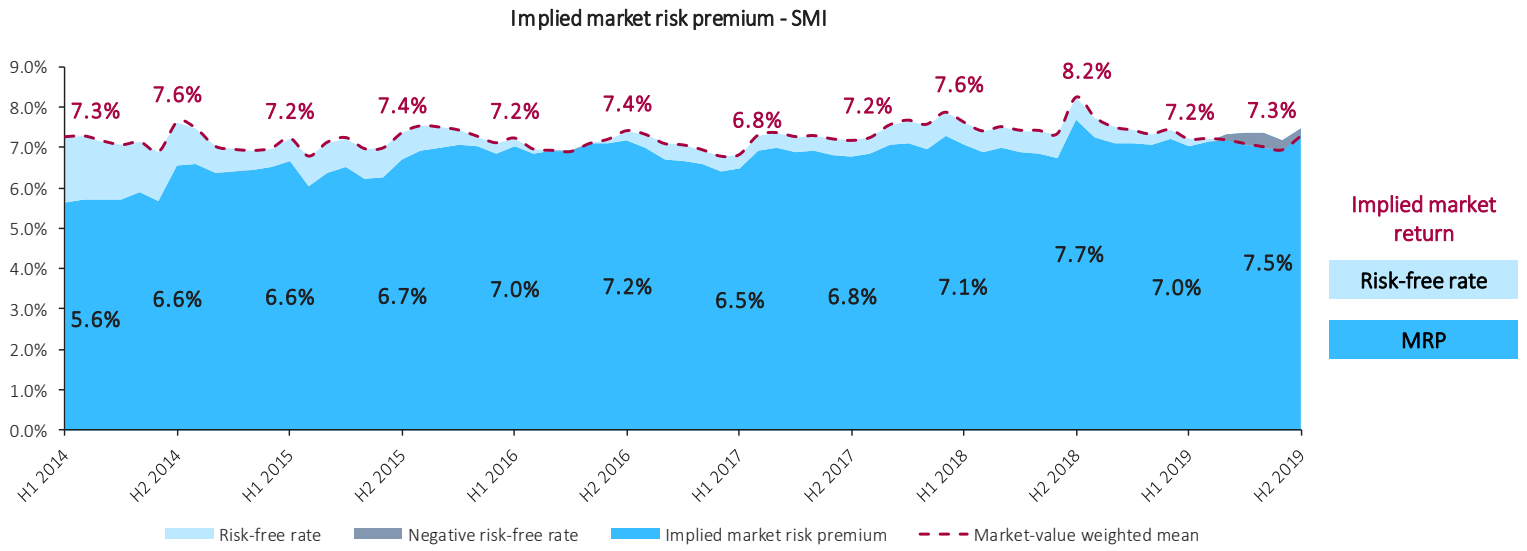
- The market-value weighted mean of the implied market return of the Swiss market stayed nearly constant with 7.2% as of June 30, 2019 and 7.3% as of December 31, 2019.
- Since June 30, 2014, it fluctuated between 6.8% and 8.2%.
- Compared to the German and Austrian market, the Swiss market represents the lowest return as of December 31, 2019.

Implied Market Risk Premium
Swiss market – SMI

Knowing the **implied market return** and the daily measured risk-free rate (cf. slide 12 in this study) of the Swiss capital market, we can determine the **implied market risk premium**.

From June 30, 2014 to December 31, 2019 the **implied market returns** fluctuated in a bandwidth between **6.8% and 8.2%** (cf. slide 22 in this study). Subtracting the risk-free rate from the implied market return, we derive an **implied market risk premium** of **5.6% to 7.7%.**

The **implied market return is at 7.3%** as of the reference date December 31, 2019. Taking the **risk-free rate of -0.20%** (cf. slide 15) into account, we determine an **implied market risk premium of 7.5%.** To determine the appropriate market risk premium for valuation purposes, it is important to take also the analysis of historical returns into account.



	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
Market-value weighted mean	7.3%	7.6%	7.2%	7.4%	7.2%	7.4%	6.8%	7.2%	7.6%	8.2%	7.2%	7.3%
Risk-free rate	1.6%	1.1%	0.6%	0.7%	0.2%	0.2%	0.3%	0.4%	0.6%	0.5%	0.2%	-0.2%
Implied market risk premium - SMI	**5.6%**	**6.6%**	**6.6%**	**6.7%**	**7.0%**	**7.2%**	**6.5%**	**6.8%**	**7.1%**	**7.7%**	**7.0%**	**7.5%**

4 Market returns and market risk premium

b. Historical returns (ex-post analysis)

Historical Market Returns
Background & approach

Besides analyzing the implied market returns through the ex-ante analysis, we also analyze **historical (ex-post) returns**. Once this analysis is performed over a **long-term observation period**, an expected **return potential** of the German, Austrian and Swiss capital markets is assessable. Therefore, the analysis of historical returns can be used for **plausibility checks of the costs of capital**, more specifically **return requirements**, which were evaluated through the CAPM.

To further enable a precise analysis of the historical returns of the German, Austrian and Swiss capital markets, we use the so-called **return triangle**.[1)] It helps to present the **annually realized returns** from **different investment periods** in a simple and understandable way. Especially the **different buying and selling points in time** and the different annual holding periods are being illustrated comprehensively. To calculate the **average annual returns** over several years, we use both the **geometric and arithmetic mean**.

In this study, we analyze the so-called **total shareholder returns,** which include the **returns on investments** and the **dividend yields**. For our analysis, it is needful to focus on **total return indices** because they include the price and dividend yields. Since **DAX** is a performance index, we already have an index which includes the price and dividend yields. The ATX and SMI only include the price yields, hence we need their specific total return indices. The relevant total return index for Austria is called the **ATX Total Return** and for Switzerland **SMI Total Return**. The composition of both indices are identical to the ATX and the SMI and compromise 20 companies each.

The observation period amounts to 25 years. Therefore, the earliest data of the **DAX and the ATX Total Return** is from the end of 1994. However, the data of the **SMI Total Return** starts from the end of 1995. All ex-post returns are being calculated by using the **data as of the reference date December 31.**

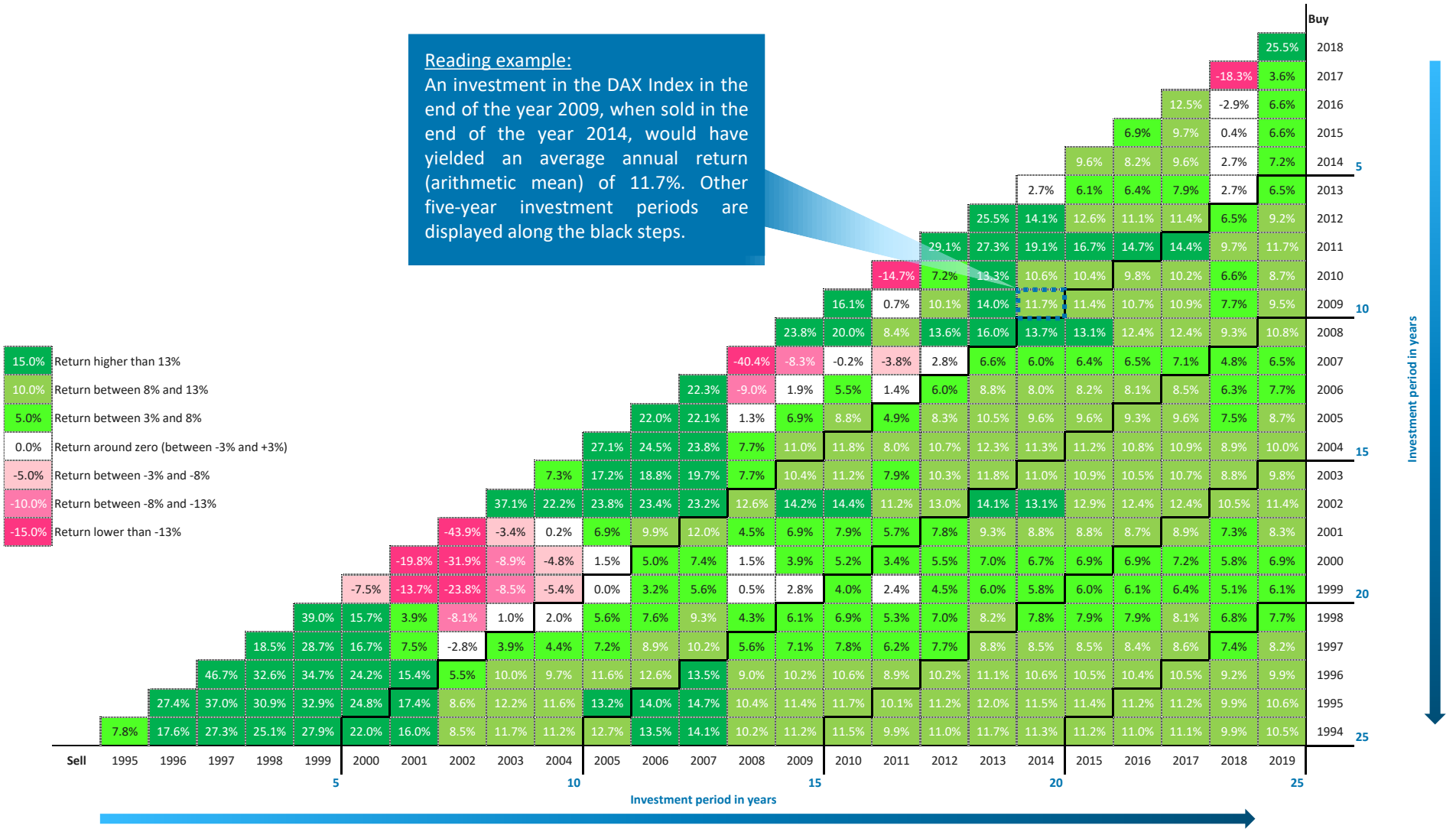
The following slides illustrate how the two calculation methods (arithmetic and geometric) differ from each other for the period between December 31, 1994 and December 31, 2019:

- DAX:
  - the **arithmetic mean** of the historical market returns is **10.5%**
  - the **geometric mean** of the historical market returns is **7.7%**
- ATX:
  - the **arithmetic mean** of the historical market returns is **10.8%**
  - the **geometric mean** of the historical market returns is **7.1%**
- SMI (December 31, 1995 and December 31, 2019):
  - the **arithmetic mean** of the historical market returns is **9.8%**
  - the **geometric mean** of the historical market returns is **7.8%**

1) The German Stock Institute e.V. (DAI) developed the return triangle for DAX and EURO STOXX.

Historical Market Returns (Arithmetic Mean) – German Market

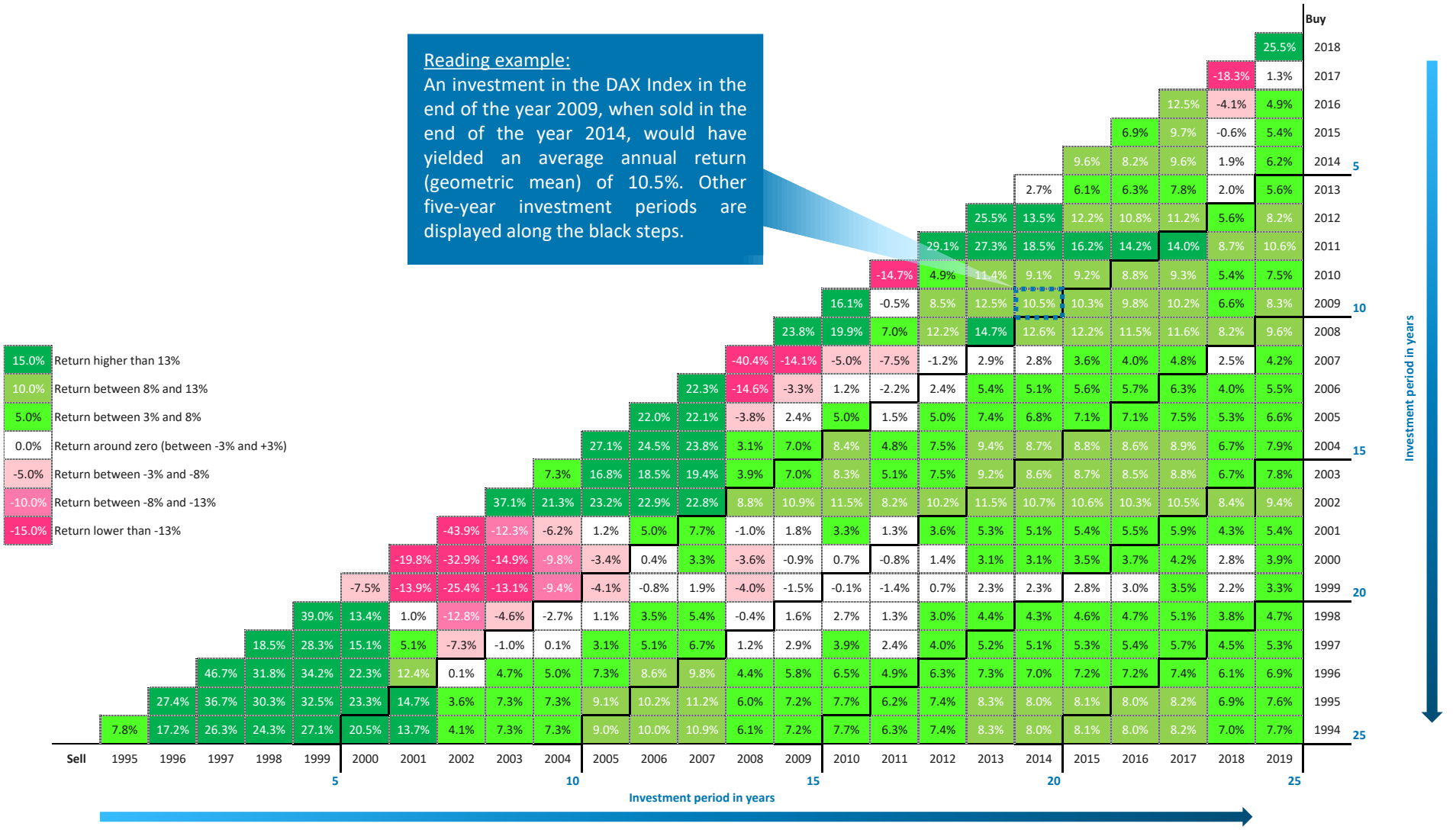
DAX Performance Index Return Triangle



Following: https://www.dai.de/files/dai_usercontent/dokumente/renditedreieck/2015-12-31%20DAX-Rendite-Dreieck%2050%20Jahre%20Web.pdf.

Historical Market Returns (Geometric Mean) – German Market

DAX Performance Index Return Triangle



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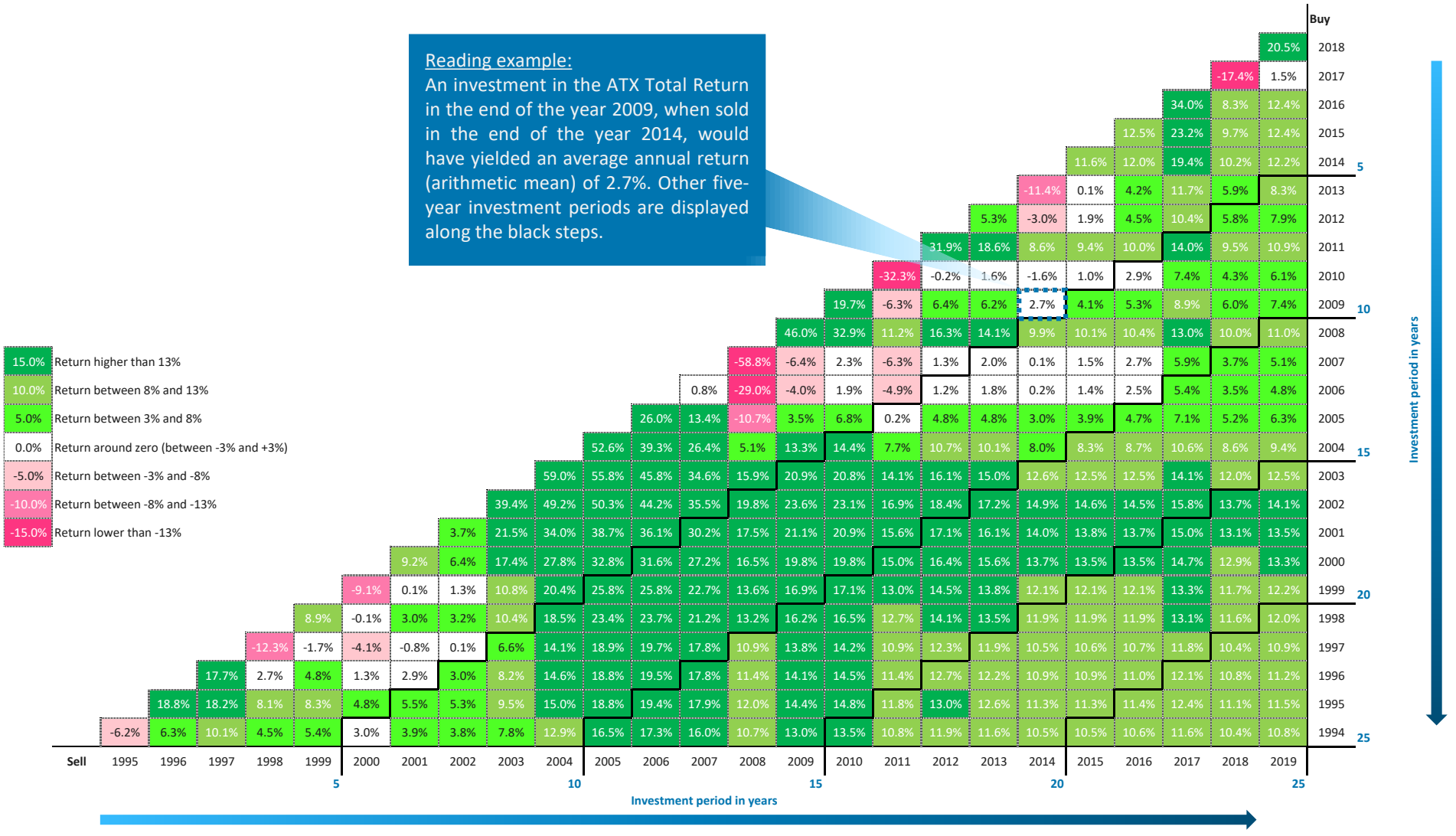
Historical Market Returns (Arithmetic Mean) – Austrian Market

ATX Total Return Index Return Triangle



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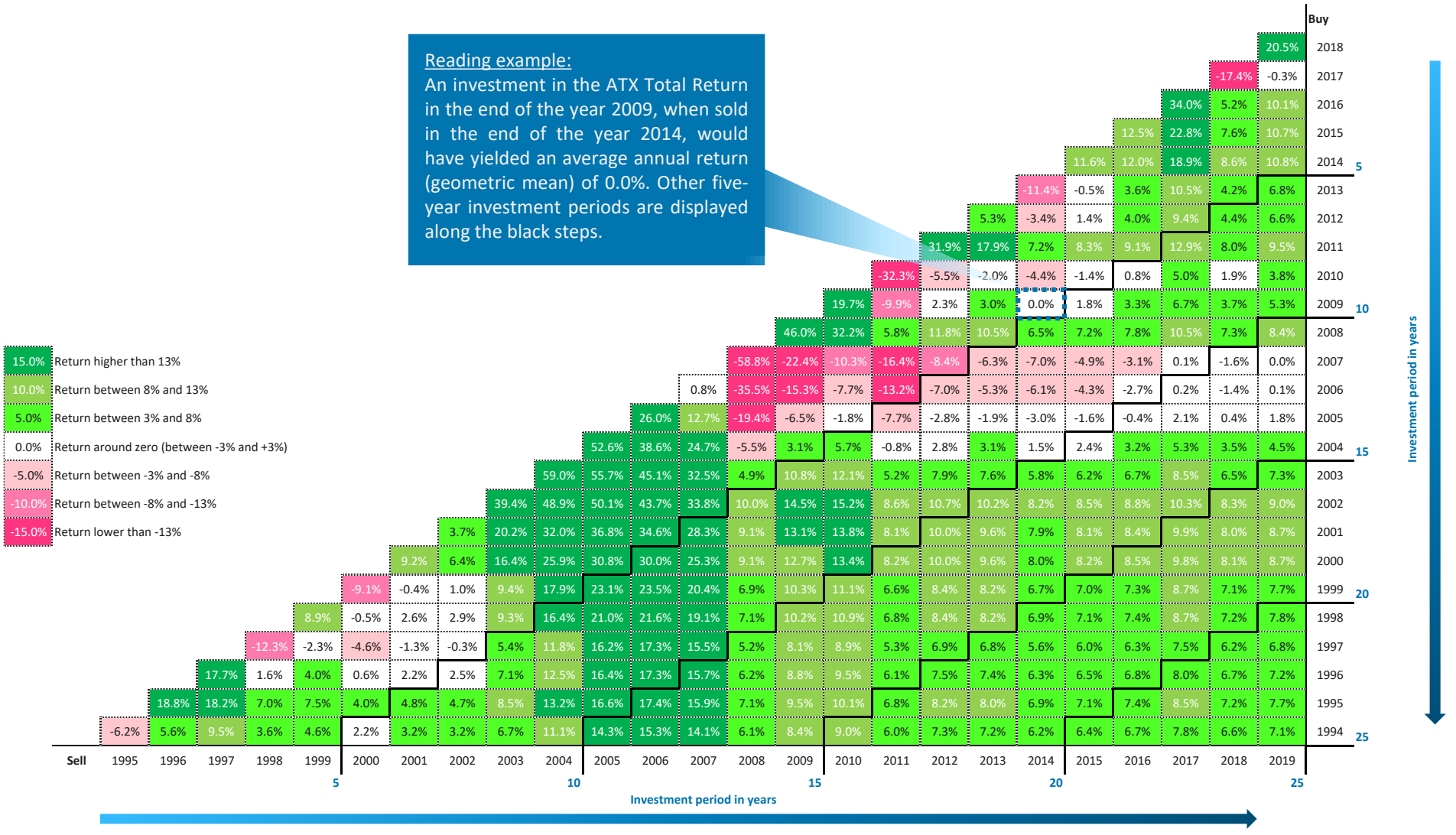
Historical Market Returns (Geometric Mean) – Austrian Market

ATX Total Return Index Return Triangle



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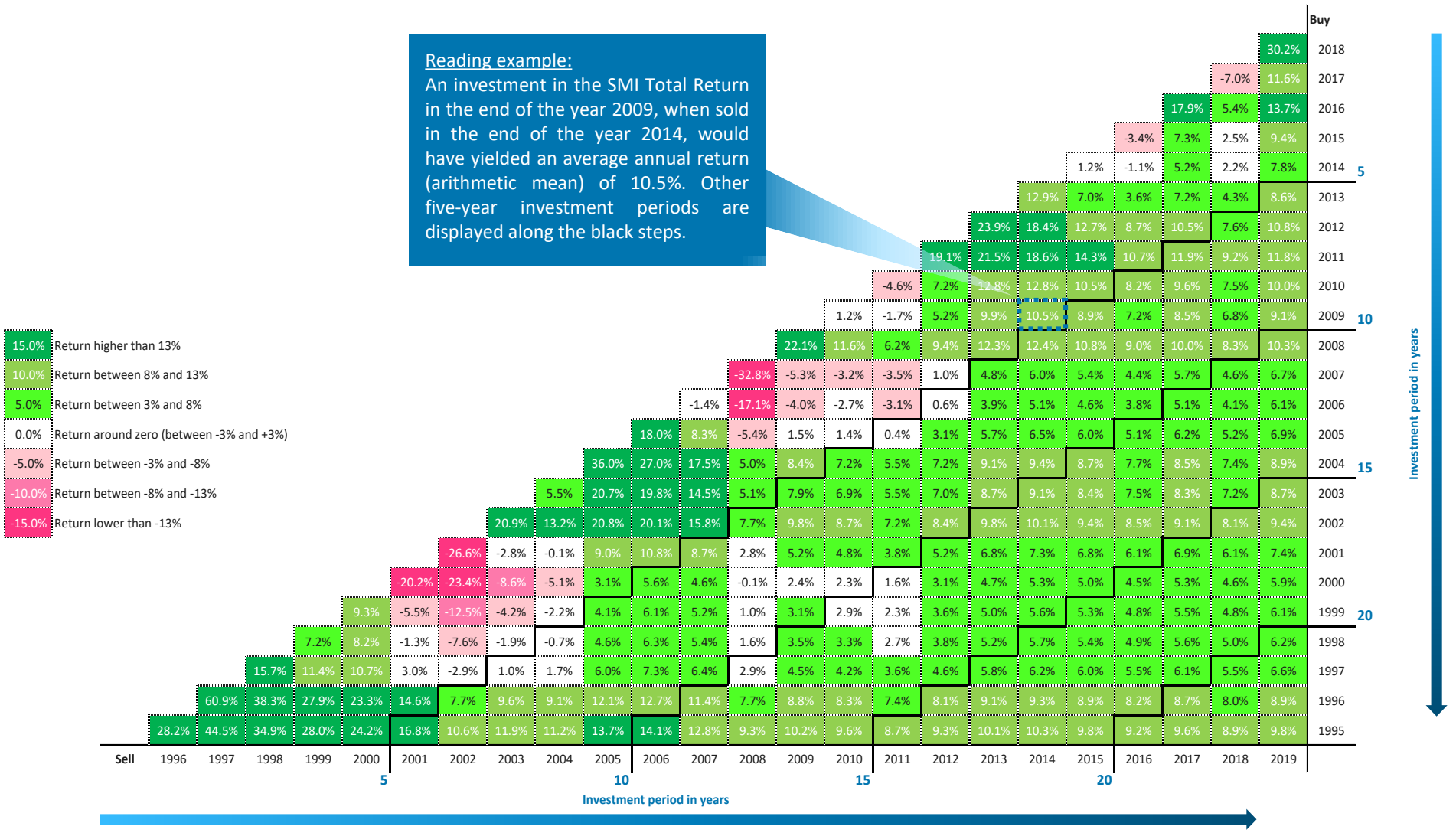
Historical Market Returns (Arithmetic Mean) – Swiss Market

SMI Total Return Index Return Triangle



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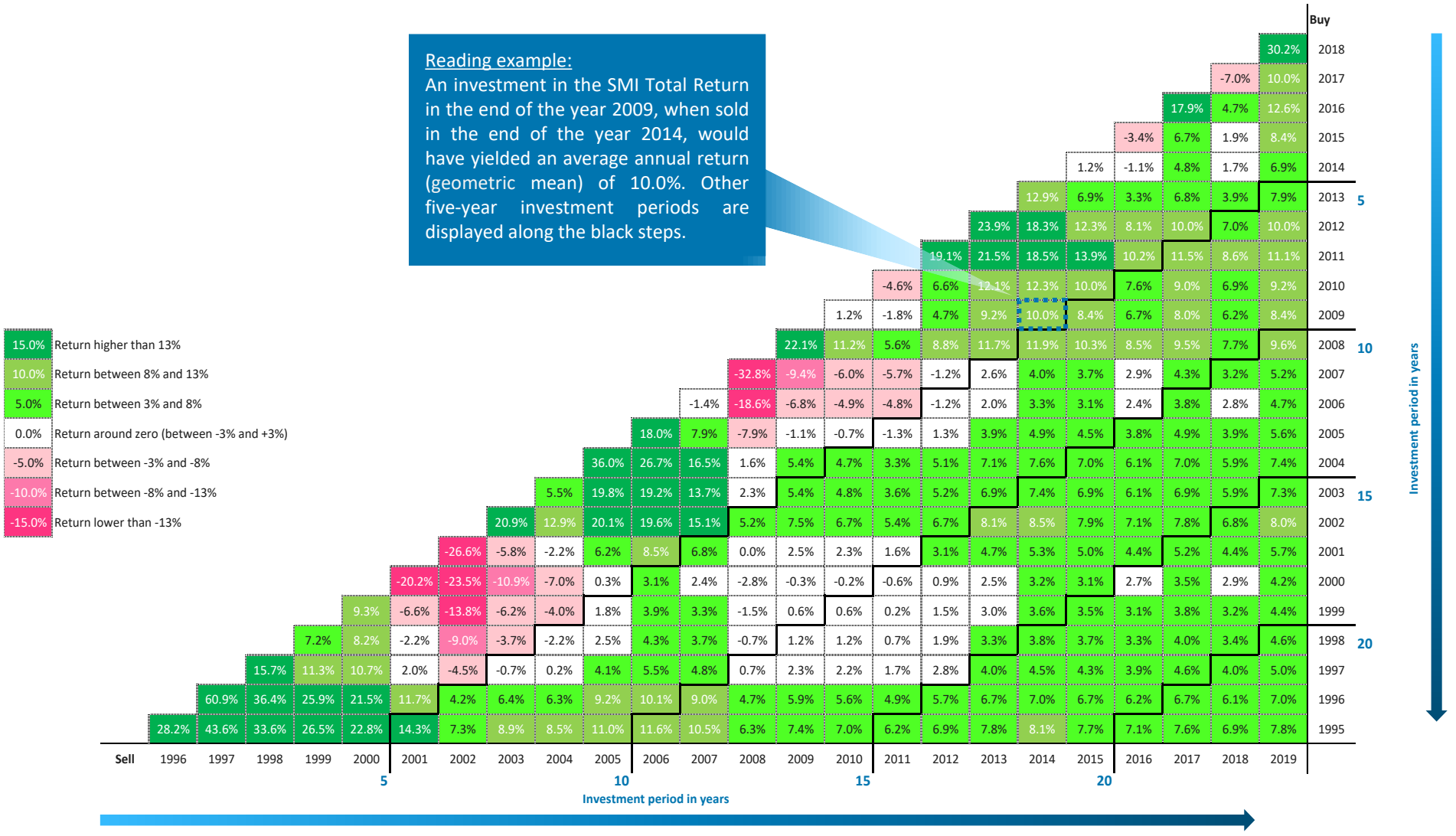
Historical Market Returns (Geometric Mean) – Swiss Market

SMI Total Return Index Return Triangle



Following: https://www.dai.de/files/dai_usercontent/dokumente/renditedreieck/2015-12-31%20DAX-Rendite-Dreieck%2050%20Jahre%20Web.pdf.

5 Sector classification of the DACH region

based on finexpert *sector indices*

finexpert Sector Indices of the DACH Region

Methodology & approach

The finexpert sector indices aim to cover the **whole capital market of the DACH region**. Therefore, this capital market study contains all equities of the **German Composite DAX Index (CDAX)**, **Vienna Stock Exchange Index (WBI)** and **Swiss Performance Index (SPI)**. These three indices contain all shares listed on the **Official** and **Semi-Official Market**.

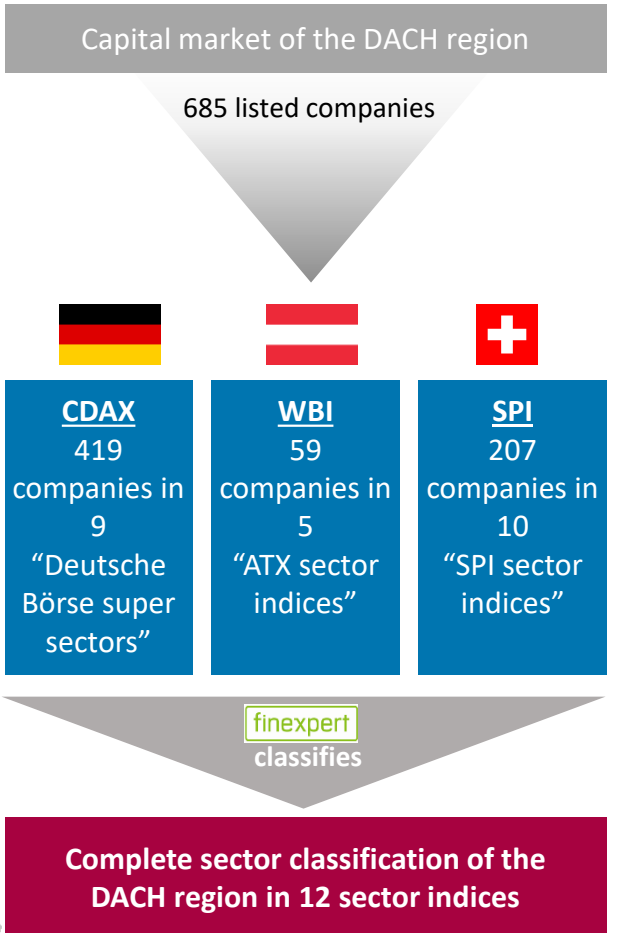
The **685 public companies**, which are listed in the mentioned indices as of December 31, 2019, build the base for the **sector classification** and the **subsequent analyses**:

- The German DAX Sector All Index includes 419 companies listed in the Prime Standard and General Standard and is classified into nine "Deutsche Börse super sectors".
- The Austrian ATX only has sector five indices, ValueTrust assigns the remaining companies of the WBI to the classified sector indices.
- The Swiss SPI contains ten sector indices that comprise 207 companies.

Eventually, finexpert merged all three market indices and the respective sector index classification into twelve finexpert sector indices, so-called "super sectors."

The **twelve sector indices** for this study are defined as follows:

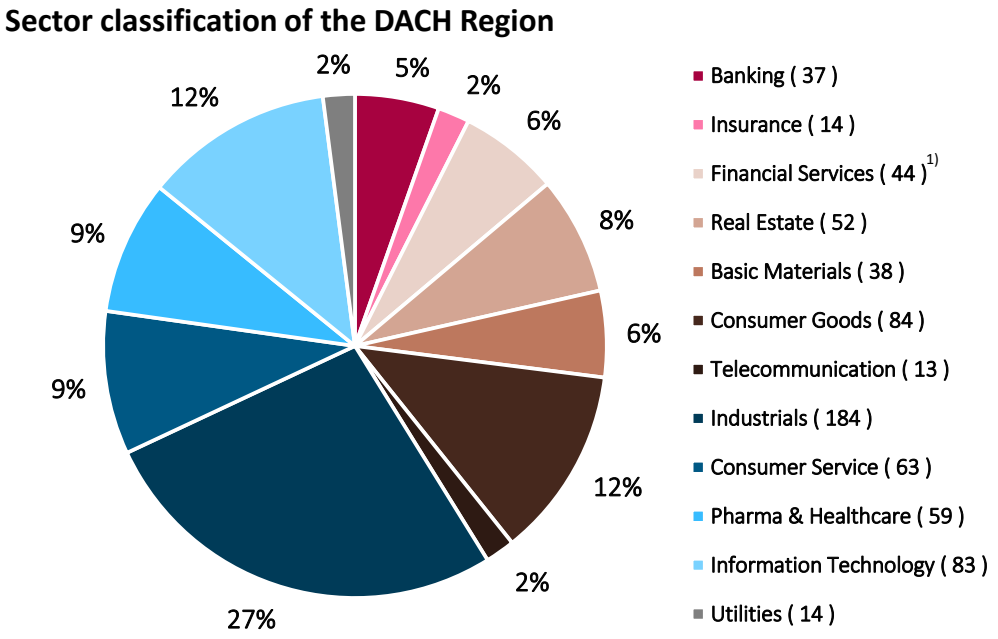
- Banking
- Insurance
- Financial Services
- Real Estate
- Basic Materials
- Consumer Goods
- Telecommunication
- Industrials
- Consumer Service
- Pharma & Healthcare
- Information Technology
- Utilities



1) The DAX Sector All Index contains all equities listed in the Prime and General Standard as well as in the Scale segment of the Frankfurt stock exchange.

finexpert Sector Indices of the DACH Region as of December 31, 2019

Sector distribution and number of companies



The chart shows the percentage distribution of the 685 listed companies in the twelve "super sectors" (the absolute number of companies is displayed in parentheses).

The twelve defined sectors can be classified in **three different dimensions**.

- nine different sectors represent a proportion of less than 10%,
- two represent a share between 10% and 20%,
- and one represents a portion of more than 20%.

Companies within the **Industrials, Information Technology and Consumer Goods sectors,** hence, represent **more than 50%** of the entire market.

1) Including asset managers, leasing firms and distribution companies for financial products.

6 Betas

Betas
Background & approach

Beta is used in the **CAPM** and is also known as the beta coefficient or beta factor. Beta is a measure of **systematic risk** of a security of a specific company (**company beta**) or a specific sector (**sector beta**) in comparison to the market. A beta of less than 1 means that the security is theoretically less **volatile** than the market. A beta of greater than 1 indicates that the security's price is more volatile than the market.

Beta factors are estimated based on **historical returns of securities** in comparison to an **approximate market portfolio**. Since the company valuation is **forward-looking**, it has to be examined whether or what potential risk factors prevailing in the past do also apply for the future. By valuing non-listed companies or companies without meaningful share price performance, it is common to use a beta factor from a group of comparable companies ("**peer group beta**"), a suitable sector ("**sector beta**") or one single listed company in the capital market with a similar business model and a similar risk profile ("**pure play beta**"). Within this capital market study we have used **sector betas** which are computed as **arithmetic means of the statistically significant beta factors of all companies** of a particular sector.

The estimation of beta factors is usually accomplished through a **linear regression analysis**. We use the CDAX, WBI, and SPI as country specific reference indices.

Furthermore, it is important to set a time period for which the data is collected (**benchmark period**) and whether daily, weekly or monthly returns (**return interval**) are analyzed. In practice, it is common to use **observation periods of two years** with the regression of **weekly returns** or a **five-year observation period** with the regression of **monthly returns**. Both alternatives are displayed in our study.

In the CAPM, company specific **risk premiums** include not only **business** risk, but also financial **risk**. The beta factor for levered companies ("**levered beta**") is usually higher compared to a company with an identical business model but without debt (due to financial risk). Hence, **changes in the capital structure** require an **adjustment of the betas** and therefore of the company specific risk premiums.

In order to calculate the **unlevered beta,** adjustment formulas have been developed. We prefer to use the **adjustment formula by Harris/Pringle** which assumes a value-based financing policy, stock-flow adjustments without time delay, uncertain tax shields and a so-called **debt beta**. We calculate the debt beta based on the respective company's rating or the average sector rating (if a company's rating is not available) through the application of the **credit spread** derived from the expected cost of debt. We do not adjust the credit spread for unsystematic risks. The capital market data, in particular historical market prices, is provided by the data supplier S&P Capital IQ.

Betas

Sector specific levered and unlevered betas as of December 31, 2019 (1/2)

Sector	Number of companies[1] 5-y. m. / 2-y. w.	Aggregation	Beta levered[1] 5-years 2019-2015 monthly	Beta levered[1] 2-years 2019-2018 weekly	Debt ratio[2] 5-years 2019-2015 monthly	Debt ratio[2] 2-years 2019-2018 weekly	Debt Beta 5-years 2019-2015 monthly	Debt Beta 2-years 2019-2018 weekly	Beta unlevered 5-years 2019-2015 monthly	Beta unlevered 2-years 2019-2018 weekly
		Median	0.77	0.86	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic Mean	**0.88**	**0.91**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Banking[3]	25 / 28	Market-Value Weighted Mean	1.24	1.12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.89	0.85	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic mean	**0.82**	**0.80**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Insurance[3]	13 / 13	Market-value weighted mean	0.83	0.86	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.99	0.81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic mean	**1.11**	**0.88**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Financial Services[3]	15 / 19	Market-value weighted mean	1.16	1.05	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.53	0.47	45%	43%	0.30	0.30	0.40	0.40
		Arithmetic mean	**0.64**	**0.50**	**58%**	**53%**	**0.32**	**0.32**	**0.45**	**0.41**
Real Estate	26 / 27	Market-value weighted mean	0.54	0.45	48%	44%	0.31	0.31	0.43	0.39
		Median	1.03	1.14	31%	30%	0.35	0.35	0.87	0.87
		Arithmetic mean	**1.09**	**1.16**	**35%**	**36%**	**0.37**	**0.37**	**0.87**	**0.89**
Basic Materials	29 / 30	Market-value weighted mean	1.13	1.21	28%	30%	0.25	0.25	0.89	0.92
		Median	0.94	0.81	23%	22%	0.20	0.20	0.66	0.61
		Arithmetic mean	**1.02**	**0.93**	**37%**	**36%**	**0.20**	**0.21**	**0.74**	**0.70**
Consumer Goods	45 / 51	Market-value weighted mean	0.99	0.92	39%	42%	0.18	0.18	0.70	0.65

1) Statistically not significant (t-test, confidence interval: 95%) betas are not being considered. Consequently, the number of companies is decreased.

2) The debt ratio corresponds to the debt-to-total capital ratio.

3) No display of debt illustration for the sectors Banking, Insurance and Financial Services. We refrained from adjustments of the companies' specific debt (unlevered) because indebtedness is part of the companies' operational activities and economic risk. Therefore, a separation of operational and financial obligations is not possible. In addition, e.g. bank specific regulations about the minimum capital within financial institutions let us assume that the indebtedness degree is widely comparable. For that reason, it is possible to renounce the adaptation of levered betas.

Betas

Sector specific levered and unlevered betas as of December 31, 2019 (2/2)

Sector	Number of companies[1] 5-y. m. / 2-y. w.	Aggregation	Beta levered[1] 5-years 2019-2015 monthly	Beta levered[1] 2-years 2019-2018 weekly	Debt ratio[2] 5-years 2019-2015 monthly	Debt ratio[2] 2-years 2019-2018 weekly	Debt Beta 5-years 2019-2015 monthly	Debt Beta 2-years 2019-2018 weekly	Beta unlevered 5-years 2019-2015 monthly	Beta unlevered 2-years 2019-2018 weekly
		Median	0.71	0.64	18%	24%	0.18	0.18	0.65	0.52
		Arithmetic mean	**0.85**	**0.70**	**26%**	**27%**	**0.19**	**0.19**	**0.73**	**0.58**
Telecommunication	10 / 13	Market-value weighted mean	0.56	0.60	41%	42%	0.19	0.19	0.42	0.45
		Median	0.99	1.14	19%	17%	0.30	0.30	0.83	0.88
		Arithmetic mean	**1.03**	**1.13**	**35%**	**99%**	**0.32**	**0.32**	**0.85**	**0.92**
Industrials	125 / 139	Market-value weighted mean	1.05	1.12	30%	29%	0.26	0.27	0.85	0.91
		Median	0.85	0.84	15%	17%	0.32	0.32	0.69	0.70
		Arithmetic mean	**0.96**	**0.89**	**24%**	**27%**	**0.33**	**0.34**	**0.82**	**0.78**
Consumer Service	33 / 38	Market-value weighted mean	0.92	0.84	16%	17%	0.33	0.33	0.85	0.77
		Median	0.98	1.05	9%	9%	0.19	0.19	0.85	1.00
		Arithmetic mean	**1.03**	**1.09**	**18%**	**12%**	**0.21**	**0.21**	**0.91**	**0.99**
Pharma & Healthcare	37 / 44	Market-value weighted mean	0.94	1.01	17%	15%	0.16	0.17	0.83	0.89
		Median	0.94	1.02	9%	10%	0.19	0.19	0.82	0.91
		Arithmetic mean	**1.05**	**1.10**	**20%**	**18%**	**0.19**	**0.19**	**0.90**	**0.97**
Information Technology	51 / 63	Market-value weighted mean	1.06	1.18	10%	10%	0.17	0.18	0.97	1.09
		Median	0.70	0.55	50%	44%	0.19	0.19	0.50	0.36
		Arithmetic mean	**0.74**	**0.53**	**55%**	**45%**	**0.19**	**0.19**	**0.50**	**0.40**
Utilities	5 / 10	Market-value weighted mean	0.79	0.52	46%	43%	0.20	0.20	0.55	0.40
DACH[3]		Market-value weighted mean	**0.98**	**0.99**						

1) Statistically not significant (t-test, confidence interval: 95%) beta factors are not being considered. Consequently, the number of the companies decreased.

2) The debt ratio corresponds to the debt-to-total capital ratio.

3) The market-value weighted mean of the levered beta for all DACH companies deviates slightly from 1 due to the exclusion of statistically insignificant betas.

7 Sector returns

a. Implied returns (ex-ante analysis)

Implied Sector Returns
Background & approach

Besides the future-oriented calculation of **implied market returns** (cf. slide 16 et seq.), we calculate **implied returns for sectors**. That offers an **alternative** and simplification to the **ex-post analysis** of the company's costs of capital via the **CAPM**. Using this approach, the calculation of sector betas via regression analyses is not necessary.

The **implied sector returns** shown on the following slides can be used as an **indicator** for the **sector specific levered costs of equity**. Those already consider a **sector specific leverage**. Because of this, another simplification is to renounce making adjustments with regards to the capital structure risk.

Comparable to the calculation of the implied market returns, the following return calculations are based on the Residual Income Valuation Model by *Babbel.*[1)] The required data (i.e. net income, market capitalization, and book values of equity) are sourced from the data provider S&P Capital IQ. Regarding the profit growth, we assume a growth rate of 2.0%.

We unlever the implied returns with the following **adjusting equation** for the **costs of equity**[2)] to take the specific leverage into account:[3)]

$$k_E^L = k_E^U + \left(k_E^U - R_f\right) * \frac{D}{E}$$

with:

k_E^L = Levered cost of equity

k_E^U = Unlevered cost of equity

R_f = Risk-free rate

$\frac{D}{E}$ = Debt[4)] -to-equity ratio

The **implied unlevered sector returns** serve as an indicator for an **aggregated** and **unlevered cost of equity** for **specific sectors**. The process of relevering a company's cost of capital to reflect a company specific debt situation (cf. calculation example on the next slide) can be worked out without using the CAPM.

1) cf. Babbel, Challenging Stock Prices: Share prices and implied growth expectations (Corporate Finance, n. 9, 2015, p. 316-323, especially p. 319); cf. Aders/Aschauer/Dollinger, Die implizite Marktrisikoprämie am österreichischen Kapitalmarkt (RWZ, 6/2016, p. 195-202).

2) In situations in which the debt betas in the market are distorted, we would have to adjust these betas to avoid unsystematic risks. For simplification reasons, we deviate from our typical analysis strategy to achieve the enterprise value (Debt beta > 0) and assume that the costs of debt are at the level of the risk-free rate. This process is designed by the so-called Practitioners formula (uncertain tax shields, debt beta = 0), cf. Pratt/Grabowski, Cost of Capital, 5th ed., 2014, p. 253.

3) We assume that the cash and cash equivalents are used entirely for operational purposes. Consequently, we do not deduct excess cash from the debt.

4) "Debt" is defined as all interest-bearing liabilities. The debt illustration of the companies in the Banking, Insurance and Financial Services sector only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic risk.

Implied Sector Returns

Exemplary calculation to adjust for the company specific capital structure

Calculation example:

As of the reference date December 31, 2019, we observe a sector specific, unlevered cost of equity of **5.3%** (market-value weighted mean) of an exemplary company X, which operates in the German Basic Materials sector. The following assumptions have been made:

- The debt-to-equity ratio of the exemplary company X: **40%**
- The risk-free rate: **0.18%** (cf. slide 12)

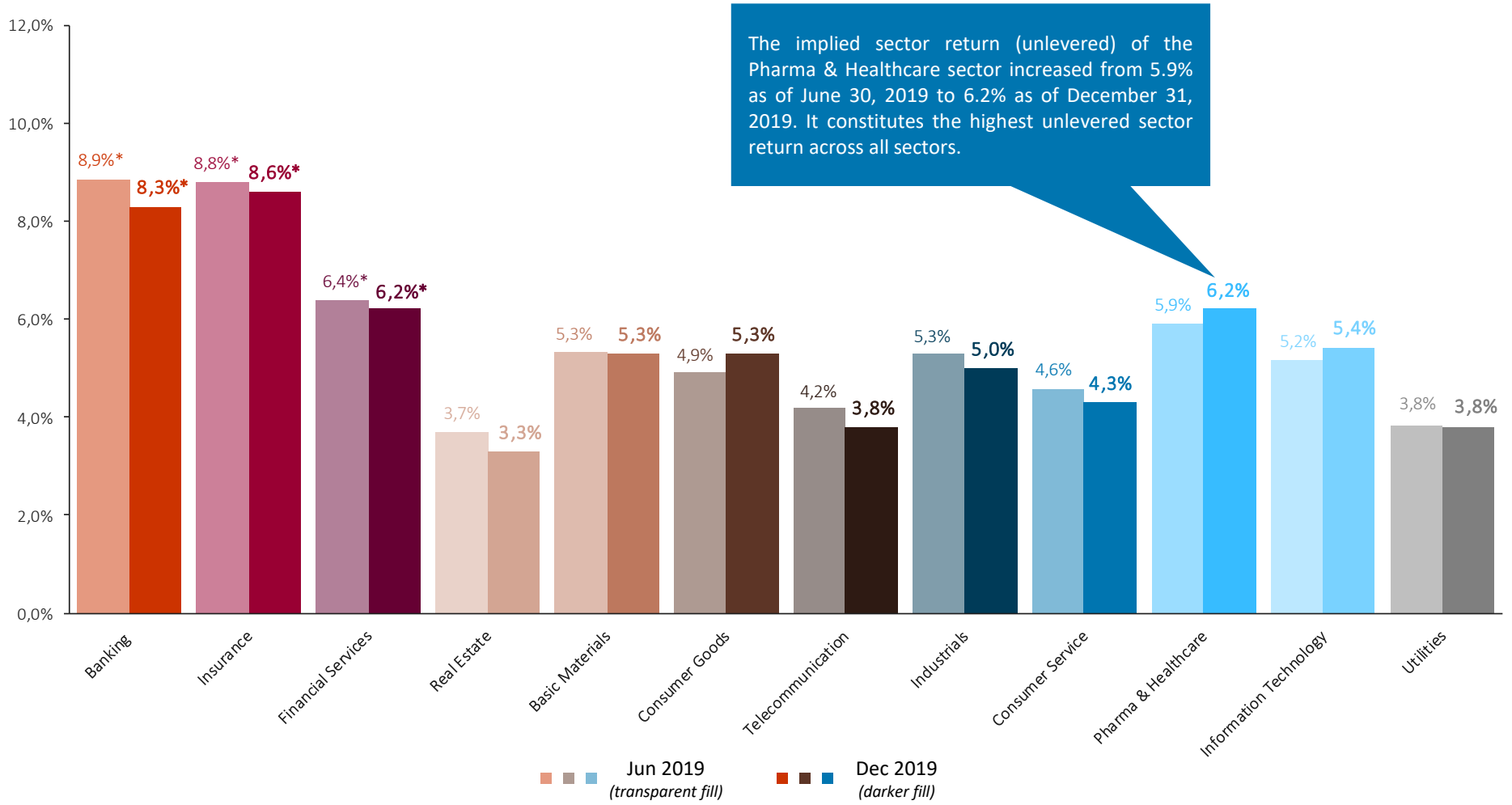
Based on these numbers, we calculate the relevered costs of equity of company X with the adjustment formula:

$$\mathbf{k_E^L} = 5.3\% + (5.3\% - 0.18\%) * 40\% = 7.3\%$$

Thus, **7.3%** is the company's relevered cost of equity. In comparison, the levered cost of equity of the Basic Materials sector is **8.0%**, reflecting the sectors' higher average leverage.

Implied Sector Returns (unlevered)*

Overview as of December 31, 2019 vs. June 30, 2019



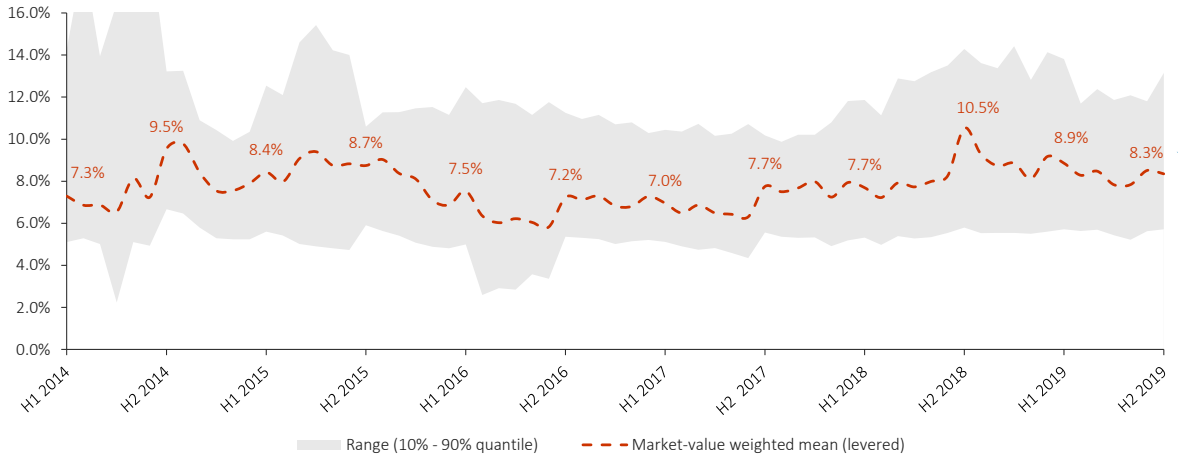
* The returns for the sectors Banking, Insurance and Financial Services are levered sector returns. For all other sectors unlevered returns are displayed.

Implied Sector Returns
Banking

Implied sector returns (levered) - DACH - Banking

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	2.9%	6.2%	5.2%	4.8%	3.3%	3.5%	2.6%	4.1%	0.9%	2.7%	0.4%	-0.9%
Lower quantile	5.1%	6.7%	5.6%	5.9%	5.0%	5.4%	5.1%	5.6%	5.3%	5.8%	5.7%	5.7%
Median	7.9%	8.8%	7.7%	8.4%	7.0%	6.6%	6.6%	7.2%	7.5%	10.1%	8.9%	7.4%
Arithmetic mean	9.1%	10.3%	8.4%	9.0%	8.5%	8.0%	7.6%	8.0%	8.1%	10.1%	8.9%	8.2%
Market-value weighted mean	**7.3%**	**9.5%**	**8.4%**	**8.7%**	**7.5%**	**7.2%**	**7.0%**	**7.7%**	**7.7%**	**10.5%**	**8.9%**	**8.3%**
Upper quantile	14.3%	13.2%	12.5%	10.6%	12.5%	11.3%	10.4%	10.2%	11.9%	14.3%	13.8%	13.1%
Maximum	35.3%	38.6%	21.8%	29.4%	24.3%	24.3%	23.2%	21.1%	22.4%	23.2%	22.0%	14.6%
Market-value weighted debt	1068.3%	1157.7%	881.6%	896.6%	1432.2%	931.8%	792.0%	658.5%	731.9%	852.6%	852.6%	727.1%

Implied sector returns - DACH - Banking



- The implied sector return in the banking sector amounts to 8.3% as of December 31, 2019.
- Thus, the implied sector return has further normalized after a peak of 10.5% in December 31, 2018.

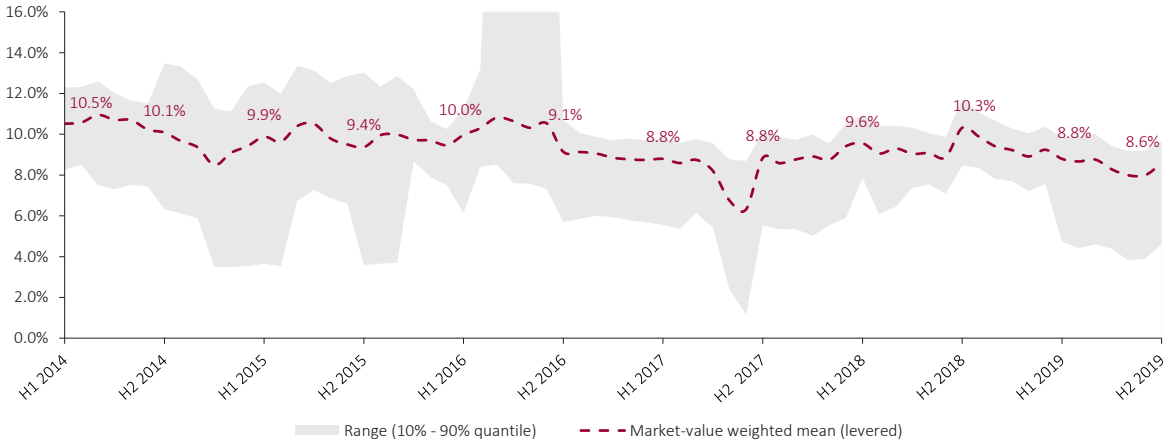
Note: The debt illustration of the companies in the Banking, Insurance and Financial Services sectors only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic risk (cf. slide 37 and 40).

Implied Sector Returns
Insurance

Implied sector returns (levered) - DACH - Insurance

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	7.9%	5.1%	1.8%	1.5%	4.8%	4.2%	4.3%	4.7%	5.4%	8.3%	3.7%	3.5%
Lower quantile	8.3%	6.3%	3.6%	3.6%	6.2%	5.7%	5.6%	5.5%	7.9%	8.4%	4.7%	4.6%
Median	10.3%	10.0%	10.0%	9.3%	9.3%	9.1%	8.5%	8.8%	9.0%	10.0%	8.5%	8.1%
Arithmetic mean	10.4%	10.0%	9.4%	9.2%	9.4%	9.0%	8.3%	8.4%	9.1%	9.9%	8.2%	7.9%
Market-value weighted mean	**10.5%**	**10.1%**	**9.9%**	**9.4%**	**10.0%**	**9.1%**	**8.8%**	**8.8%**	**9.6%**	**10.3%**	**8.8%**	**8.6%**
Upper quantile	12.3%	13.5%	12.5%	13.0%	11.2%	10.7%	9.8%	10.1%	10.9%	11.7%	9.8%	9.6%
Maximum	12.8%	14.4%	13.4%	13.6%	11.4%	10.8%	10.1%	10.4%	11.1%	12.0%	10.0%	9.7%
Market-value weighted debt	49.1%	54.0%	48.0%	56.2%	61.4%	53.1%	42.8%	48.2%	46.8%	41.0%	39.4%	33.8%

Implied sector returns - DACH - Insurance



- The implied sector return in the insurance sector decreased from 8.8% as of June 30, 2019 to 8.6% as of December 31, 2019.
- Over the course of time, the market-value weighted mean of the implied sector return fluctuated between 8.6% and 10.5%.

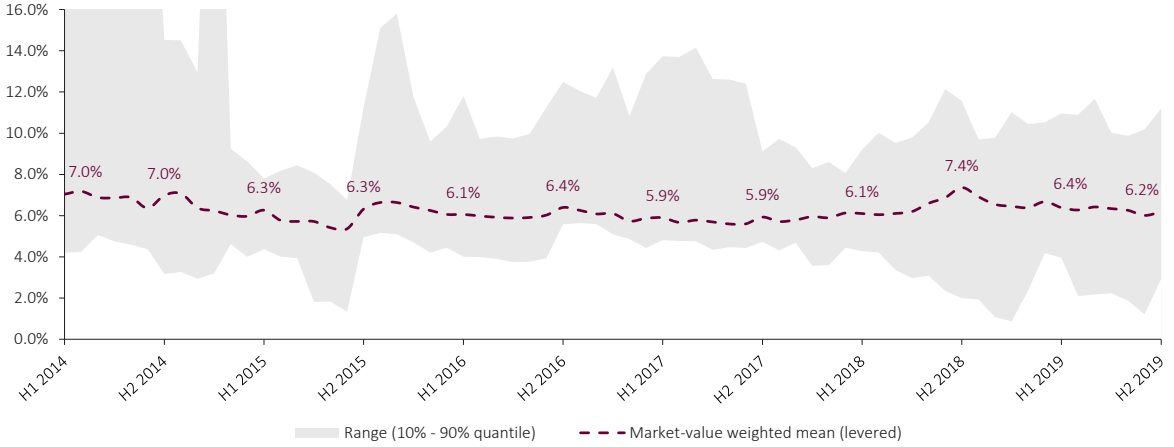
Note: The debt illustration of the companies in the Banking, Insurance and Financial Services sectors only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic risk (cf. slide 37 and 40).

Implied Sector Returns
Financial Services

Implied sector returns (levered) - DACH - Financial Services

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.5%	0.4%	3.1%	4.6%	3.8%	5.1%	3.6%	4.6%	3.4%	1.9%	0.8%	1.9%
Lower quantile	4.2%	3.2%	4.4%	5.0%	4.0%	5.6%	4.8%	4.7%	4.3%	2.0%	4.0%	2.9%
Median	7.0%	7.8%	6.3%	6.4%	6.7%	7.1%	6.0%	6.7%	6.9%	7.2%	6.6%	5.8%
Arithmetic mean	8.8%	8.2%	8.8%	7.4%	7.1%	7.8%	7.4%	7.0%	7.1%	7.3%	7.4%	6.6%
Market-value weighted mean	**7.0%**	**7.0%**	**6.3%**	**6.3%**	**6.1%**	**6.4%**	**5.9%**	**5.9%**	**6.1%**	**7.4%**	**6.4%**	**6.2%**
Upper quantile	19.6%	14.5%	7.8%	11.3%	11.8%	12.5%	13.7%	9.1%	9.2%	11.6%	10.9%	11.2%
Maximum	32.4%	15.8%	55.8%	15.2%	12.0%	14.9%	14.2%	13.0%	16.9%	17.1%	20.9%	12.7%
Market-value weighted debt	72.8%	68.2%	58.3%	49.4%	58.3%	59.8%	55.4%	44.4%	46.3%	59.9%	62.5%	37.3%

Implied sector returns - DACH - Financial Services



- The implied market return in the Financial Services sector decreased from 6.4% as of June 30, 2019 to 6.2% as of December 31, 2019.
- Since the beginning of 2014, the market-value weighted mean fluctuated between 5.9% and 7.4%.

Note: The debt illustration of the companies in the Banking, Insurance and Financial Services sectors only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic risk (cf. slide 37 and 40).

Implied Sector Returns
Real Estate (table)

Implied sector returns (levered) - DACH - Real Estate

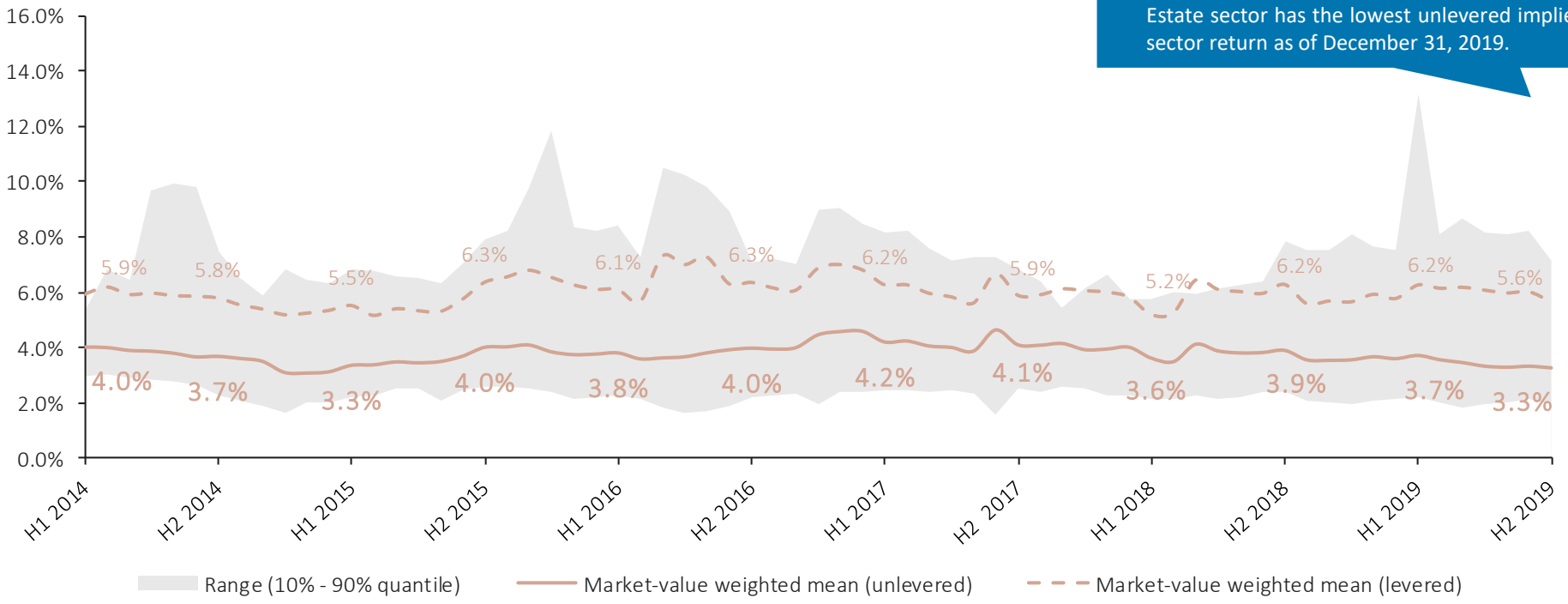
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	2.7%	1.9%	2.5%	2.2%	1.6%	1.5%	-0.2%	3.1%	2.9%	1.7%	2.9%	1.9%
Lower quantile	3.8%	3.2%	3.3%	3.6%	3.4%	3.2%	3.2%	3.8%	3.0%	3.3%	3.7%	3.2%
Median	6.2%	6.2%	5.9%	6.4%	6.4%	6.7%	6.5%	6.1%	5.2%	6.5%	7.7%	5.7%
Arithmetic mean	6.6%	7.9%	7.3%	7.9%	7.6%	7.9%	7.0%	7.0%	6.0%	7.8%	9.2%	7.7%
Market-value weighted mean	**5.9%**	**5.8%**	**5.5%**	**6.3%**	**6.1%**	**6.3%**	**6.2%**	**5.9%**	**5.2%**	**6.2%**	**6.2%**	**5.6%**
Upper quantile	10.2%	14.1%	16.6%	15.9%	15.3%	18.0%	12.4%	11.4%	10.1%	14.7%	14.9%	13.7%
Maximum	14.3%	32.5%	25.4%	17.2%	19.5%	32.4%	20.4%	21.8%	14.6%	23.5%	44.8%	19.8%
Market-value weighted debt	116.3%	109.3%	112.6%	97.5%	91.6%	90.4%	83.6%	76.9%	84.0%	83.3%	83.7%	77.6%

Implied sector returns (unlevered) - DACH - Real Estate

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	2.5%	1.9%	1.5%	2.1%	1.2%	1.6%	0.8%	2.3%	2.0%	1.4%	1.8%	1.3%
Lower quantile	3.0%	2.2%	2.2%	2.6%	2.3%	2.2%	2.5%	2.5%	2.2%	2.4%	2.2%	1.9%
Median	4.0%	3.7%	3.3%	3.8%	3.4%	3.4%	3.7%	3.6%	3.3%	3.9%	4.3%	3.3%
Arithmetic mean	4.1%	4.5%	3.8%	4.8%	4.4%	4.7%	4.6%	4.6%	3.7%	4.5%	5.1%	4.0%
Market-value weighted mean	**4.0%**	**3.7%**	**3.3%**	**4.0%**	**3.8%**	**4.0%**	**4.2%**	**4.1%**	**3.6%**	**3.9%**	**3.7%**	**3.3%**
Upper quantile	5.3%	7.5%	6.8%	7.9%	8.4%	7.1%	8.2%	6.8%	5.7%	7.9%	13.2%	7.2%
Maximum	8.0%	20.0%	7.4%	14.2%	17.4%	17.5%	16.8%	17.9%	6.1%	10.4%	13.7%	8.7%
Market-value weighted debt	116.3%	109.3%	112.6%	97.5%	91.6%	90.4%	83.6%	76.9%	84.0%	83.3%	83.7%	77.6%

Implied Sector Returns
Real Estate (chart)

- The implied market return (unlevered) in the Real Estate sector decreased from 3.7% as of June 30, 2019 to 3.3% as of December 31, 2019.
- In comparison to the other sectors, the Real Estate sector has the lowest unlevered implied sector return as of December 31, 2019.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Basic Materials (table)

Implied sector returns (levered) - DACH - Basic Materials

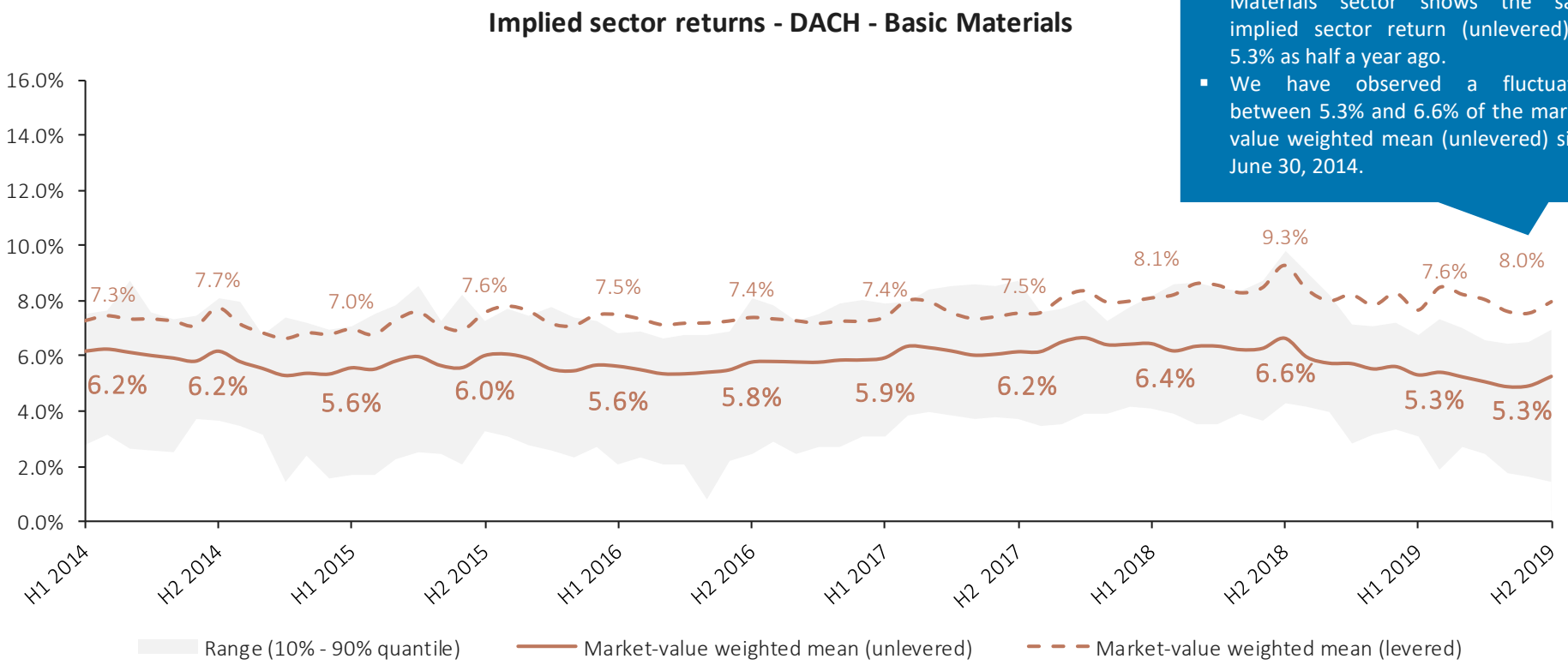
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	-1.8%	0.2%	1.3%	3.6%	0.4%	2.1%	0.6%	1.3%	1.9%	4.9%	2.3%	0.6%
Lower quantile	3.2%	3.8%	1.9%	4.7%	2.6%	4.1%	4.4%	3.3%	4.7%	5.9%	5.0%	4.4%
Median	6.2%	7.6%	6.2%	7.7%	7.6%	6.8%	6.8%	7.0%	7.7%	10.0%	8.4%	7.4%
Arithmetic mean	9.0%	7.8%	6.2%	8.1%	6.7%	7.3%	6.9%	7.6%	8.2%	10.1%	8.1%	7.3%
Market-value weighted mean	**7.3%**	**7.7%**	**7.0%**	**7.6%**	**7.5%**	**7.4%**	**7.4%**	**7.5%**	**8.1%**	**9.3%**	**7.6%**	**8.0%**
Upper quantile	10.1%	11.8%	9.1%	11.1%	9.2%	9.4%	10.6%	9.8%	12.9%	14.5%	11.7%	11.4%
Maximum	73.2%	20.4%	9.9%	20.4%	11.0%	23.3%	13.9%	31.3%	16.8%	19.6%	13.8%	15.1%
Market-value weighted debt	33.0%	38.3%	35.2%	34.9%	43.5%	35.0%	31.9%	29.2%	32.3%	45.8%	45.5%	55.2%

Implied sector returns (unlevered) - DACH - Basic Materials

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0.9%	1.9%	1.2%	2.6%	0.5%	1.9%	0.9%	2.0%	1.7%	3.1%	1.5%	0.4%
Lower quantile	2.7%	3.6%	1.7%	3.3%	2.1%	2.4%	3.1%	3.7%	4.1%	4.3%	3.1%	1.5%
Median	5.4%	5.9%	5.0%	5.7%	5.4%	5.3%	5.2%	5.9%	5.6%	6.8%	5.3%	5.0%
Arithmetic mean	7.4%	5.9%	4.9%	5.7%	5.0%	5.4%	5.3%	6.0%	5.9%	6.6%	5.1%	4.5%
Market-value weighted mean	**6.2%**	**6.2%**	**5.6%**	**6.0%**	**5.6%**	**5.8%**	**5.9%**	**6.2%**	**6.4%**	**6.6%**	**5.3%**	**5.3%**
Upper quantile	7.5%	8.1%	7.1%	7.3%	6.8%	8.1%	7.9%	8.7%	8.1%	9.8%	6.8%	6.9%
Maximum	57.6%	12.6%	8.3%	12.1%	8.9%	15.0%	9.0%	15.3%	13.0%	11.1%	8.0%	7.5%
Market-value weighted debt	33.0%	38.3%	35.2%	34.9%	43.5%	35.0%	31.9%	29.2%	32.3%	45.8%	45.5%	55.2%

Implied Sector Returns
Basic Materials (chart)

- As of December 31, 2019 the Basic Materials sector shows the same implied sector return (unlevered) of 5.3% as half a year ago.
- We have observed a fluctuation between 5.3% and 6.6% of the market-value weighted mean (unlevered) since June 30, 2014.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Consumer Goods (table)

Implied sector returns (levered) - DACH - Consumer Goods

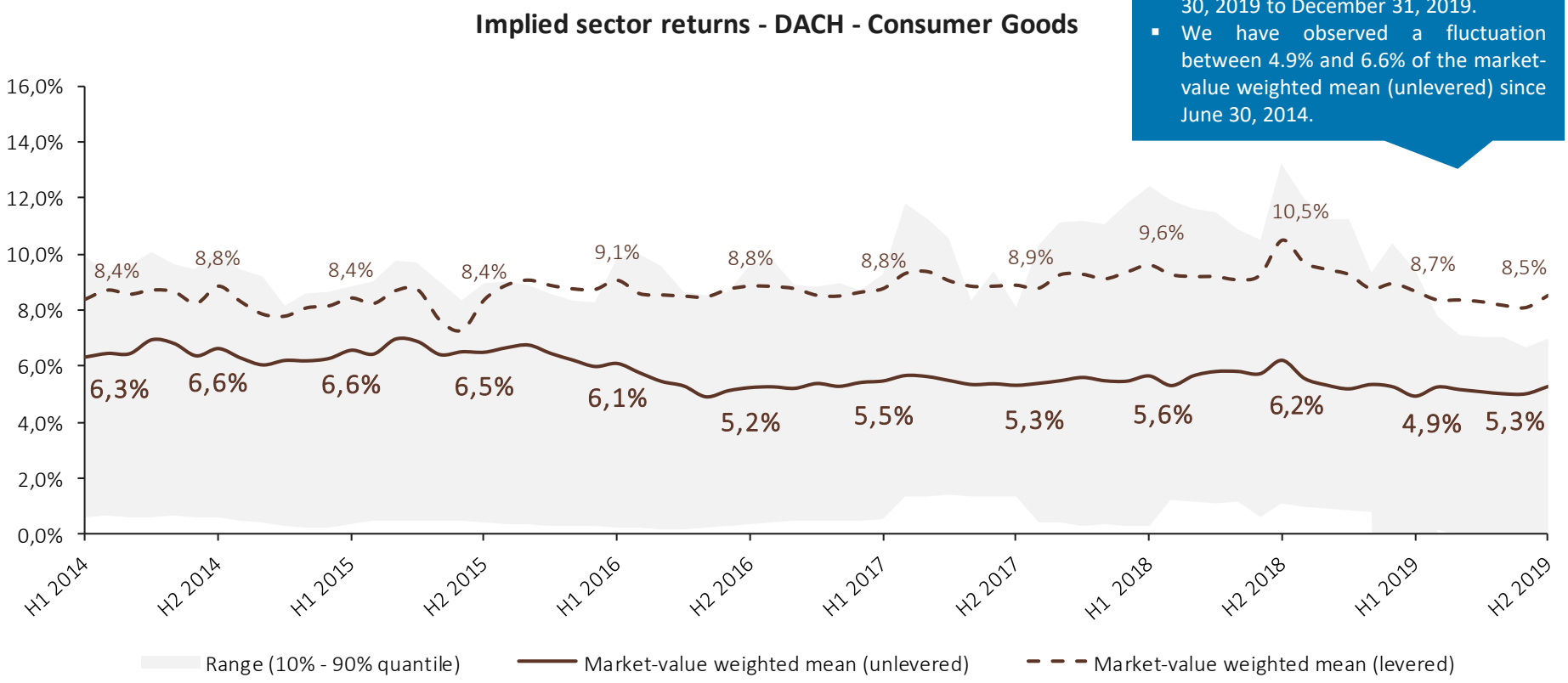
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	1.3%	2.2%	0.5%	2.1%	2.6%	2.5%	2.0%	1.7%	1.8%	2.3%	-26.5%	-1.4%
Lower quantile	4.8%	4.5%	4.6%	4.4%	4.7%	4.8%	3.4%	4.7%	4.3%	4.8%	3.4%	3.7%
Median	8.0%	7.9%	7.6%	7.9%	7.5%	7.6%	6.9%	7.3%	7.3%	9.0%	7.4%	6.9%
Arithmetic mean	11.2%	8.0%	7.4%	7.8%	8.5%	8.1%	7.4%	7.7%	8.0%	10.0%	7.4%	7.7%
Market-value weighted mean	**8.4%**	**8.8%**	**8.4%**	**8.4%**	**9.1%**	**8.8%**	**8.8%**	**8.9%**	**9.6%**	**10.5%**	**8.7%**	**8.5%**
Upper quantile	11.8%	11.3%	10.2%	11.2%	14.7%	12.8%	12.2%	11.7%	14.6%	17.4%	13.6%	12.8%
Maximum	113.8%	16.6%	15.1%	13.4%	21.3%	16.8%	18.9%	16.7%	22.7%	25.0%	21.9%	20.0%
Market-value weighted debt	58.0%	60.6%	59.8%	61.4%	79.6%	70.0%	67.9%	67.4%	75.1%	85.6%	80.7%	82.3%

Implied sector returns (unlevered) - DACH - Consumer Goods

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0,6%	0,6%	0,3%	0,4%	0,2%	0,4%	0,5%	1,3%	0,3%	1,1%	-21,0%	-0,8%
Lower quantile	3,8%	2,3%	2,5%	3,0%	3,0%	2,9%	2,1%	3,0%	1,3%	1,3%	0,6%	2,1%
Median	5,8%	5,7%	5,0%	5,2%	5,2%	5,1%	4,7%	5,5%	5,1%	5,6%	4,6%	4,5%
Arithmetic mean	7,6%	6,5%	5,8%	6,0%	6,1%	5,9%	5,6%	5,7%	5,8%	6,8%	4,4%	4,8%
Market-value weighted mean	**6,3%**	**6,6%**	**6,6%**	**6,5%**	**6,1%**	**5,2%**	**5,5%**	**5,3%**	**5,6%**	**6,2%**	**4,9%**	**5,3%**
Upper quantile	9,9%	10,1%	8,8%	9,0%	9,9%	9,6%	9,3%	8,1%	12,4%	13,2%	9,5%	7,0%
Maximum	44,8%	12,0%	11,1%	10,6%	13,3%	13,3%	14,6%	12,6%	15,1%	17,4%	12,1%	20,0%
Market-value weighted debt	58,0%	60,6%	59,8%	61,4%	79,6%	70,0%	67,9%	67,4%	75,1%	85,6%	80,7%	82,3%

Implied Sector Returns
Consumer Goods (chart)

- The implied sector return (unlevered) of the Consumer Goods sector increased from 4.9% to 5.3% from June 30, 2019 to December 31, 2019.
- We have observed a fluctuation between 4.9% and 6.6% of the market-value weighted mean (unlevered) since June 30, 2014.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Telecommunication (table)

Implied sector returns (levered) - DACH - Telecommunication

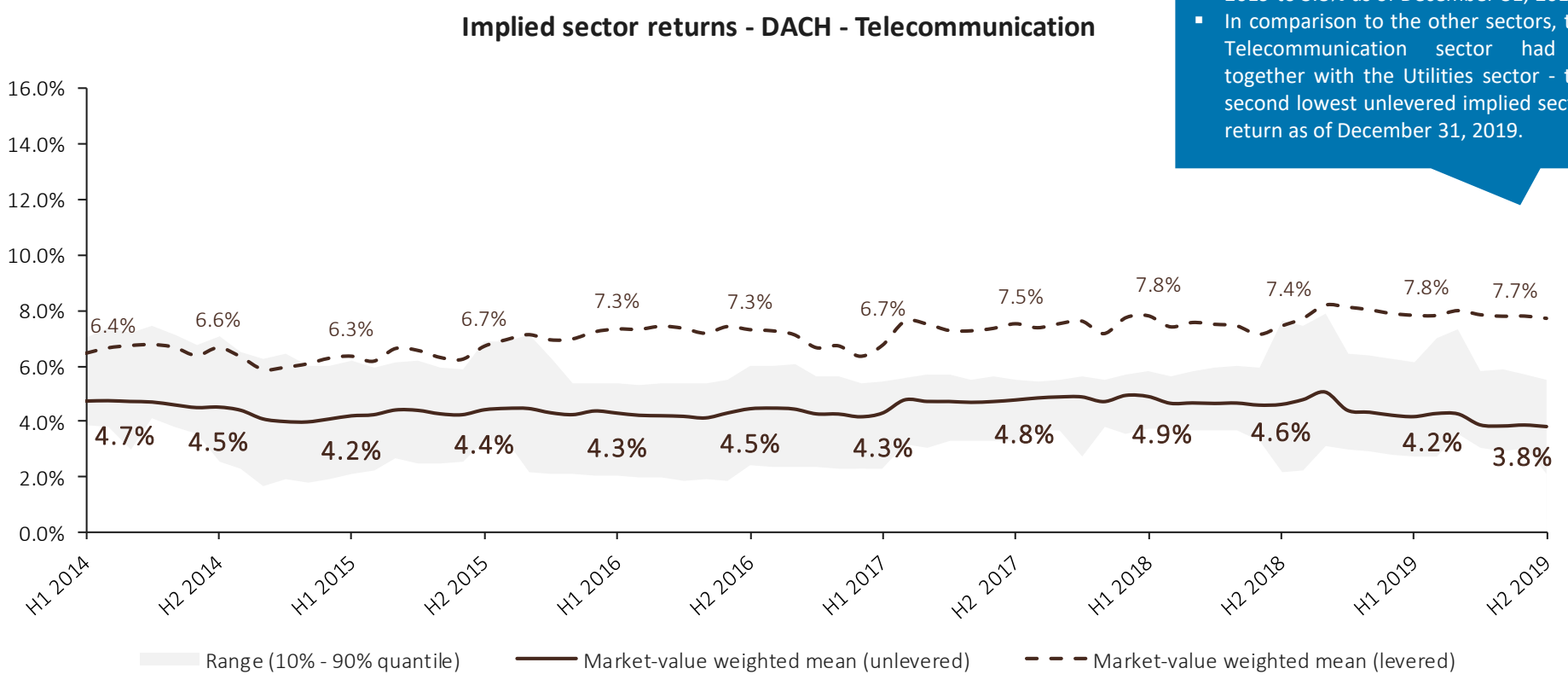
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	5.1%	-0.7%	-1.8%	4.0%	2.8%	3.9%	3.4%	3.4%	3.5%	0.7%	4.1%	0.7%
Lower quantile	5.3%	2.8%	1.8%	4.3%	3.2%	4.4%	3.7%	4.8%	4.5%	3.1%	4.1%	3.8%
Median	5.8%	6.4%	6.7%	7.3%	5.9%	6.8%	4.6%	7.1%	7.6%	7.4%	7.8%	7.0%
Arithmetic mean	6.5%	5.9%	5.4%	6.8%	5.9%	6.5%	5.5%	6.5%	7.0%	7.8%	7.7%	6.8%
Market-value weighted mean	**6.4%**	**6.6%**	**6.3%**	**6.7%**	**7.3%**	**7.3%**	**6.7%**	**7.5%**	**7.8%**	**7.4%**	**7.8%**	**7.7%**
Upper quantile	8.5%	8.4%	7.6%	8.4%	8.9%	8.5%	7.8%	7.8%	8.6%	12.4%	11.0%	10.1%
Maximum	9.3%	9.2%	7.7%	9.1%	9.3%	8.7%	8.0%	7.8%	9.5%	12.7%	11.0%	10.3%
Market-value weighted debt	78.7%	79.0%	68.8%	71.3%	80.5%	75.9%	73.1%	70.8%	77.0%	74.7%	100.3%	107.0%

Implied sector returns (unlevered) - DACH - Telecommunication

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.5%	0.5%	-0.1%	2.6%	1.6%	2.1%	2.3%	2.6%	2.7%	0.8%	2.6%	0.5%
Lower quantile	3.9%	2.5%	2.1%	3.3%	2.1%	2.4%	2.3%	3.3%	3.8%	2.2%	2.8%	2.1%
Median	5.2%	5.0%	4.5%	4.8%	4.0%	5.3%	4.0%	5.3%	5.3%	5.2%	5.0%	4.1%
Arithmetic mean	5.3%	4.8%	4.3%	4.9%	4.1%	4.7%	4.1%	4.7%	4.9%	5.2%	4.6%	3.9%
Market-value weighted mean	**4.7%**	**4.5%**	**4.2%**	**4.4%**	**4.3%**	**4.5%**	**4.3%**	**4.8%**	**4.9%**	**4.6%**	**4.2%**	**3.8%**
Upper quantile	7.0%	7.1%	6.2%	6.9%	5.4%	6.0%	5.5%	5.5%	5.8%	7.7%	6.1%	5.5%
Maximum	8.0%	8.0%	6.7%	7.1%	6.1%	6.7%	5.7%	5.7%	6.0%	9.5%	6.1%	6.1%
Market-value weighted debt	78.7%	79.0%	68.8%	71.3%	80.5%	75.9%	73.1%	70.8%	77.0%	74.7%	100.3%	107.0%

Implied Sector Returns
Telecommunication (chart)

- The implied sector return (unlevered) of the Telecommunication sector decreased from 4.2% as of June 30, 2019 to 3.8% as of December 31, 2019.
- In comparison to the other sectors, the Telecommunication sector had – together with the Utilities sector - the second lowest unlevered implied sector return as of December 31, 2019.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Industrials (table)

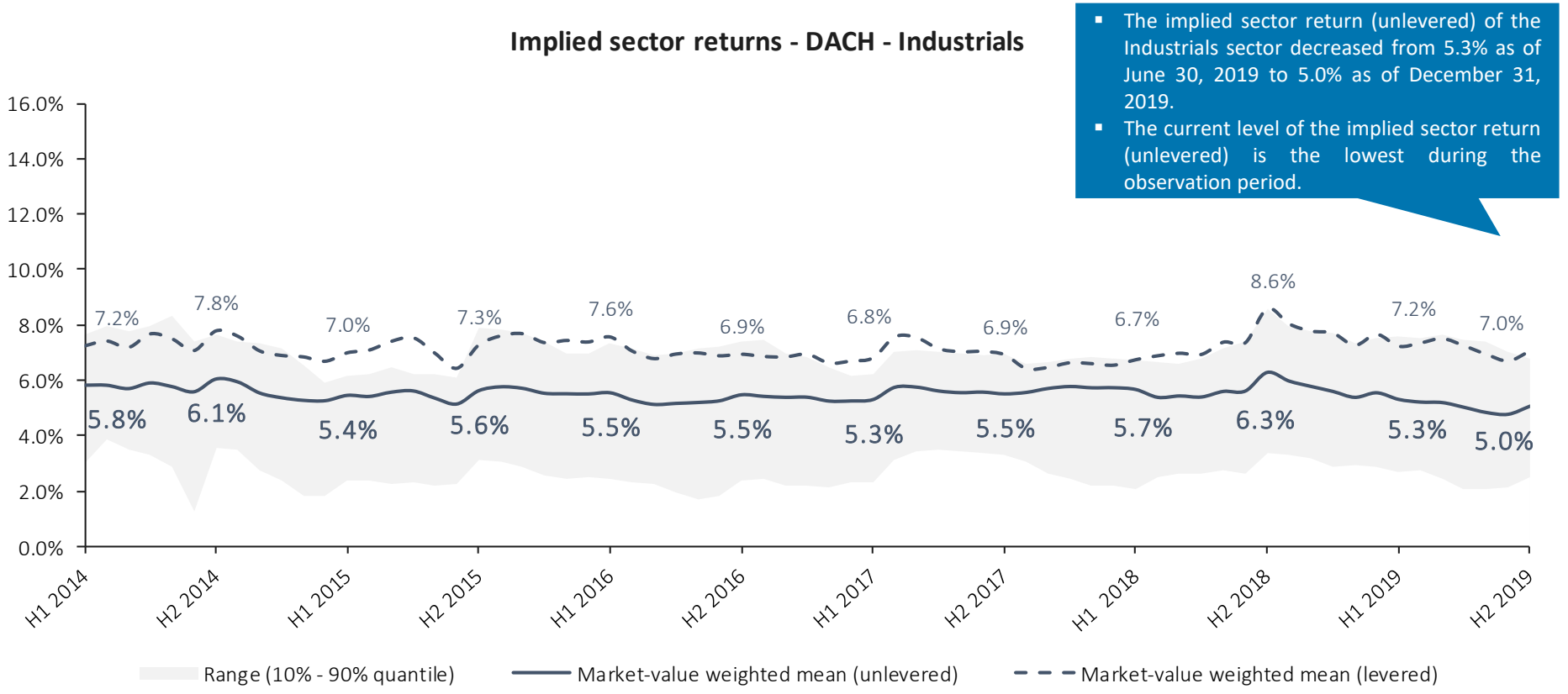
Implied sector returns (levered) - DACH - Industrials

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0.6%	0.2%	-0.4%	1.6%	1.7%	2.1%	0.5%	2.7%	0.9%	0.9%	0.1%	-0.7%
Lower quantile	3.5%	3.3%	2.9%	4.4%	4.3%	4.3%	3.2%	3.5%	3.1%	4.9%	4.0%	4.2%
Median	6.8%	8.0%	6.5%	7.2%	7.4%	7.2%	6.2%	6.7%	6.7%	8.0%	6.9%	6.7%
Arithmetic mean	6.5%	7.9%	6.4%	7.7%	7.8%	7.0%	5.7%	6.3%	6.2%	8.1%	6.9%	7.0%
Market-value weighted mean	**7.2%**	**7.8%**	**7.0%**	**7.3%**	**7.6%**	**6.9%**	**6.8%**	**6.9%**	**6.7%**	**8.6%**	**7.2%**	**7.0%**
Upper quantile	8.7%	10.6%	8.8%	10.3%	9.8%	9.4%	7.6%	8.3%	8.4%	11.2%	9.4%	10.0%
Maximum	12.3%	29.1%	12.8%	40.7%	42.5%	18.1%	9.5%	11.5%	10.9%	20.1%	21.2%	20.1%
Market-value weighted debt	39.1%	40.3%	41.7%	42.6%	47.4%	39.0%	37.4%	34.1%	37.6%	47.0%	46.9%	45.9%

Implied sector returns (unlevered) - DACH - Industrials

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0.6%	0.6%	0.5%	1.5%	1.5%	1.7%	0.4%	2.4%	1.0%	1.0%	0.2%	-0.1%
Lower quantile	3.0%	3.6%	2.4%	3.1%	2.4%	2.4%	2.3%	3.3%	2.1%	3.3%	2.7%	2.5%
Median	6.1%	6.4%	4.3%	5.2%	5.1%	5.2%	5.1%	5.4%	5.5%	6.1%	5.5%	5.0%
Arithmetic mean	5.5%	5.9%	4.5%	5.4%	5.1%	5.3%	4.5%	5.2%	4.8%	6.2%	5.3%	4.9%
Market-value weighted mean	**5.8%**	**6.1%**	**5.4%**	**5.6%**	**5.5%**	**5.5%**	**5.3%**	**5.5%**	**5.7%**	**6.3%**	**5.3%**	**5.0%**
Upper quantile	7.6%	7.7%	6.1%	7.9%	7.3%	7.4%	6.2%	6.9%	6.7%	8.6%	7.6%	6.8%
Maximum	8.4%	9.5%	8.0%	8.0%	7.6%	9.7%	6.8%	7.5%	7.7%	10.8%	11.8%	10.6%
Market-value weighted debt	39.1%	40.3%	41.7%	42.6%	47.4%	39.0%	37.4%	34.1%	37.6%	47.0%	46.9%	45.9%

Implied Sector Returns
Industrials (chart)



- The implied sector return (unlevered) of the Industrials sector decreased from 5.3% as of June 30, 2019 to 5.0% as of December 31, 2019.
- The current level of the implied sector return (unlevered) is the lowest during the observation period.

Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Consumer Service (table)

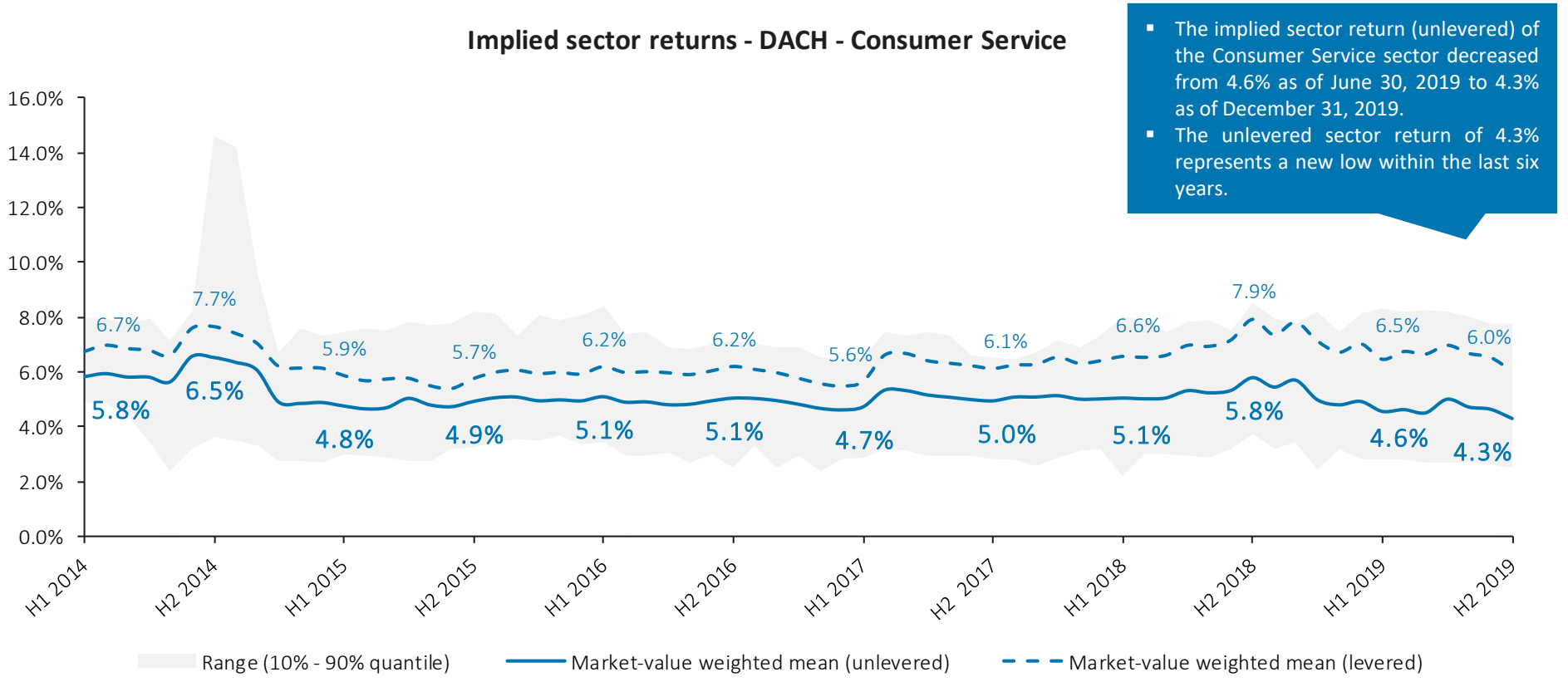
Implied sector returns (levered) - DACH - Consumer Service

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.6%	2.9%	2.7%	1.6%	1.8%	1.3%	2.1%	2.0%	2.0%	2.5%	1.5%	-3.3%
Lower quantile	5.5%	4.3%	3.8%	3.0%	3.4%	3.8%	3.3%	2.9%	2.8%	4.6%	3.4%	3.1%
Median	6.6%	7.5%	5.9%	6.2%	6.4%	6.7%	6.0%	6.2%	6.3%	7.7%	7.3%	6.1%
Arithmetic mean	9.0%	9.8%	7.0%	6.7%	6.6%	6.4%	5.9%	6.1%	6.8%	8.3%	7.6%	6.5%
Market-value weighted mean	**6.7%**	**7.7%**	**5.9%**	**5.7%**	**6.2%**	**6.2%**	**5.6%**	**6.1%**	**6.6%**	**7.9%**	**6.5%**	**6.0%**
Upper quantile	11.3%	20.5%	10.5%	10.7%	8.9%	8.8%	8.2%	8.7%	10.4%	12.0%	10.7%	10.6%
Maximum	39.1%	35.1%	19.0%	14.7%	14.1%	9.5%	10.3%	11.0%	13.8%	17.0%	18.6%	15.1%
Market-value weighted debt	22.8%	20.3%	17.4%	21.5%	25.0%	26.0%	23.9%	32.9%	29.0%	37.0%	41.7%	35.7%

Implied sector returns (unlevered) - DACH - Consumer Service

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.6%	2.7%	2.1%	1.9%	1.3%	1.2%	2.1%	1.9%	1.7%	2.2%	1.5%	-2.9%
Lower quantile	4.9%	3.6%	3.0%	3.2%	3.4%	2.5%	2.8%	2.8%	2.2%	3.7%	2.8%	2.5%
Median	5.8%	6.4%	5.2%	5.1%	5.0%	5.0%	5.0%	5.2%	5.1%	6.0%	5.1%	4.6%
Arithmetic mean	7.4%	7.9%	5.2%	5.6%	5.3%	5.1%	4.9%	4.9%	5.3%	6.0%	5.7%	4.6%
Market-value weighted mean	**5.8%**	**6.5%**	**4.8%**	**4.9%**	**5.1%**	**5.1%**	**4.7%**	**5.0%**	**5.1%**	**5.8%**	**4.6%**	**4.3%**
Upper quantile	7.9%	14.6%	7.5%	8.2%	8.4%	7.1%	6.5%	6.5%	8.0%	8.5%	8.3%	7.8%
Maximum	38.9%	34.6%	8.3%	11.4%	8.9%	8.3%	8.8%	7.2%	13.1%	9.6%	18.1%	10.7%
Market-value weighted debt	22.8%	20.3%	17.4%	21.5%	25.0%	26.0%	23.9%	32.9%	29.0%	37.0%	41.7%	35.7%

Implied Sector Returns
Consumer Service (chart)



- The implied sector return (unlevered) of the Consumer Service sector decreased from 4.6% as of June 30, 2019 to 4.3% as of December 31, 2019.
- The unlevered sector return of 4.3% represents a new low within the last six years.

Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Pharma & Healthcare (table)

Implied sector returns (levered) - DACH - Pharma & Healthcare

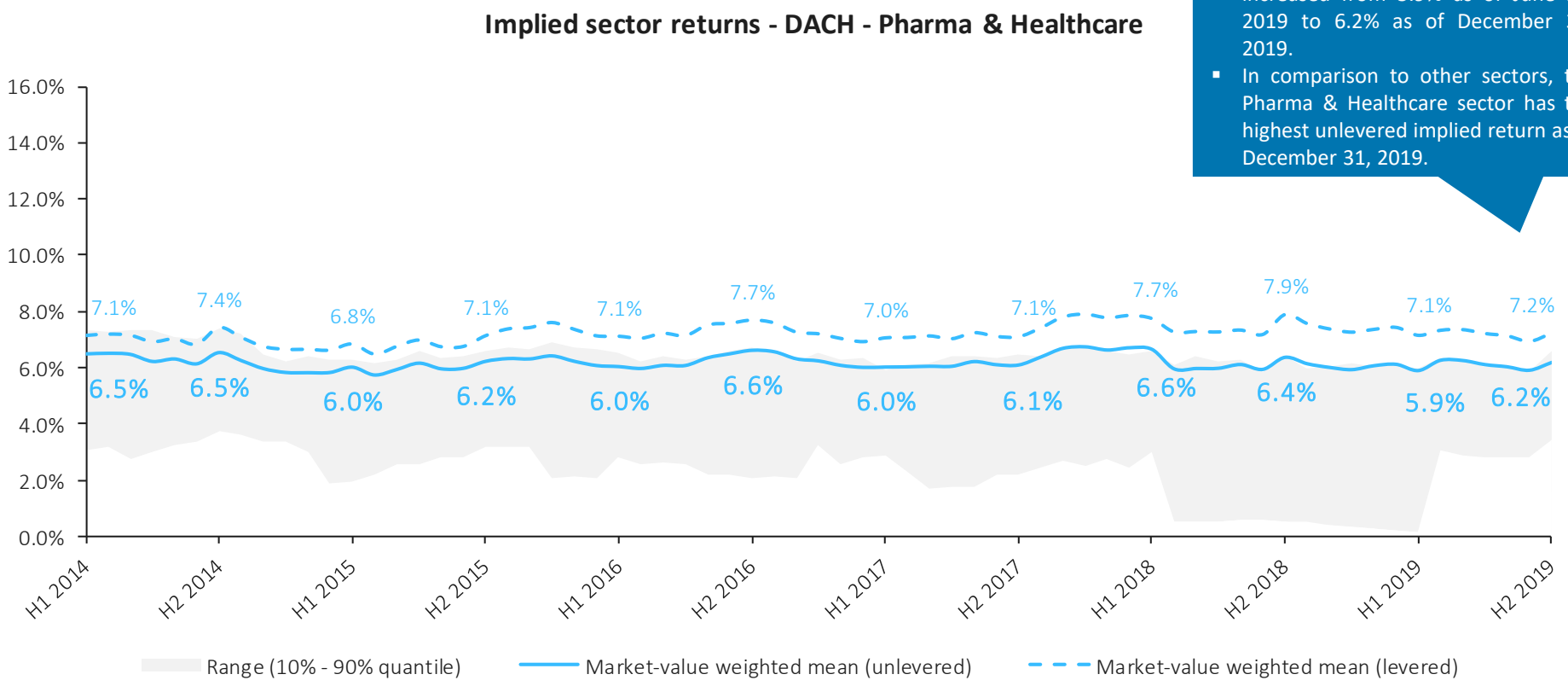
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	0.8%	2.0%	1.4%	1.1%	1.4%	1.6%	2.0%	1.9%	1.9%	1.1%	2.4%	1.8%
Lower quantile	2.4%	3.5%	2.0%	3.7%	3.7%	2.7%	2.9%	2.4%	3.2%	3.3%	3.2%	3.7%
Median	6.1%	6.3%	5.8%	6.1%	6.0%	5.6%	5.8%	5.0%	5.2%	5.7%	5.1%	5.6%
Arithmetic mean	5.9%	6.9%	5.6%	6.6%	5.9%	7.9%	5.9%	5.5%	5.7%	5.8%	5.3%	6.1%
Market-value weighted mean	**7.1%**	**7.4%**	**6.8%**	**7.1%**	**7.1%**	**7.7%**	**7.0%**	**7.1%**	**7.7%**	**7.9%**	**7.1%**	**7.2%**
Upper quantile	8.3%	9.3%	7.5%	8.6%	7.9%	8.0%	7.3%	7.7%	7.9%	9.0%	7.8%	8.0%
Maximum	11.7%	22.2%	11.5%	24.8%	9.2%	76.3%	27.9%	20.2%	23.9%	13.2%	8.9%	14.1%
Market-value weighted debt	15.7%	18.2%	16.8%	18.5%	20.3%	20.6%	20.2%	19.6%	20.2%	20.3%	19.5%	18.4%

Implied sector returns (unlevered) - DACH - Pharma & Healthcare

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	1.3%	2.0%	1.4%	1.2%	1.3%	1.4%	1.5%	1.4%	1.2%	0.5%	0.2%	1.6%
Lower quantile	3.1%	3.8%	1.9%	3.2%	2.8%	2.1%	2.9%	2.2%	3.0%	0.5%	0.2%	3.4%
Median	5.6%	5.8%	5.1%	5.2%	4.9%	5.3%	4.8%	4.5%	4.6%	5.0%	4.3%	5.0%
Arithmetic mean	5.4%	5.7%	4.7%	5.0%	4.9%	5.3%	4.6%	5.1%	5.1%	4.2%	3.7%	5.3%
Market-value weighted mean	**6.5%**	**6.5%**	**6.0%**	**6.2%**	**6.0%**	**6.6%**	**6.0%**	**6.1%**	**6.6%**	**6.4%**	**5.9%**	**6.2%**
Upper quantile	7.3%	7.4%	6.3%	6.6%	6.5%	6.7%	5.9%	6.5%	6.6%	6.4%	5.9%	6.6%
Maximum	10.8%	9.2%	6.6%	7.7%	7.6%	18.6%	7.1%	20.1%	21.9%	12.1%	8.0%	14.1%
Market-value weighted debt	15.7%	18.2%	16.8%	18.5%	20.3%	20.6%	20.2%	19.6%	20.2%	20.3%	19.5%	18.4%

Implied Sector Returns
Pharma & Healthcare (chart)

- The implied sector return (unlevered) of the Pharma & Healthcare sector increased from 5.9% as of June 30, 2019 to 6.2% as of December 31, 2019.
- In comparison to other sectors, the Pharma & Healthcare sector has the highest unlevered implied return as of December 31, 2019.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Information Technology (table)

Implied sector returns (levered) - DACH - Information Technology

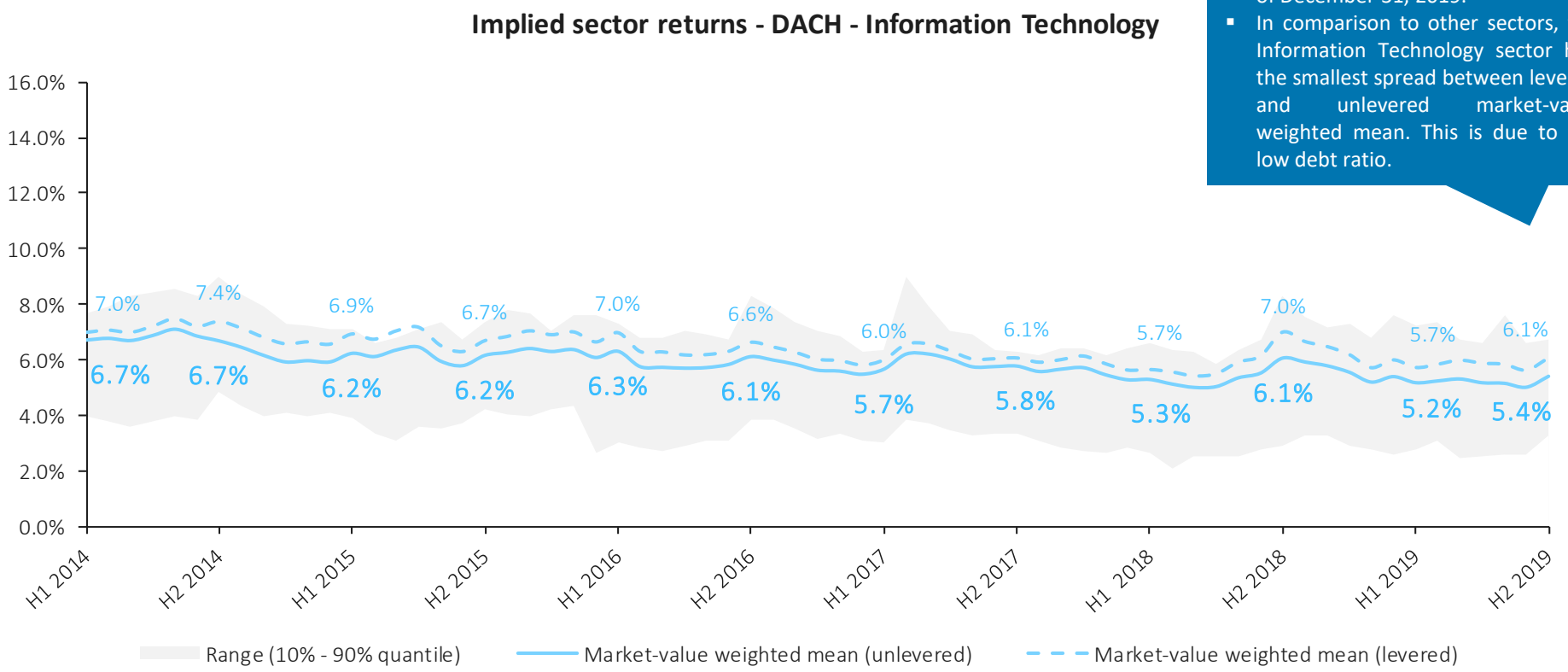
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	1.8%	0.9%	-1.4%	1.0%	1.7%	0.2%	2.1%	0.5%	0.2%	1.3%	0.1%	1.2%
Lower quantile	4.2%	5.0%	4.6%	4.4%	3.8%	4.6%	3.6%	3.6%	3.4%	4.3%	3.3%	3.7%
Median	6.4%	7.6%	6.2%	6.5%	6.2%	6.6%	5.5%	5.5%	5.0%	7.3%	5.4%	5.9%
Arithmetic mean	6.4%	7.6%	6.4%	6.6%	6.3%	7.5%	5.7%	5.7%	5.6%	7.8%	5.8%	6.1%
Market-value weighted mean	**7.0%**	**7.4%**	**6.9%**	**6.7%**	**7.0%**	**6.6%**	**6.0%**	**6.1%**	**5.7%**	**7.0%**	**5.7%**	**6.1%**
Upper quantile	9.1%	10.8%	9.2%	8.7%	7.9%	10.1%	7.6%	6.9%	7.6%	12.1%	9.0%	8.5%
Maximum	11.9%	14.1%	11.7%	18.6%	16.5%	35.0%	15.8%	28.2%	28.2%	26.6%	13.0%	15.5%
Market-value weighted debt	7.1%	16.3%	14.1%	10.7%	11.0%	8.5%	6.8%	5.5%	11.9%	18.0%	13.5%	11.8%

Implied sector returns (unlevered) - DACH - Information Technology

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	2.7%	2.2%	1.3%	1.0%	1.2%	0.2%	2.0%	0.5%	0.7%	0.2%	1.7%	1.2%
Lower quantile	4.0%	4.8%	3.9%	4.2%	3.0%	3.9%	3.0%	3.3%	2.6%	2.9%	2.8%	3.3%
Median	5.8%	6.6%	5.4%	5.4%	5.3%	6.0%	5.0%	5.1%	4.9%	5.6%	4.5%	4.9%
Arithmetic mean	5.8%	6.7%	5.5%	5.7%	5.4%	6.6%	5.0%	4.9%	4.6%	5.7%	4.9%	4.8%
Market-value weighted mean	**6.7%**	**6.7%**	**6.2%**	**6.2%**	**6.3%**	**6.1%**	**5.7%**	**5.8%**	**5.3%**	**6.1%**	**5.2%**	**5.4%**
Upper quantile	7.7%	9.0%	7.1%	7.4%	7.3%	8.3%	6.3%	6.3%	6.6%	8.3%	7.2%	6.7%
Maximum	9.0%	10.6%	9.5%	17.6%	15.4%	33.4%	11.2%	9.5%	7.6%	10.1%	10.6%	8.1%
Market-value weighted debt	7.1%	16.3%	14.1%	10.7%	11.0%	8.5%	6.8%	5.5%	11.9%	18.0%	13.5%	11.8%

Implied Sector Returns
Informational Technology (chart)

- The implied sector return (unlevered) of the Information Technology sector increased from 5.2% as of June 30, 2019 to 5.4% as of December 31, 2019.
- In comparison to other sectors, the Information Technology sector had the smallest spread between levered and unlevered market-value weighted mean. This is due to the low debt ratio.



Note: The ranges refer to the implied sector returns (unlevered).

Implied Sector Returns
Utilities (table)

Implied sector returns (levered) - DACH - Utilities

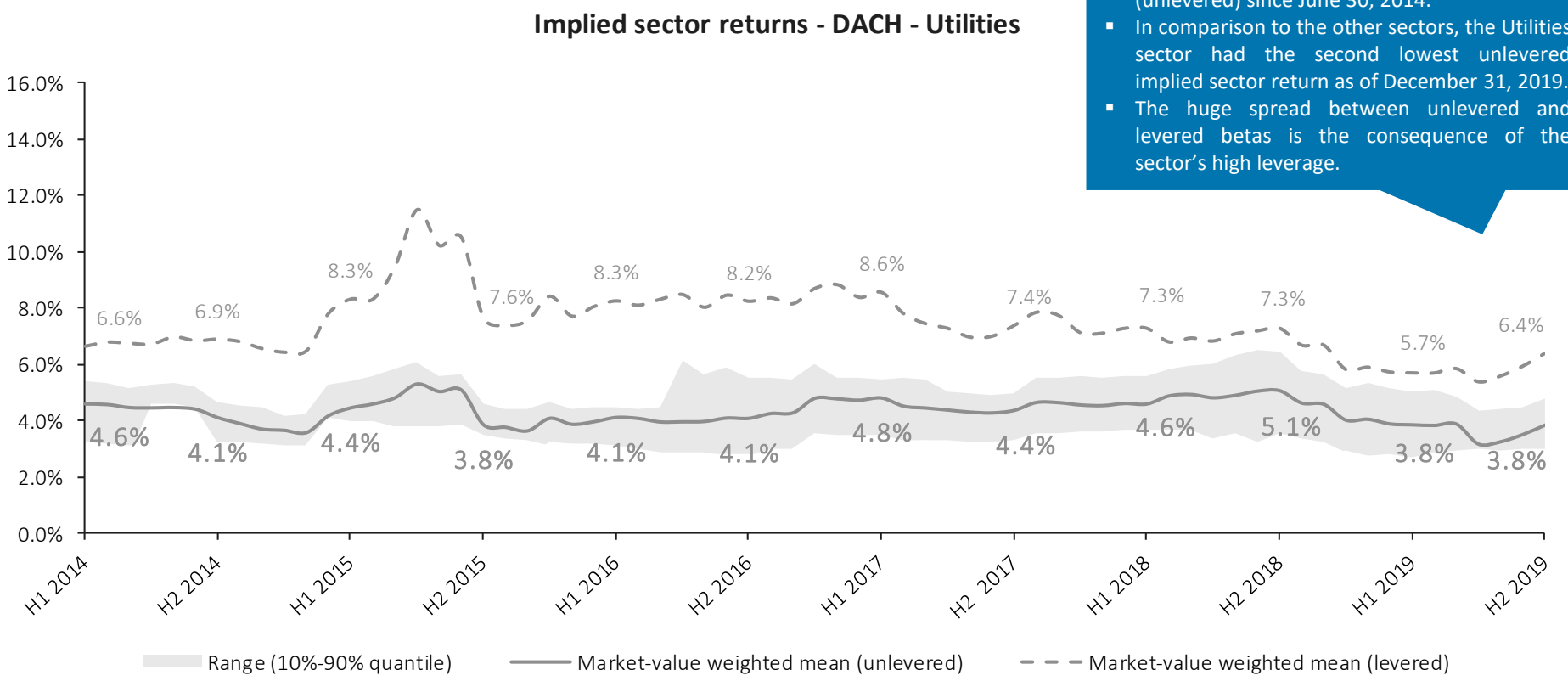
	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.7%	3.8%	3.9%	4.9%	5.2%	4.8%	5.5%	4.5%	4.8%	5.3%	3.9%	5.0%
Lower quantile	4.0%	4.9%	5.4%	5.2%	6.8%	5.7%	5.5%	5.2%	5.6%	5.7%	4.2%	5.0%
Median	7.0%	7.1%	6.5%	7.0%	7.5%	7.4%	7.5%	6.2%	6.6%	7.0%	5.0%	5.9%
Arithmetic mean	6.8%	7.0%	7.8%	7.0%	7.6%	7.7%	7.7%	6.8%	6.9%	7.2%	5.6%	6.1%
Market-value weighted mean	**6.6%**	**6.9%**	**8.3%**	**7.6%**	**8.3%**	**8.2%**	**8.6%**	**7.4%**	**7.3%**	**7.3%**	**5.7%**	**6.4%**
Upper quantile	8.9%	9.4%	11.5%	8.7%	8.9%	10.2%	9.7%	8.6%	8.6%	9.3%	7.4%	7.3%
Maximum	9.9%	10.1%	14.6%	9.7%	9.4%	10.5%	11.8%	10.7%	9.0%	9.6%	8.9%	8.3%
Market-value weighted debt	87.8%	118.4%	107.9%	158.5%	124.5%	139.9%	101.6%	89.8%	80.7%	61.3%	60.2%	76.6%

Implied sector returns (unlevered) - DACH - Utilities

	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019	H2 2019
	06/30/2014	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**	**12/31/2019**
Minimum	3.1%	2.8%	3.0%	2.6%	2.9%	2.6%	2.7%	3.0%	2.8%	3.1%	2.5%	2.3%
Lower quantile	3.3%	3.0%	3.0%	3.0%	3.1%	2.7%	3.5%	3.3%	3.6%	3.5%	2.7%	2.6%
Median	4.5%	4.2%	4.0%	3.8%	3.6%	4.1%	4.2%	4.1%	4.1%	4.6%	3.3%	4.0%
Arithmetic mean	4.5%	4.0%	4.2%	3.7%	3.7%	4.1%	4.5%	4.1%	4.4%	4.8%	3.7%	3.8%
Market-value weighted mean	**4.6%**	**4.1%**	**4.4%**	**3.8%**	**4.1%**	**4.1%**	**4.8%**	**4.4%**	**4.6%**	**5.1%**	**3.8%**	**3.8%**
Upper quantile	5.4%	4.7%	5.4%	4.6%	4.5%	5.5%	5.4%	5.0%	5.6%	6.5%	5.0%	4.8%
Maximum	5.6%	4.8%	7.2%	4.7%	4.9%	6.0%	6.9%	5.3%	5.6%	7.6%	5.5%	5.2%
Market-value weighted debt	87.8%	118.4%	107.9%	158.5%	124.5%	139.9%	101.6%	89.8%	80.7%	61.3%	60.2%	76.6%

Implied Sector Returns
Utilities (chart)

- As of December 31, 2019 the Utilities sector shows the same implied sector return (unlevered) of 3.8% as half a year ago.
- We have observed a fluctuation between 3.8% and 5.1% of the market-value weighted mean (unlevered) since June 30, 2014.
- In comparison to the other sectors, the Utilities sector had the second lowest unlevered implied sector return as of December 31, 2019.
- The huge spread between unlevered and levered betas is the consequence of the sector's high leverage.



Note: The ranges refer to the implied sector returns (unlevered).

7 Sector returns

b. Historical returns (ex-post analysis)

Historical Sector Returns
Background & approach

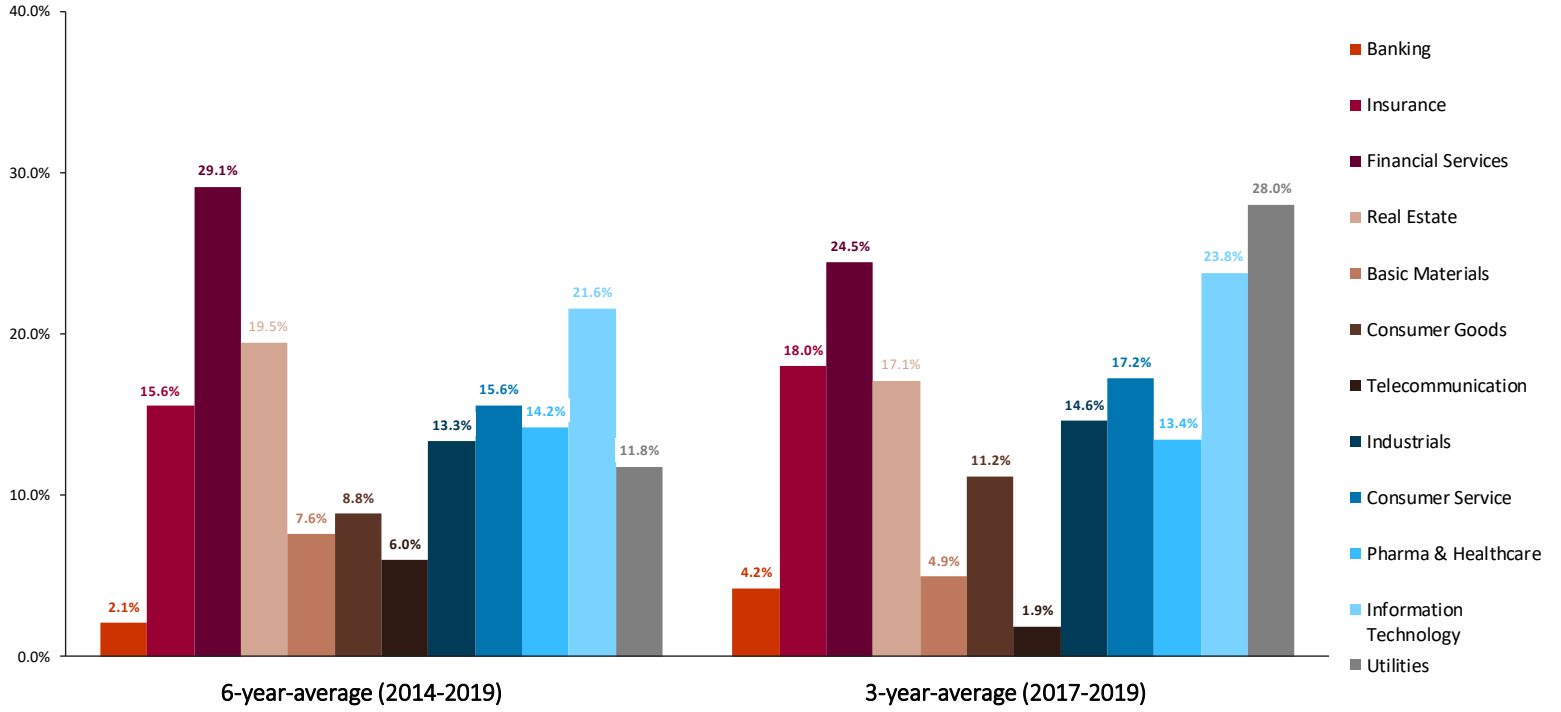
In **addition** to the **determination of historical market returns**, we calculate **historical sector returns**. This option creates an **alternative approach**, like the implied sector returns, to the ex-post analysis of the determination of costs of capital based on regression analyses following the **CAPM**.

Our analysis contains so-called **total shareholder returns** analogous to the return triangles for the German, Austrian and Swiss total return indices. This means, we consider the **share price development** as well as the **dividend yield,** whereas the share price development generally represents the main component of the total shareholder return.

We calculate the **annual total shareholder returns as of December 31,** for every DAX Sector All Index, WBI, and SPI listed company. Afterwards, we aggregate those returns market-value weighted **to sector returns**. Our calculations comprise the time period between 2014 and 2019. Since annual total shareholder returns tend to fluctuate to a great extent, their explanatory power is limited. Therefore, we do not only calculate the 1-year market-value weighted means, but furthermore calculate the 3-year (2017-2019) and the 6-year (2014-2019) averages.

Historical Sector Returns

Annual total shareholder returns as of December 31, 2019



Annual total shareholder returns by sector

	Banking	Insurance	Financial Services	Real Estate	Basic Materials	Consumer Goods	Telecom-munication	Industrials	Consumer Service	Pharma & Healthcare	Information Technology	Utilities
31 December 2014	-4.7%	14.8%	28.6%	31.0%	5.6%	6.3%	8.5%	4.9%	9.3%	25.7%	6.3%	5.0%
31 December 2015	15.1%	19.3%	58.2%	24.7%	10.2%	10.5%	22.1%	12.1%	38.5%	20.7%	36.5%	-20.4%
31 December 2016	-10.6%	5.3%	14.5%	10.0%	14.8%	2.7%	-0.4%	19.3%	-6.0%	-1.4%	15.1%	2.0%
31 December 2017	17.5%	13.2%	38.9%	24.0%	17.6%	13.7%	2.5%	23.3%	10.7%	6.0%	41.1%	34.3%
31 December 2018	-23.1%	3.1%	-8.2%	3.3%	-28.3%	-9.2%	-1.7%	-20.2%	-20.8%	2.6%	-5.8%	19.8%
31 December 2019	18.2%	37.7%	42.7%	24.0%	25.5%	29.1%	4.8%	40.7%	61.7%	31.7%	36.1%	29.9%

8 Trading multiples

Trading Multiples
Background & approach

Besides absolute valuation models (earnings value, DCF), the **multiples approach** offers a practical way for an enterprise value estimation. The multiples method estimates a company's value **relative** to another company's value. Following this approach, the enterprise value results from the product of a reference value (revenue or earnings values are frequently used) of the company with the respective multiples of **similar companies**.

Within this capital market study, we analyze **multiples for the "super - sectors"** as well as **multiples for the DACH market** consisting of the German, Austrian and Swiss capital markets (DAX Sector All Index, ATX and SPI). We will look at the following multiples:

- Revenue-Multiples ("**EV**[1]**/Revenue**")
- EBIT-Multiples ("**EV**[1]**/EBIT**")
- Price-to-Earnings-Multiples ("**P/E**")
- Price-to-Book Value-Multiples ("**EqV**[2]**/BV**")

Multiples are presented for two different reference values. Firstly, the reference values are based on a company's realized trailing last 12 months, which represent its financial performance for the past 12-month period (so-called **trailing-multiples,** in the following "**LTM**"). Secondly, the reference values are based on one-year forecasts of analysts (so-called **forward-multiples**, in the following "**1yf**"). Both approaches are typically not limited to the end of the fiscal year. The Price-to-Book Value-Multiples are calculated with the book values as of the reference date (December 31, 2019).

1) Enterprise Value.

2) Equity Value.

We present historical multiples since June 30, 2014 in the appendix and will update the applied multiples **semi-annually at the predefined reference date (as of June 30 and as of December 31)**.

We provide a graphical, as well as a tabular illustration of the multiples as of December 31, 2019 on the following slides.

Additional to the **arithmetic mean** and **median** as essential average sizes, we show the minimum, the maximum, the standard deviation and the number of companies. For the purpose of **simplification**, we exclude negative multiples and multiples in the highest quantile (95%). The multiples in the lowest quantile (5%) build the lower limit.

To calculate the multiples, we source the data (i.e. Market Cap., Revenue, EBIT, etc.) from the data provider S&P Capital IQ.

Additionally, we present a **ranking table** of the sector multiples. In a first step, the sector multiples are sorted from highest to lowest for each analyzed multiple. The resulting score in the ranking is displayed in the table and visualized by a color code that assigns a **red color** to the **highest rank** and a dark **green color** to the **lowest rank**. Thus, a red colored high rank indicates a high valuation level, whereas a green colored low rank suggests a low valuation level. In a second step, we aggregate the rankings and calculate an average of all single rankings for each sector multiple. This is shown in the right column of the ranking table. This **average ranking** indicates the overall **relative valuation levels** of the sectors when using multiples.

Trading Multiples

Sector multiples – Median
LTM and 1yf as of December 31, 2019

	EV/Revenue		EV/EBIT		P/E		EqV/BV
Sector	LTM	1yf	LTM	1yf	LTM	1yf	
Banking	n.a.	n.a.	n.a.	n.a.	15.1x	12.4x	0.9x
Insurance	n.a.	n.a.	n.a.	n.a.	14.6x	13.7x	1.1x
Financial Services	n.a.	n.a.	n.a.	n.a.	18.5x	18.6x	1.2x
Real Estate	13.4x	16.0x	34.8x	24.3x	12.7x	24.3x	1.2x
Basic Materials	1.3x	1.4x	19.1x	18.3x	18.9x	17.1x	1.5x
Consumer Goods	1.1x	1.3x	24.5x	18.7x	18.4x	19.5x	1.4x
Telecommunication	1.7x	1.9x	19.3x	17.2x	17.8x	13.5x	1.9x
Industrials	1.1x	1.3x	18.6x	18.7x	19.7x	19.4x	2.1x
Consumer Service	1.4x	1.6x	20.0x	19.5x	17.7x	18.8x	1.7x
Pharma & Healthcare	4.5x	5.2x	28.5x	23.7x	33.5x	24.8x	3.3x
Information Technology	1.7x	1.7x	24.7x	23.2x	29.0x	25.7x	2.7x
Utilities	2.1x	2.1x	34.0x	21.8x	26.7x	18.5x	1.9x
DACH	1.6x	1.7x	22.7x	19.6x	19.1x	19.8x	1.7x

Note: For companies in the Banking, Insurance and Financial Services sectors, Revenue- and EBIT-Multiples are not meaningful and thus are not reported.

Reading example:

The median of the Industrials EV/EBIT ratio calculated on the basis of the last 12 months is 18.6x as of December 31, 2019.

EUR 200 m in EBIT over the last twelve months would hence result in an enterprise value of EUR 3,720 m.

Trading Multiples

Sector multiples ranking based on median (LTM and 1yf as of December 31, 2019)

	EV/Revenue		EV/EBIT		P/E		EqV/BV	Ø Ranking
Sector	LTM	1yf	LTM	1yf	LTM	1yf		
Banking	n.a.	n.a.	n.a.	n.a.	10	12	12	11.3
Insurance	n.a.	n.a.	n.a.	n.a.	11	10	11	10.7
Financial Services	n.a.	n.a.	n.a.	n.a.	6	7	10	7.7
Real Estate	1	1	1	1	12	3	9	4.0
Basic Materials	7	7	8	8	5	9	7	7.3
Consumer Goods	9	8	5	6	7	4	8	6.7
Telecommunication	5	4	7	9	8	11	5	7.0
Industrials	8	9	9	7	4	5	3	6.4
Consumer Service	6	6	6	5	9	6	6	6.3
Pharma & Healthcare	2	2	3	2	1	2	1	1.9
Information Technology	4	5	4	3	2	1	2	3.0
Utilities	3	3	2	4	3	8	4	3.9

The Banking and Insurance sectors show the least expensive valuation levels of all sectors.

The Pharma & Healthcare sector shows the highest multiples on average, followed by the Information Technology sector.

The EqV/BV-Multiple of the Utilities sector ranks 4th highest in a comparison of all sectors. Overall, the average ranking of the Utilities sector is 3.9, indicating a high valuation level.

Note: Multiples are ranked from highest to lowest values: 1 – highest (red), 9/12 – lowest (dark green).

Trading Multiples

Sector multiples detailed (1/4)

LTM and 1yf as of December 31, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
DACH	Min	0.3x	0.5x	8.4x	9.9x	4.0x	8.6x	0.4x
	Arithmetic mean	**3.5x**	**3.3x**	**28.2x**	**21.0x**	**24.5x**	**22.4x**	**2.5x**
	Median	**1.6x**	**1.7x**	**22.7x**	**19.6x**	**19.1x**	**19.8x**	**1.7x**
	Max	25.0x	21.3x	131.1x	43.2x	127.6x	64.8x	11.5x
	Standard deviation	4.6x	4.0x	19.0x	7.6x	18.5x	10.7x	2.1x
	Number of companies	520	336	406	297	451	290	550
Banking	Min	-	-	-	-	7.1x	8.8x	0.4x
	Arithmetic mean	**-**	**-**	**-**	**-**	**15.1x**	**13.2x**	**1.1x**
	Median	**-**	**-**	**-**	**-**	**15.1x**	**12.4x**	**0.9x**
	Max	-	-	-	-	35.3x	19.5x	3.5x
	Standard deviation	-	-	-	-	6.1x	3.3x	0.6x
	Number of companies	-	-	-	-	33	12	30
Insurance	Min	-	-	-	-	11.4x	11.7x	0.6x
	Arithmetic mean	**-**	**-**	**-**	**-**	**22.2x**	**15.2x**	**1.3x**
	Median	**-**	**-**	**-**	**-**	**14.6x**	**13.7x**	**1.1x**
	Max	-	-	-	-	89.7x	23.1x	3.3x
	Standard deviation	-	-	-	-	21.1x	3.4x	0.6x
	Number of companies	-	-	-	-	13	10	14
Financial Services	Min	-	-	-	-	7.7x	10.9x	0.5x
	Arithmetic mean	**-**	**-**	**-**	**-**	**24.0x**	**19.4x**	**2.1x**
	Median	**-**	**-**	**-**	**-**	**18.5x**	**18.6x**	**1.2x**
	Max	-	-	-	-	96.6x	31.0x	11.4x
	Standard deviation	-	-	-	-	20.1x	6.9x	2.2x
	Number of companies	-	-	-	-	26	11	38

Reading example:

The average (arithmetic mean) DACH EV/Revenue-ratio calculated on the basis of the last 12 months is 3.5x as of the reference date December 31, 2019.

EUR 300 m in revenues over the last twelve months would result in an enterprise value of EUR 1,050 m.

Note: For companies in the Banking, Insurance and Financial Services sector, Revenues- and EBIT-Multiples are not meaningful and thus are not reported. For historical developments of the multiples please refer to the appendix (cf. 83 et seq.).

Trading Multiples

Sector multiples detailed (2/4)

LTM and 1yf as of December 31, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Real Estate	Min	1.2x	1.7x	4.0x	8.6x	4.0x	8.6x	0.6x
	Arithmetic mean	**12.7x**	**13.0x**	**33.9x**	**22.4x**	**15.1x**	**23.5x**	**1.3x**
	Median	**13.4x**	**16.0x**	**34.8x**	**24.3x**	**12.7x**	**24.3x**	**1.2x**
	Max	25.0x	21.3x	45.4x	43.1x	45.4x	43.1x	3.7x
	Standard deviation	5.9x	6.7x	8.8x	9.5x	8.8x	9.5x	0.6x
	Number of companies	41	18	43	26	42	17	44
Basic Materials	Min	0.3x	0.5x	8.7x	10.7x	6.5x	10.0x	0.4x
	Arithmetic mean	**1.9x**	**2.1x**	**24.8x**	**20.4x**	**20.2x**	**19.6x**	**2.1x**
	Median	**1.3x**	**1.4x**	**19.1x**	**18.3x**	**18.9x**	**17.1x**	**1.5x**
	Max	9.1x	6.8x	90.4x	36.6x	45.7x	39.8x	8.5x
	Standard deviation	2.0x	1.6x	17.2x	7.3x	10.7x	7.9x	1.9x
	Number of companies	34	24	25	22	29	25	36
Consumer Goods	Min	0.3x	0.5x	9.6x	10.5x	5.2x	8.7x	0.4x
	Arithmetic mean	**2.2x**	**1.5x**	**31.0x**	**19.2x**	**23.8x**	**20.6x**	**2.2x**
	Median	**1.1x**	**1.3x**	**24.5x**	**18.7x**	**18.4x**	**19.5x**	**1.4x**
	Max	22.6x	4.8x	106.6x	33.0x	75.7x	40.0x	9.8x
	Standard deviation	3.8x	1.0x	22.5x	6.2x	14.5x	8.8x	1.9x
	Number of companies	72	43	57	37	53	32	65

Reading example:

The median Real Estate EV/EBIT ratio calculated on the basis of the expected EBIT (1-year forward) is 24.3x as of the reference date December 31, 2019.

An expected EBIT of EUR 30 m would result in an enterprise value of EUR 729 m.

Note: For companies in the Banking, Insurance and Financial Services sector, Revenues- and EBIT-Multiples are not meaningful and thus are not reported. For historical developments of the multiples please refer to the appendix (cf. 83 et seq.).

Trading Multiples

Sector multiples detailed (3/4)

LTM and 1yf as of December 31, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Telecommunication	Min	0.5x	1.1x	13.8x	12.8x	10.2x	10.5x	0.9x
	Arithmetic mean	**1.8x**	**2.2x**	**21.3x**	**18.3x**	**18.1x**	**15.9x**	**2.1x**
	Median	**1.7x**	**1.9x**	**19.3x**	**17.2x**	**17.8x**	**13.5x**	**1.9x**
	Max	3.3x	3.3x	27.7x	30.6x	30.1x	30.5x	3.8x
	Standard deviation	0.8x	0.7x	4.9x	6.0x	6.6x	6.5x	1.0x
	Number of companies	13	9	7	6	7	7	12
Industrials	Min	0.3x	0.5x	8.9x	10.0x	5.8x	8.9x	0.4x
	Arithmetic mean	**1.9x**	**2.1x**	**22.6x**	**20.0x**	**23.6x**	**22.3x**	**2.8x**
	Median	**1.1x**	**1.3x**	**18.6x**	**18.7x**	**19.7x**	**19.4x**	**2.1x**
	Max	15.5x	14.5x	98.7x	43.1x	127.6x	57.0x	10.9x
	Standard deviation	2.1x	2.2x	14.5x	6.9x	15.1x	9.7x	2.3x
	Number of companies	171	124	140	110	125	92	155
Consumer Service	Min	0.3x	0.5x	8.4x	9.9x	6.6x	9.3x	0.5x
	Arithmetic mean	**3.5x**	**2.6x**	**25.2x**	**20.4x**	**27.6x**	**19.7x**	**2.8x**
	Median	**1.4x**	**1.6x**	**20.0x**	**19.5x**	**17.7x**	**18.8x**	**1.7x**
	Max	24.8x	11.4x	68.9x	40.8x	109.3x	34.7x	11.1x
	Standard deviation	5.3x	2.8x	15.4x	8.3x	25.0x	7.8x	2.6x
	Number of companies	53	25	35	21	29	15	40

Reading example:

The average (arithmetic mean) Industrials P/E ratio calculated on the basis of expected earnings (1-year forward) is 22.3x as of the reference date December 31, 2019.

Expected earnings of EUR 20 m would result in an equity value of EUR 446 m.

Note: For companies in the Banking, Insurance and Financial Services sector, Revenues- and EBIT-Multiples are not meaningful and thus are not reported. For historical developments of the multiples please refer to the appendix (cf. 83 et seq.).

Trading Multiples

Sector multiples detailed (4/4)

LTM and 1yf as of December 31, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Pharma & Healthcare	Min	0.4x	0.6x	14.8x	11.4x	6.6x	12.4x	0.6x
	Arithmetic mean	**5.6x**	**6.2x**	**36.1x**	**24.3x**	**39.5x**	**29.9x**	**3.8x**
	Median	**4.5x**	**5.2x**	**28.5x**	**23.7x**	**33.5x**	**24.8x**	**3.3x**
	Max	19.6x	19.1x	131.1x	38.4x	120.8x	64.8x	9.1x
	Standard deviation	4.4x	4.4x	24.7x	8.3x	24.2x	14.3x	2.4x
	Number of companies	48	35	31	25	28	23	40
Information Technology	Min	0.4x	0.5x	9.6x	10.2x	5.0x	9.2x	0.5x
	Arithmetic mean	**2.8x**	**3.0x**	**33.0x**	**23.8x**	**33.5x**	**28.8x**	**3.2x**
	Median	**1.7x**	**1.7x**	**24.7x**	**23.2x**	**29.0x**	**25.7x**	**2.7x**
	Max	19.1x	17.6x	120.0x	43.2x	108.5x	60.4x	11.5x
	Standard deviation	3.1x	3.3x	23.9x	8.4x	23.3x	13.1x	2.1x
	Number of companies	75	51	57	42	55	39	62
Utilities	Min	1.0x	1.4x	16.1x	16.0x	10.3x	15.4x	0.7x
	Arithmetic mean	**3.8x**	**3.7x**	**37.7x**	**20.7x**	**31.5x**	**19.9x**	**2.2x**
	Median	**2.1x**	**2.1x**	**34.0x**	**21.8x**	**26.7x**	**18.5x**	**1.9x**
	Max	14.8x	11.1x	85.4x	23.6x	103.2x	28.8x	5.3x
	Standard deviation	4.1x	3.2x	19.8x	2.5x	25.4x	4.6x	1.4x
	Number of companies	13	7	11	8	11	7	14

Reading example:

The median Utilities EqV/BV is 1.9x as of the reference date December 31, 2019.

A BV of EUR 100 m would result in an equity value of EUR 190 m.

Note: For companies in the Banking, Insurance and Financial Services sector, Revenues- and EBIT-Multiples are not meaningful and thus are not reported. For historical developments of the multiples please refer to the appendix (cf. 83 et seq.).

Trading Multiples

Country multiples detailed

LTM and 1yf as of December 31, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Germany								
	Min	0.3x	0.5x	9.2x	9.9x	4.0x	8.6x	0.4x
	Arithmetic mean	**3.3x**	**3.3x**	**28.4x**	**21.1x**	**25.9x**	**22.1x**	**2.5x**
	Median	**1.5x**	**1.6x**	**22.5x**	**19.5x**	**18.9x**	**19.1x**	**1.7x**
	Max	25.0x	20.5x	120.0x	43.1x	127.6x	64.8x	11.5x
	Standard deviation	4.6x	4.1x	19.4x	7.9x	21.1x	11.4x	2.1x
	Number of companies	330	203	239	173	246	159	322
Austria								
	Min	0.3x	0.6x	8.9x	10.5x	5.2x	9.1x	0.5x
	Arithmetic mean	**3.5x**	**2.7x**	**25.2x**	**17.0x**	**17.9x**	**17.5x**	**1.7x**
	Median	**1.2x**	**1.3x**	**20.3x**	**16.2x**	**14.1x**	**14.5x**	**1.2x**
	Max	22.6x	17.4x	102.8x	30.3x	75.7x	33.1x	6.6x
	Standard deviation	5.4x	4.0x	17.2x	4.8x	12.2x	6.5x	1.3x
	Number of companies	44	26	38	27	49	27	57
Switzerland								
	Min	0.3x	0.5x	8.4x	10.0x	5.0x	9.2x	0.4x
	Arithmetic mean	**3.8x**	**3.4x**	**28.7x**	**22.1x**	**24.5x**	**24.0x**	**2.7x**
	Median	**2.2x**	**2.2x**	**24.5x**	**21.3x**	**20.1x**	**22.1x**	**1.8x**
	Max	24.3x	21.3x	131.1x	43.2x	120.8x	64.1x	10.9x
	Standard deviation	4.4x	3.8x	18.8x	7.3x	15.1x	9.9x	2.4x
	Number of companies	146	107	129	97	156	104	171

- Austria shows lower (median and mean) valuation levels than Germany and Switzerland. While on the one hand Austrian companies in general have a different regional focus than German and Swiss companies*, on the other hand the lower valuation level can be attributable to the different industry mix of listed companies (e.g. high share of banks and insurance companies in Austria).

* I.e. on average a comparably high exposure to Central Eastern Europe.

Appendix

Composition of the sectors of DAX Sector All Index, WBI and SPI as of December 31, 2019

Appendix

Composition of each finexpert sector as of December 31, 2019

Banking

Germany
AAREAL BANK AG
COMMERZBANK AG
DEUTSCHE BANK AG
DEUTSCHE BOERSE AG
DT.PFANDBRIEFBK AG
PROCREDIT HLDG AG
WUESTENROT & WUERTTEMBERG AG

Austria
ADDIKO BANK AG
BANK FUER TIROL UND VBG AG
BAWAG AG
BKS BANK AG ST
ERSTE GROUP BANK AG
OBERBANK AG
RAIFFEISEN BANK INTERNATATIONAL AG

Switzerland
BASELLAND. KANTONALBANK AG
BASLER KANTONALBANK SA
BC DE GENEVE SA
BC DU JURA SA
BC VAUDOISE SA
BERNER KANTONALBANK AG
BK LINTH LLB AG
CEMBRA MONEY BANK AG
CREDIT SUISSE GROUP AG
EFG INTERNATIONAL AG
GLARNER KANTONALBANK AG
GRAUB KANTONALBANK AG
HYPOTHEKARBANK LENZBURG AG
JULIUS BAER EUROPE AG
LUZERNER KANTONALBANK AG
SCHWEIZERISCHE NATIONALBANK AG
ST GALLER KANTONALBANK GA
THURGAUER KANTONALBANK AG
UBS GROUP AG
VALIANT BANK AG
VONTOBEL EUROPE AG
WALLISER KANTONALBANK AG
ZUGER KANTONALBANK AG

Insurance

Germany
ALLIANZ SE
DFV DEUTSCHE FAMILIENVERSICHERUNG AG
HANNOVER RUECK SE
MUENCHNER RUECK AG
TALANX AG

Austria
UNIQA INSURANCE GROUP AG
VIENNA INSURANCE GROUP AG

Switzerland
BALOISE HOLDING AG
HELVETIA HOLDING AG
PARGESA HOLDING AG
SWISS LIFE HOLDING AG
SWISS RE AG
VAUDOISE ASSURANCES HLD. SA
ZURICH INSURANCE AG

Financial Services

Germany
ALBIS LEASING AG
CAPSENIXX AG
COMDIRECT BANK AG
CREDITSHELF AG
DEUTSCHE BETEILIGUNGS AG
DEUTSCHE CANNABIS AG
DEUTSCHE TECHNISCHE BET. AG
DF DEUTSCHE FORFAIT AG
DWS GROUP GMBH & CO KGAA
ERWE IMMOBILIEN AG
FORIS AG
FRITZ NOLS AG
GRENKE AG
HEIDELBERGER BET. HOLDING AG
HESSE NEWMAN CAPITAL AG
HYPOPORT AG
KAP BETEILIGUNGS-AG
MAIER & PARTNER AG
MARS ONE VENTURES AG
MLP AG
OVB HOLDING AG
PEARL GOLD AG
PONGS & ZAHN AG
SIXT LEASING
SPOBAG
VALUE MGMT & RESEARCH AG
VDN AG
WCM BET. & GRUNDBESITZ AG
WEBAC HOLDING AG

Austria
BURGENLAND HOLDING AG
UNTERNEHMENS INVEST AG
WIENER PRIVATBANK SE

Switzerland
BANQUE PROFIL DE GESTION SA
BELLEVUE GROUP AG
CIE FIN. RICHEMONT AG
GLOBAL ASSET MGMT AG
LEONTEQ AG
LUMX GROUP LTD
PARTNERS GROUP HOLDING AG
PRIVATE EQUITY HOLDING AG
SPCE PRIVATE EQUITY AG
SWISSQUOTE GROUP HOLDING LTD
VALARTIS GROUP AG
VZ HOLDING AG

Appendix

Composition of each finexpert sector as of December 31, 2019

Real Estate

Germany
A.A.A. AG
ACCENTRO REAL ESTATE AG
ADLER REAL ESTATE AG
ALSTRIA OFFICE REIT-AG
DEMIRE DT.MTS.RE AG
DEUTSCHE EUROSHOP AG
DEUTSCHE INDUSTRIE REIT AG
DEUTSCHE KONSUM REIT-AG
DEUTSCHE REAL ESTATE AG
DEUTSCHE WOHNEN AG
DIC ASSET AG
EYEMAXX REAL ESTATE AG
FAIR VALUE REIT-AG
GATEWAY REAL ESTATE LTD.
GODEWIND IMMOBILIEN AG
GSW IMMOBILIEN AG
GWB IMMOBILIEN
HAMBORNER REIT AG
INSTONE REAL ESTATE GROUP N.V.
LEG IMMOBILIEN AG
PATRIZIA IMMOBILIEN AG
TAG IMMOBILIEN AG
TLG IMMOBILIEN AG
UNIPROF REAL ESTATE HLD AG
VONOVIA SE
YMOS AG

Austria
ATRIUM EUROPEAN REAL ESTATE LTD
CA IMMOBILIEN ANLAGEN AG
IMMOFINANZ AG
S IMMO AG
UBM DEVELOPMENT AG
WARIMPEX FINANZ- UND BETEILIGUNGS AG

Switzerland
ALLREAL HOLDING AG
ARUNDEL AG
BFW LIEGENSCHAFTEN AG
CI COM SA
FUNDAMENTAL REAL ESTATE LTD.
HIAG IMMOBILIEN HOLDING AG
INTERSHOP HOLDING AG
INVESTIS HOLDING SA
MOBIMO AG
NOVAVEST REAL ESTATE AG
ORASCOM DEVELOPMENT HLD AG
PEACH PROPERTY GROUP AG
PLAZZA AG
PSP AG
SWISS FIN & PROP INVESTMENT AG
SWISS PRIME SITE AG
VARIA US PROPERTIES AG
WARTECK INVEST AG
ZUEBLIN AG
ZUG ESTATES HOLDING AG

Basic Materials

Germany
ALZCHEM GROUP AG
AURUBIS AG
B.R.A.I.N. AG
BASF SE
BAYER AG
COVESTRO AG
DE RAJ GROUP AG
DECHENG TECHNOLOGY AG
EISEN- & HUETTENWERKE AG
EVONIK INDUSTRIES AG
FUCHS PETROLUB SE
H & R GMBH & CO KGAA
K & S AG
KHD HUMBOLDT WEDAG AG
LANXESS AG
PETRO WELT TECHNOLOGIE AG
SALZGITTER AG
SGL CARBON SE
SIMONA AG
SURTECO SE
SYMRISE AG
WACKER CHEMIE AG
YOUBISHENG GREEN PAPER AG

Austria
AMAG AUSTRIA METALL AG
LENZING AG
OMV AG
PORR AG
SCHOELLER-BLECKMANN AG
STRABAG SE
VOESTALPINE AG
WIENERBERGER AG

Switzerland
CLARIANT AG
CPH CHEMIE & PAPIER HOLDING AG
EMS-CHEMIE AG
GIVAUDAN SA
GURIT HOLDING AG
SCHMOLZ & BICKENBACH AG
ZWAHLEN & MAYR SA

Appendix

Composition of each finexpert sector as of December 31, 2019

Consumer Goods

Germany

A.S.CREATION TAPETEN AG
ADIDAS AG
ADLER MODEMAERKTE AG
AHLERS AG
AKASOL AG
AUDI AG
BAWAG AG
BAYERISCHE MOTOREN WERKE AG
BBS KRAFTFAHRZEUGTECHNIK AG
BEIERSDORF AG
BERENTZEN-GROUP AG
BERTRANDT AG
BHS TABLETOP AG
BORUSSIA DORTMUND GMBH & CO. KGAA
CEWE STIFTUNG & CO.KGAA
CONTINENTAL AG
DAIMLER AG
DIERIG HOLDING AG
EDAG ENGINEERING
EINHELL GERMANY AG
ELRINGKLINGER AG
FENGHUA SOLETECH AG
GERRY WEBER INTERNATIONAL AG
GRAMMER AG
HELLA KGAA HUECK & CO.
HENKEL AG & CO. KGAA
HUGO BOSS AG
IFA HOTEL & TOURISTIK AG
JJ AUTO AG
KAMPA AG
LEIFHEIT AG
LEONI AG
MING LE SPORTS AG
MUEHL PRODUKT & SERVICE AG
PFERDEWETTEN.DE AG
PORSCHE AUTOMOBIL HLD. SE
PROGRESS-WERK OBERKIRCH AG
PUMA SE
ROY CERAMICS SE
SCHAEFFLER AG
SCHLOSS WACHENHEIM AG
STEILMANN SE
STO SE & CO. KGAA
STS GROUP AG
SUEDZUCKER AG
TC UNTERHALTUNGSELEKTRONIK AG
TOM TAILOR HOLDING AG
ULTRASONIC AG
VALENS HOLDING AG
VERALLIA DTLD AG
VILLEROY & BOCH AG
VOLKSWAGEN AG
WASGAU PRODUNKTIONS & HANDELS AG
WESTAG & GETALIT AG

Austria

AGRANA BETEILIGUNGS AG
DO & CO AG
GURKTALER AG
JOSEF MANNER & COMP. AG
KTM INDUSTRIES AG
LINZ TEXTIL HOLDING AG
OTTAKRINGER GETRAENKE AG
POLYTEC HOLDING AG
STADLAUER MALZFABRIK AG
WOLFORD AG

Switzerland

AIRESIS SA
ARYZTA AG
AUTONEUM AG
BARRY CALLEBAUT AG
BELL AG
BLACKSTONE RESOURCES LTD
CALIDA HOLDING AG
EMMI AG
GM SA
HOCHDORF HOLDING AG
LALIQUE GROUP SE
LECLANCHE SA
LINDT & SPRUENGLI AG
METALL ZUG AG
NESTLE SA
ORIOR AG
RESAPHENE SUISSE AG
RICHEMONT SA
STADLER RAIL AG
SWATCH GROUP SA

Telecommunication

Germany

11 88 0 SOLUTIONS AG
3U HOLDING AG
DEUTSCHE TELEKOM AG
DRILLISCH AG
ECOTEL COMMUNICATION AG
FREENET AG
LS TELCOM AG
NFON AG
TELEFONICA DEUTSCHLAND HOLDING AG
YOC AG

Austria

TELEKOM AUSTRIA AG

Switzerland

SUNRISE COMMUNICATIONS AG
SWISSCOM AG

Appendix
Composition of each finexpert sector as of December 31, 2019

Industrials (1/2)

Germany

7C SOLARPARKEN AG
A.I.S. AG
ALBA SE
AMADEUS FIRE AG
AUMANN AG
AVES ONE AG
BASLER AG
BAUER AG
BAYWA AG
BILFINGER SE
BOEWE SYSTEC AG
BRENNTAG AG
CENTROTEC SUSTAINABLE AG
CROPENERGIES AG
DEUTSCHE POST AG
DEUTZ AG
DMG MORI AG
DR. HOENLE AG
DUERR AG
ELECTRAWINDS SE
ENERGIEKONTOR AG
FRANCOTYP-POSTALIA HOLDING AG
FRAPORT AG
FRIWO AG
FROEHLICH BAU AG
GEA GROUP AG
GESCO AG
HAMBURGER HAFEN & LOGISTIK AG
HANSEYACHTS AG
HAPAG-LLOYD AG
HEIDELBERG.DRUCKMASCHINEN AG
HEIDELBERGCEMENT AG
HELIOCENTRIS ENERGIE SOL. AG
HOCHTIEF AG
INDUS HOLDING AG
INFAS HLDG AG
ITN NANOVATION AG
JENOPTIK AG
JOST WERKE AG
JUNGHEINRICH AG
KHD HUMBOLDT WEDAG AG
KION GROUP AG
KLOECKNER & CO: SE
KNORR-BREMSE AG
KOENIG & BAUER AG
KROMI LOGISTIK
KRONES AG
KSB AG
KUKA AG
KWS SAAT SE
LPKF LASER & ELECTRONICS AG
LUFTHANSA AG
MAN SE
MANZ AG
MASCHINENFABRIK BERT.HER. AG
MASTERFLEX AG
MAX AUTOMATION AG
MBB SE
MEDION AG
MS INDUSTRIE AG
MTU AERO ENGINES AG
MUELLER-DIE LILA LOGISTIK AG
NESCHEN AG
NORDEX SE
NORDWEST HANDEL AG
NORMA GROUP SE
ORBIS AG
OSRAM LICHT AG
PFEIFFER VACUUM TECHNOLOGY AG
PHILIPP HOLZMANN AG
PHOENIX SOLAR AG
PITTLER MA.FABR. AG
PNE WIND AG
PVA TEPLA AG
R. STAHL AG
RATIONAL AG
RHEINMETALL AG
RINGMETALL AG
S & O AGRAR AG
SCHALTBAU HOLDING
SCHUMAG AG
SFC ENERGY AG
SIEMENS AG
SINGULUS
SINO-GERMAN UNITED AG
SIXT SE
SLM SOLUTIONS GROUP AG
SMA SOLAR TECHNOLOGY AG
SMT SCHARF AG
SOFTING AG
SOLAR-FABRIK AG
TECHNOTRANS AG
THYSSENKRUPP AG
TRATON SE
TUFF GROUP AG
UTD POWER TECHNOLOGY AG
UZIN UTZ AG
VA-Q-TEC AG
VARTA AG
VERBIO VEREINIGTE BIOENERGIE AG
VISCOM AG
VOLTABOX AG
VOSSLOH AG
WACKER NEUSON SE
WALTER BAU-AG
WASHTEC AG
ZHONGDE WASTE TECHNOLOGY AG

Austria

ANDRITZ AG
CLEEN ENERGY AG
FACC AG
FLUGHAFEN WIEN AG
FRAUENTHAL HOLDING AG
HTI HIGH TECH INDUSTRIES AG
MAYR-MELNHOF KARTON AG
OESTER. STAATSDRUCKEREI HOLDING AG
OESTERREICHISCHE POST AG
PALFINGER AG
ROSENBAUER INTERNATIONAL AG
SEMPERIT AG HOLDING
SW UMWELTTECHNIK AG
ZUMTOBEL GROUP AG

Switzerland

ABB SCHWEIZ AG
ADECCO GROUP AG
ADVAL TECH HOLDING AG
ALUFLEXPACK AG
ARBONIA AG
BELIMO AUTOMATION AG
BOBST GROUP SA
BOSSARD HOLDING AG
BUCHER INDUSTRIES AG
BURCKHARDT AG
BURKHALTER HOLDING AG
BVZ HOLDING AG
CICOR MANAGEMENT AG
COMET HOLDING AG
CONZZETA AG
DAETWYLER HOLDING AG
DKSH HOLDING AG
DORMAKABA HOLDING AG
ELMA ELECTRONIC AG
FEINTOOL INTERNATIONAL HOLDING AG
FISCHER AG
FLUGHAFEN ZUERICH AG
FORBO HOLDING AG
GAVAZZI HOLDING AG
GEBERIT AG
IMPLENIA AG
INFICON HOLDING AG
INTERROLL HOLDING AG
KARDEX AG
KLINGELNBERG LTD
KOMAX HOLDING AG
KUEHNE & NAGEL INTERNATIONAL AG

Appendix

Composition of each finexpert sector as of December 31, 2019

Industrials (2/2)

LAFARGEHOLCIM AG
LANDIS+GYR GROUP AG
LEM HOLDING AG
MCH GROUP AG
MEDACTA GROUP SA
MEYER BURGER AG
MIKRON SA
OC OERLIKON CORPORATION AG
PANALPINA WELTTRANSPORT AG
PERFECT SA
PERROT DUVAL HOLDING SA
PHOENIX AG
POENINA HOLDING AG
RIETER MASCHINENFABRIK AG
SCHAFFNER AG
SCHINDLER AUFZUEGE AG
SCHLATTER HOLDING AG
SCHWEITER TECHNOLOGIES AG
SENSIRION HOLDING AG
SFS GROUP AG
SGS SA
SIG COMBIBLOC GROUP AG
SIKA AG
STARRAG GROUP HOLDING AG
SULZER AG
TORNOS HOLDING AG
VAT GROUP AG
VETROPACK HOLDING AG
VON ROLL HOLDING AG
WALTER MEIER AG
ZEHNDER GROUP AG

Consumer Service

Germany

A.SPRINGER SE
AD PEPPER MEDIA N.V.
ARTNET AG
BASTEI LUEBBE AG
BEATE UHSE AG
BET-AT-HOME.COM AG
BIJOU BRIGITTE AG
CECONOMY AG
CTS EVENTIM AG & CO. KGAA
DEAG DEUTSCHE ENTERTAINMENT AG
DELIVERY HERO AG
DELTICOM AG
ELANIX BIOTECHNIK AG
ELUMEO SE
ENERXY AG
FD GROUP AG
FIELMANN AG
HAWESKO HOLDING AG
HELLOFRESH SE
HIGHLIGHT COMMUNICATIONS AG
HOME24 SE
HORNBACH BAUMARKT AG
HORNBACH HOLDING AG & CO. KGAA
INTERTAINMENT AG
KLASSIK RADIO AG
LOTTO24 AG
LUDWIG BECK AG
METRO AG
MYBET HOLDING SE
ODEON FILM AG
PROSIEBENSAT.1 MEDIA SE
ROCKET INTERNET SE
SCOUT24 AG
SLEEPZ AG
SNOWBIRD AG
SPL.MEDIEN AG
STARAMBA SE
STROEER SE & CO. KGAA
TAKKT AG
TELE COLUMBUS AG
TMC CONTENT GROUP AG
TRAVEL24.COM AG
UNITED LABELS AG
WESTWING GROUP AG
WIGE MEDIA AG
WILD BUNCH AG
WINDELN.DE SE
YOUR FAMILY ENTERTAINMENT AG
ZALANDO SE
ZOOPLUS AG

Switzerland

APG SGA AG
ASMALLWORLD AG
DUFRY AG
GALENICA AG
HIGHLIGHT EVENT & ENTERTAINMENT AG
JUNGFRAUBAHN HOLDING AG
MOBILEZONE HOLDING AG
OREL FUESSLI HOLDING AG
TAMEDIA AG
TITL BN BERG AG
VALORA AG
VILLARS HOLDING SA
ZUR ROSE GROUP AG

Appendix

Composition of each finexpert sector as of December 31, 2019

Pharma & Healthcare

Germany
4 SC AG
AAP IMPLANTATE AG
BB BIOTECH AG
BIOFRONTERA AG
BIOTEST AG.
CARL ZEISS MEDITEC AG
CO.DON AG
CURASAN AG
DERMAPHARM HOLDING SE
DRAEGERWERK AG & CO. KGAA
ECKERT & ZIEGLER AG
EPIGENOMICS AG
EVOTEC AG
FRESEN.MED.CARE AG & CO. KGAA
FRESENIUS SE & CO.KGAA
GERATHERM MEDICAL AG
GERRESHEIMER AG
MATERNUS-KLINK AG
MEDICLIN AG
MEDIGENE AG
MEDIOS AG
MERCK AG & CO. KGAA
MOLOGEN AG
MORPHOSYS AG
PAION AG
RHOEN-KLINIKUM AG
SARTORIUS AG
SIEMENS HEALTHINEER AG
STRATEC BIOMEDICAL AG
SYGNIS AG
VITA 34 AG
WILEX AG

Austria
MARINOMED BIOTECH AG

Switzerland
ADDEX AG
AEVIS HOLDING SA
ALCON INC.
BACHEM HOLDING AG
BASILEA PHARMACEUTICA AG
COLTENE HOLDING AG
EVOLVA HOLDING SA
IDORSIA LTD
IGEA PHARMA N.V.
IVF HARTMANN AG
KUROS BIOSCIENCES AG
LONZA GROUP AG
MEDARTIS HOLDING AG
MOLECULAR PARTNERS AG
NOVARTIS AG
OBSEVA SA
POLYPHOR AG
RELIEF THERAPEUTICS HOLDING AG
ROCHE AG
SANTHERA PHARM. HOLDING AG
SIEGFRIED HOLDING AG
SONOVA HOLDING AG
STRAUMANN HOLDING AG
TECAN GROUP AG
VIFOR PHARMA AG
YPSOMED HOLDING AG

Information Technology (1/2)

Germany
ADESSO AG
ADVA OPTICAL NETWORKING SE
AIXTRON SE
ALL FOR ONE STEEB AG
ALLGEIER SE
AMATECH AG
ATOSS SOFTWARE AG
B & S BANKSYSTEME AG
BECHTLE AG
CANCOM SE
CENIT AG
COMPUGROUP MEDICAL SE
DATA MODUL AG
EASY SOFTWARE AG
ELMOS SEMICONDUCTOR AG
EUROMICRON AG
FABASOFT AG
FIRST SENSOR AG
FORTEC ELEKTRONIK AG
GFT TECHNOLOGIES SE
GIGASET AG
GK SOFTWARE
HOLIDAYCHECK GROUP AG
INFINEON TECHNIK AG
INIT INNOVATION SE
INTERSHOP COMMUNICATIONS AG
INTICA SYSTEMS AG
INVISION AG
ISRA VISION
IVU TRAFFIC TECHNOLOGIE AG
KPS AG
M & S ELEKTRONIK AG
METRIC MOBILITY SOLUTIONS AG
MEVIS MEDICAL SOLUTIONS AG
MYHAMMER HOLDING AG
NEMETSCHEK SE
NEW WORK SE
NEXUS AG
NORCOM INFORMATION TECHN. AG
OHB SE
OPENLIMIT HOLDING AG
PANAMAX AG
PARAGON AG
PSI AG
QSC AG
REALTECH AG
RIB SOFTWARE AG
S & T AG
SAP SE
SCHWEIZER ELECTRONIC AG
SECUNET SECURITY AG
SERVICEW ARE AG
SILTRONIC AG
SNP AG
SOFTWARE AG
STEMMER IMAGING AG
SUESS MICROTEC AG
SYZYGY AG
TDMI AG
TEAMVIEWER AG
TELES AG
TISCON AG
TTL AG
USU SOFTWARE AG
UTD. INTERNET AG
VIVANCO GRUPPE AG
WIRECARD AG

Austria
AT&S AUSTRIA TECH.& SYSTEMTECH. AG
FREQUENTIS AG
KAPSCH TRAFFICCOM AG
MASCHINENFABRIK HEID AG
RATH AG

Switzerland
ALSO HOLDING AG
AMS AG
ASCOM HOLDING AG

Appendix

Composition of each finexpert sector as of December 31, 2019

Information Technology (2/2)

CREALOGIX HOLDING AG
HUBER+SUHNER AG
KUDELSKI SA
LOGITECH INTERNATIONAL SA
SOFTWAREONE HOLDING AG
TEMENOS GROUP AG
U-BLOX HOLDING AG
WISEKEY INTERNATIONAL HOLDING AG

Utilities

Germany
CAPITAL STAGE AG
E.ON SE
ENBW ENERGIE B./W. AG
GELSENWASSER AG
INNOGY SE
MAINOVA AG
MVV ENERGIE AG
RWE AG
UNIPER SE

Austria
EVN AG
VERBUND AG

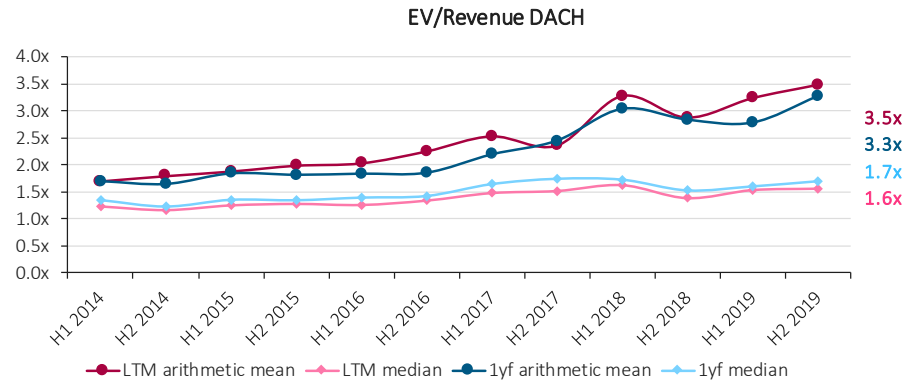
Switzerland
BKW ENERGIE AG
EDISUN POWER EUROPE AG
ROMANDE ENERGIE HOLDING SA

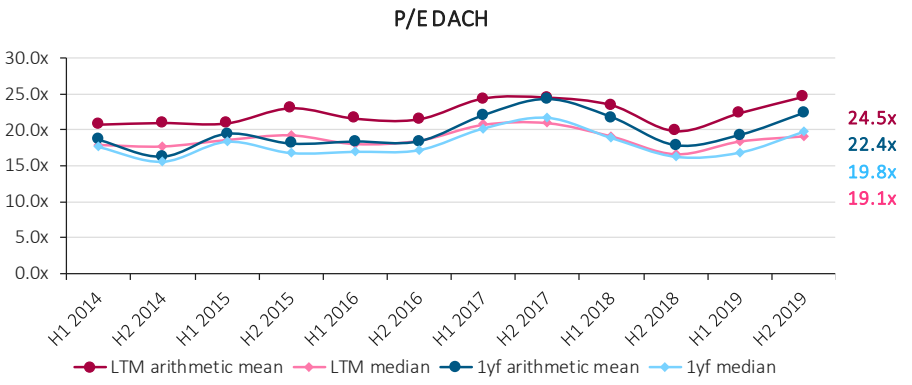
Appendix

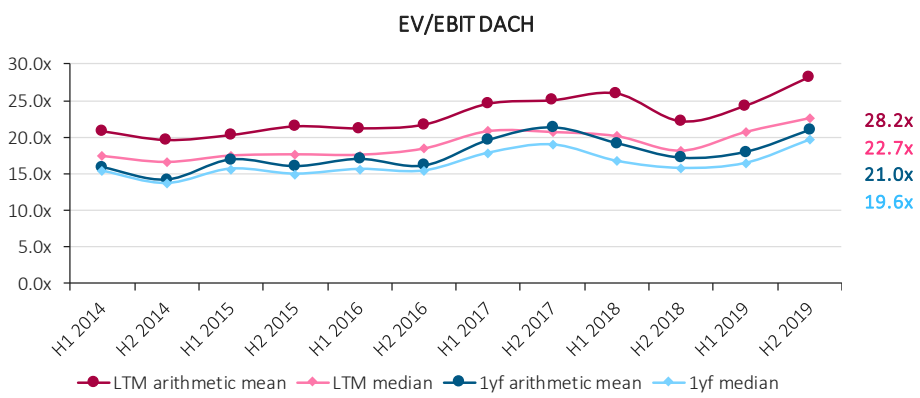
Historical development of trading multiples since 2014

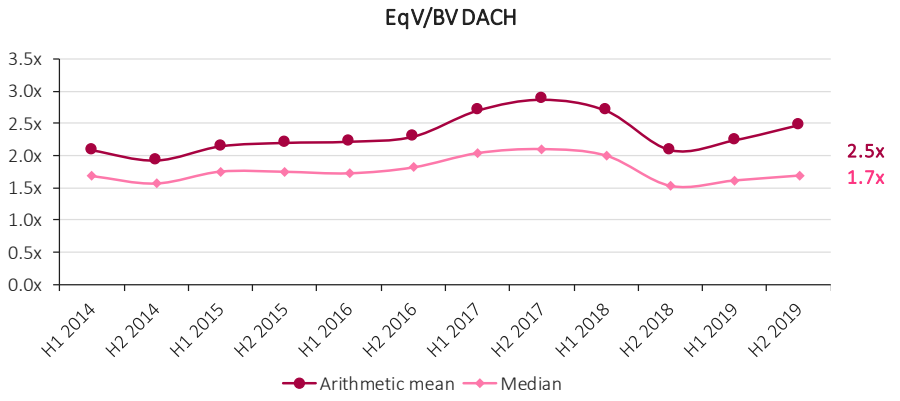
Trading Multiples

DACH – Revenue-, EBIT-, P/E- and EqV/BV-Multiples



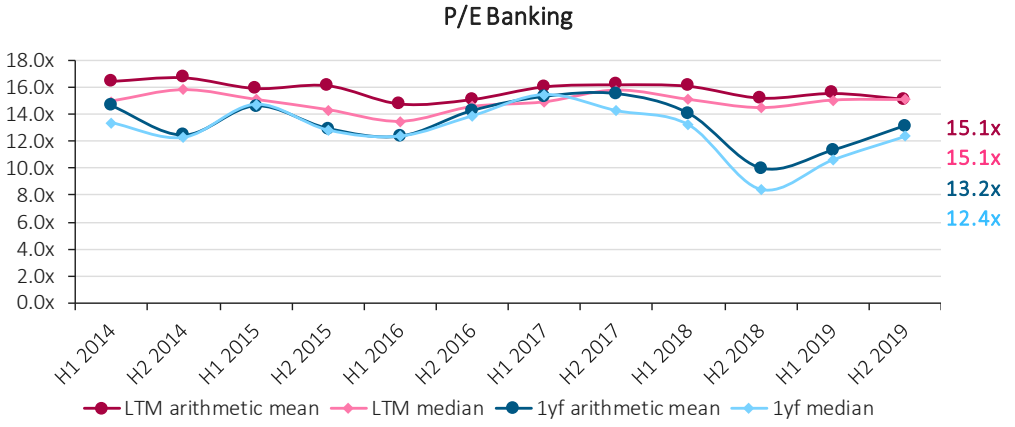


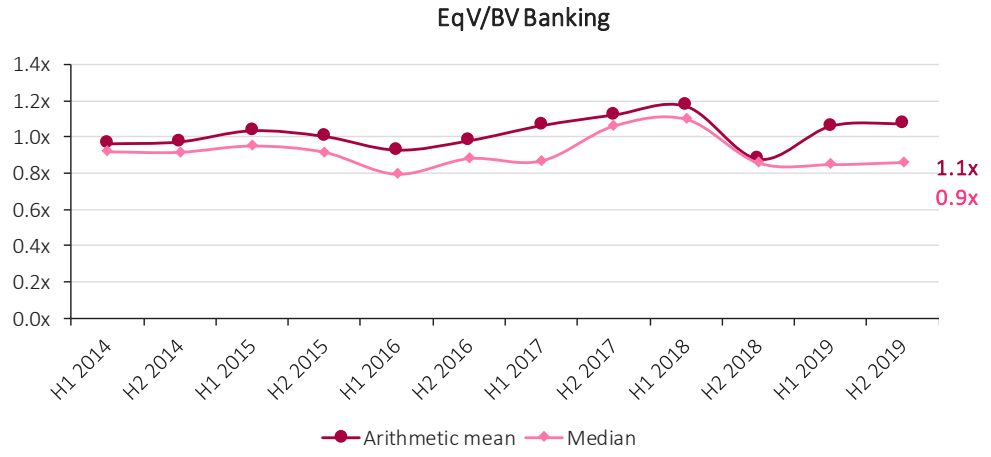




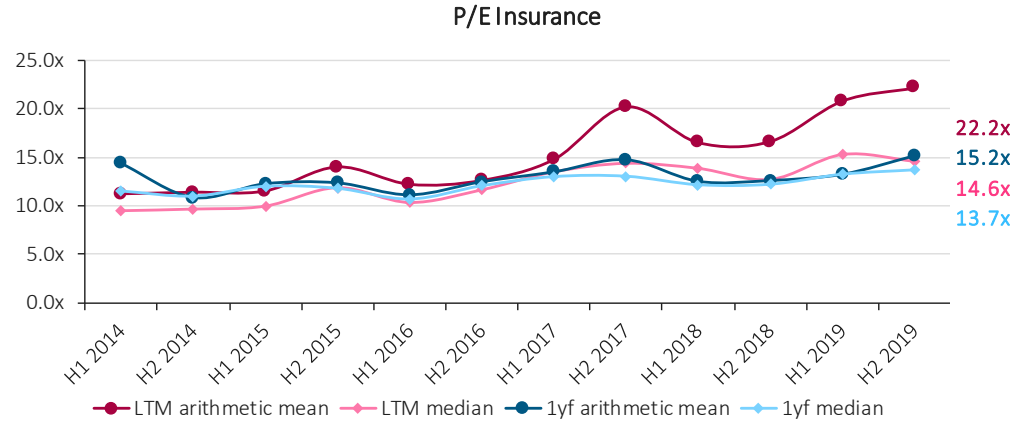
Note: As of the reference date, the "FIRE" sector used in previous studies was divided into the sectors Banking, Financial Services, Insurance and Real Estate. The historical development of the DACH multiples is based on the sector classification used in previous studies. Opposed to that, the DACH multiples as of the reference date December 31, 2019 correspond to the newly introduced sector classification (cf. 33).

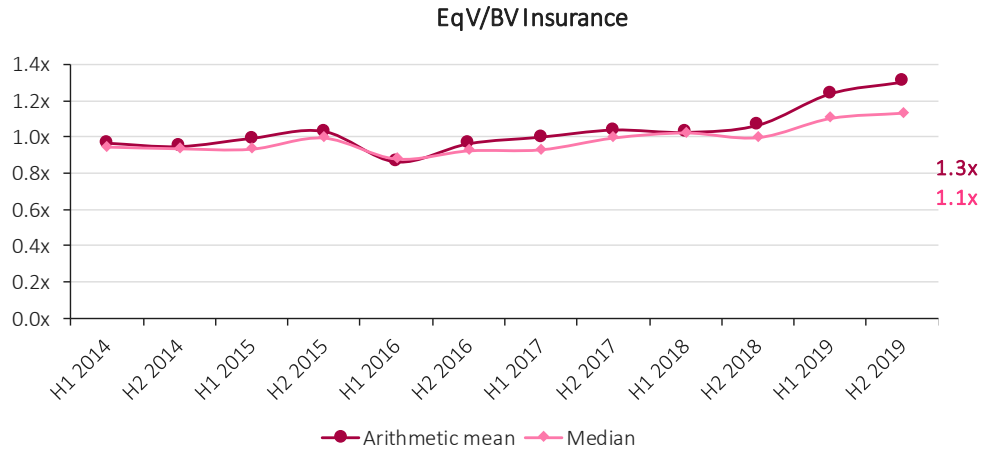
Trading Multiples
Banking – P/E- and EqV/BV-Multiples





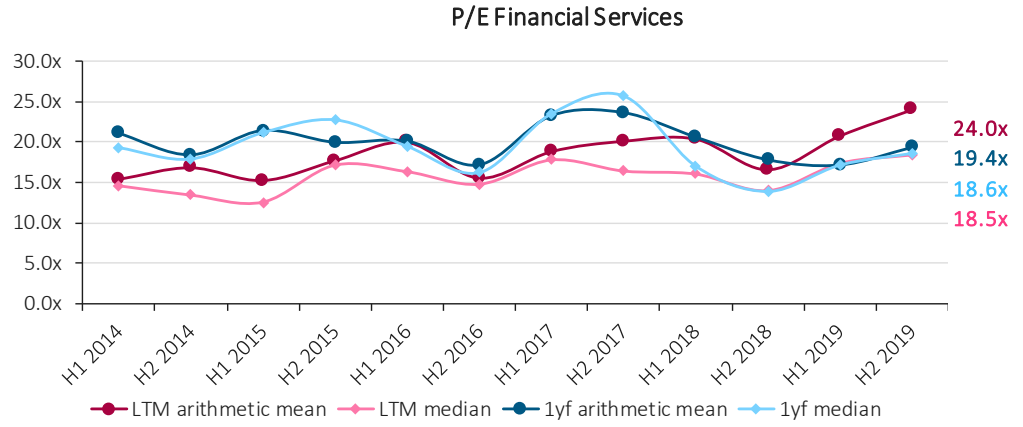
Trading Multiples
Insurance – P/E- and EqV/BV-Multiples

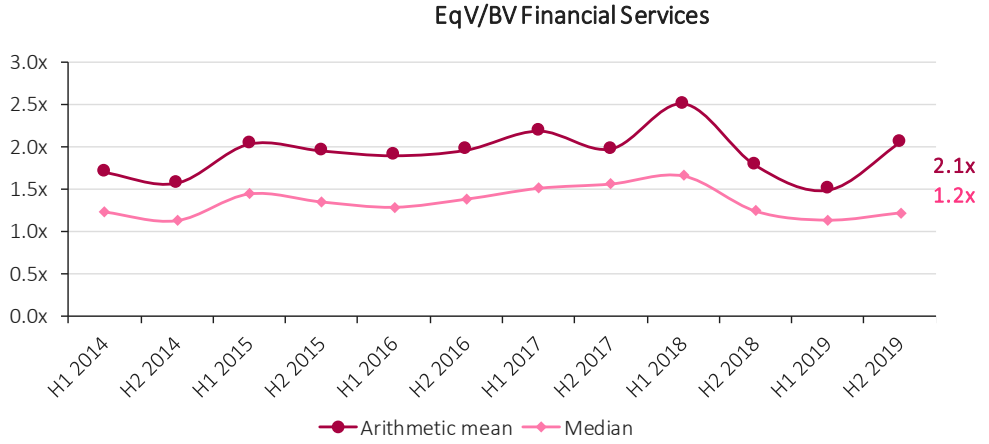




Trading Multiples

Financial Services – P/E- and EqV/BV-Multiples

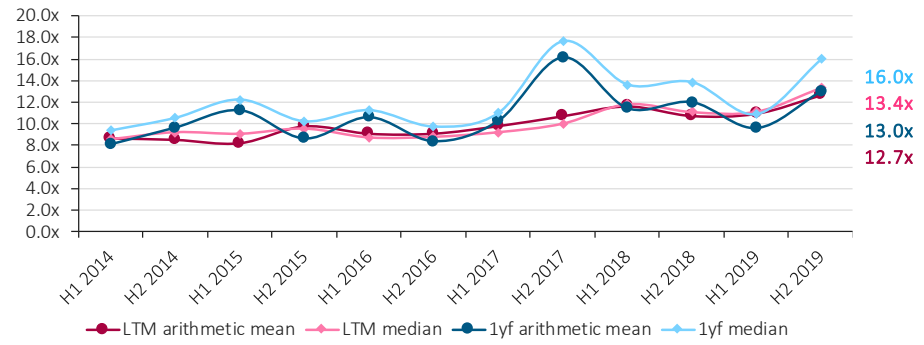




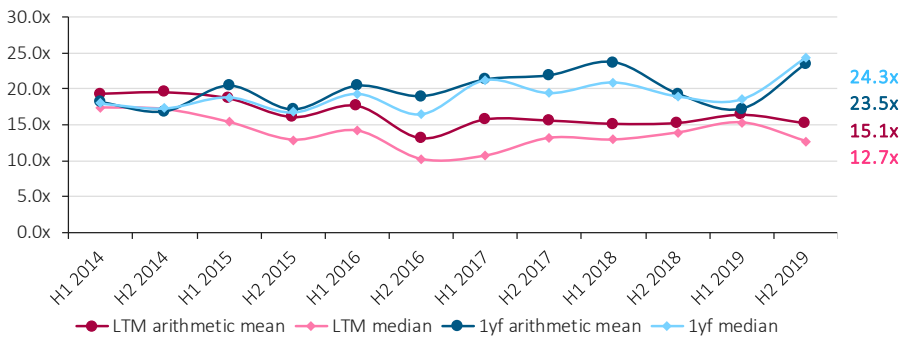
Trading Multiples

Real Estate – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

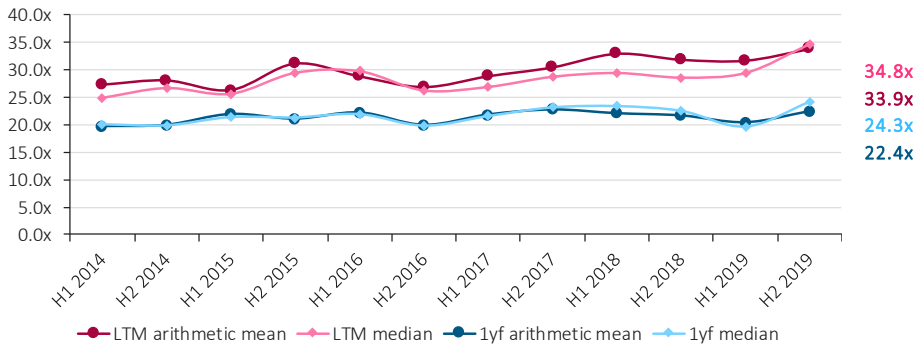
EV/Revenue Real Estate



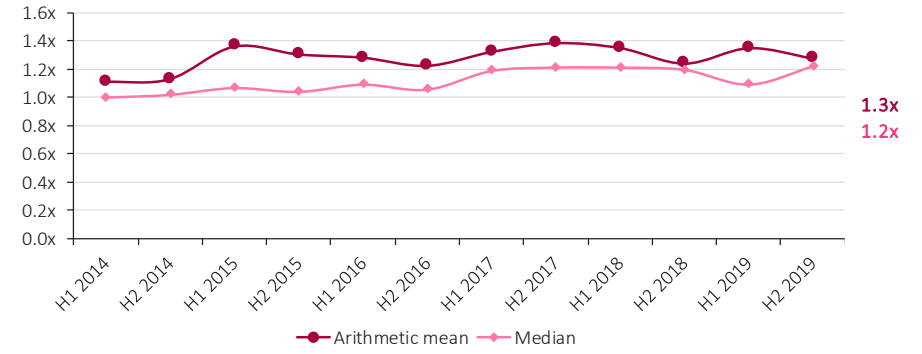
P/E Real Estate



EV/EBIT Real Estate



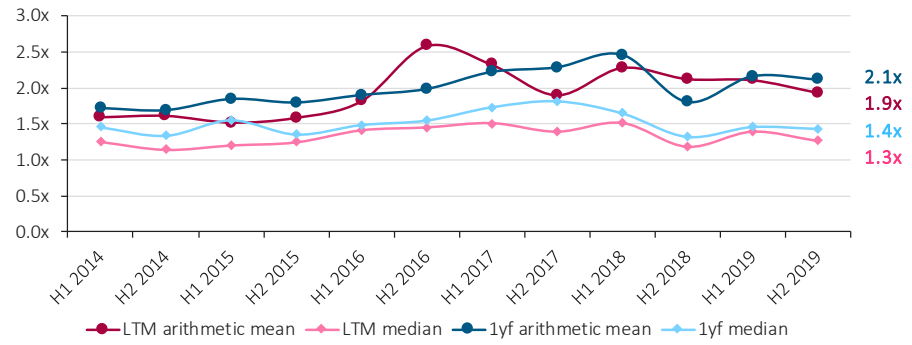
EqV/BV Real Estate



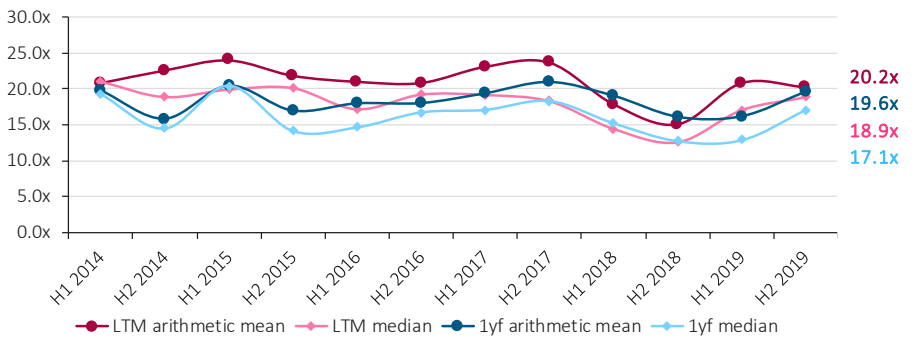
Trading Multiples

Basic Materials – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

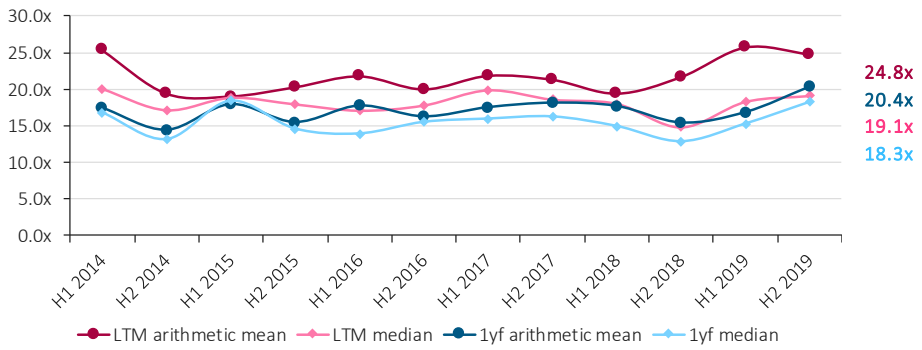
EV/Revenue Basic Materials



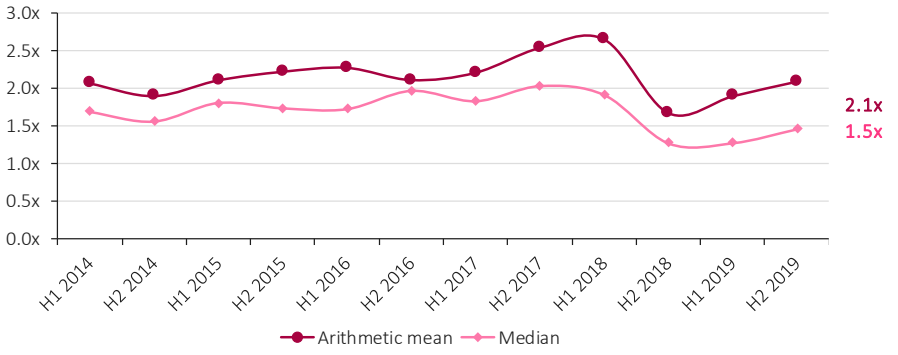
P/E Basic Materials



EV/EBIT Basic Materials



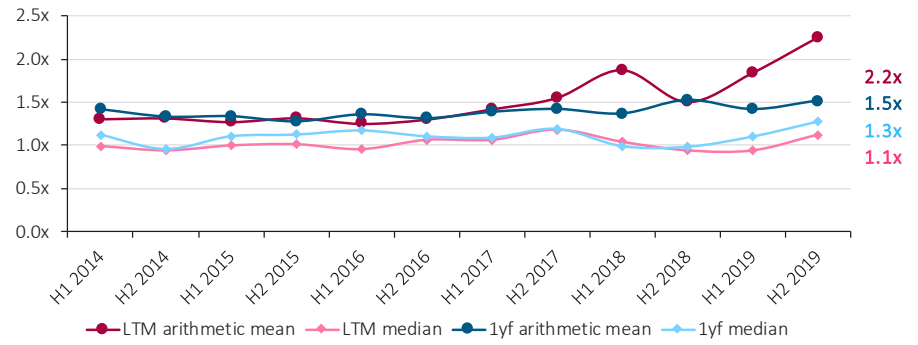
EqV/BV Basic Materials



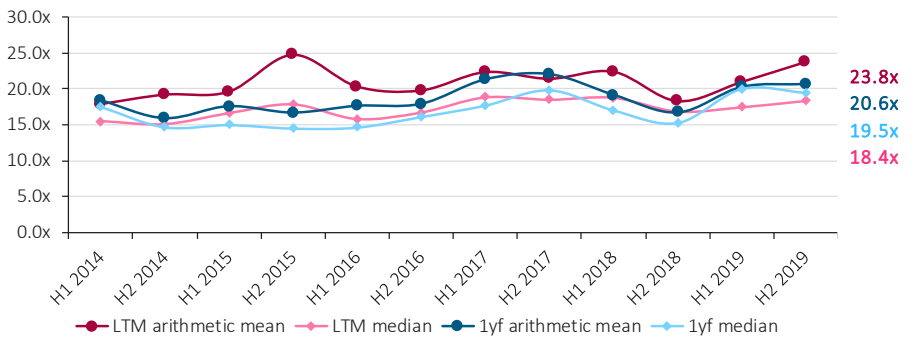
Trading Multiples

Consumer Goods – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

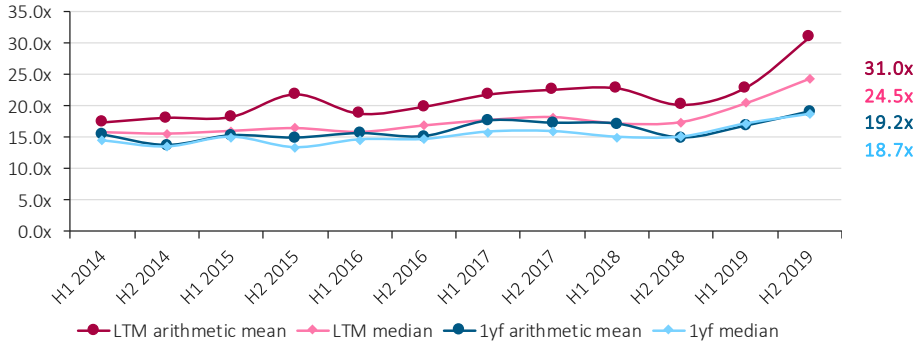
EV/Revenue Consumer Goods



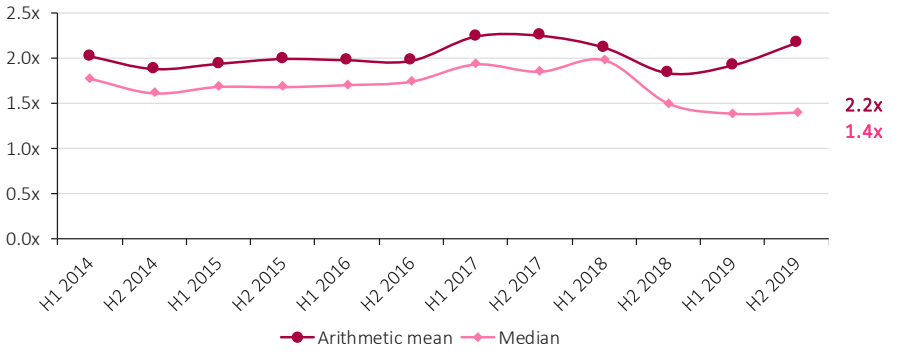
P/E Consumer Goods



EV/EBIT Consumer Goods



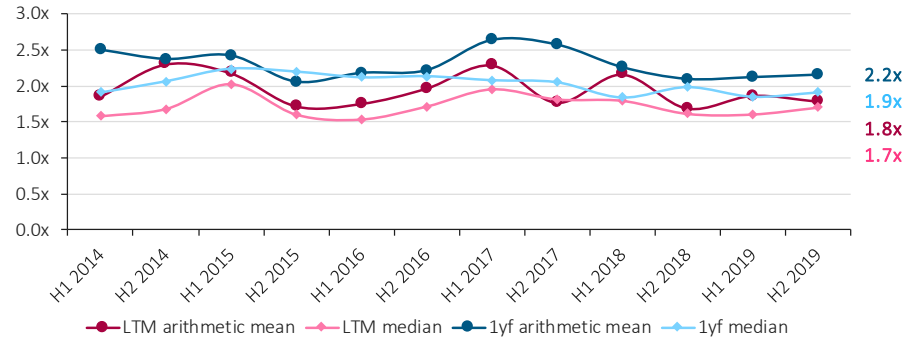
EqV/BV Consumer Goods



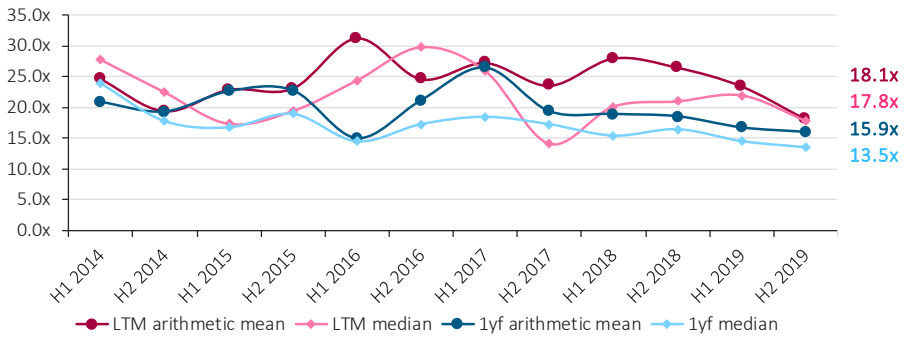
Trading Multiples

Telecommunication – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

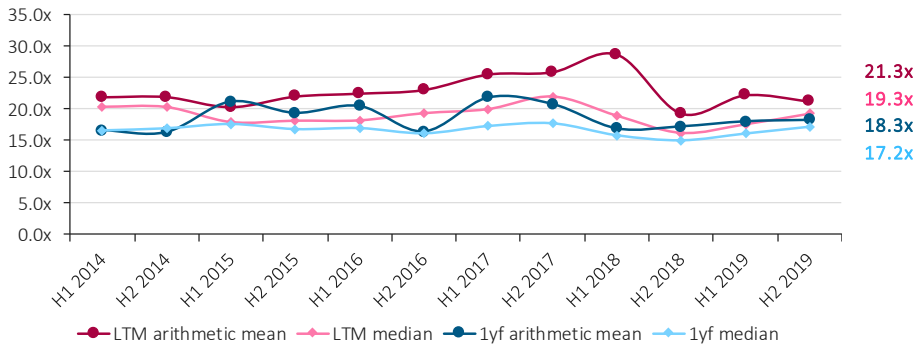
EV/Revenue Telecommunication



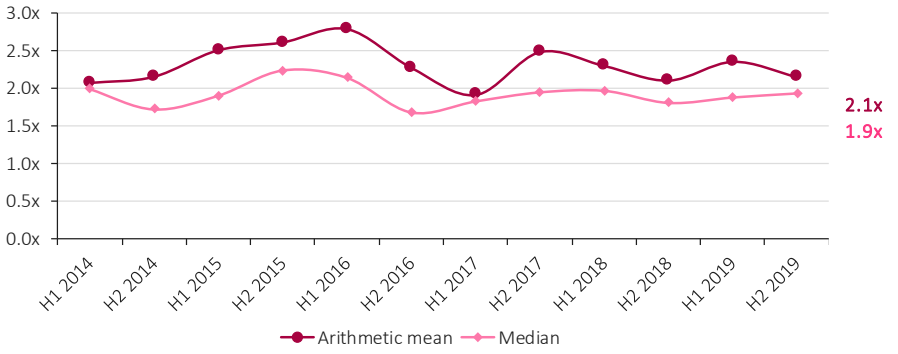
P/E Telecommunication



EV/EBIT Telecommunication



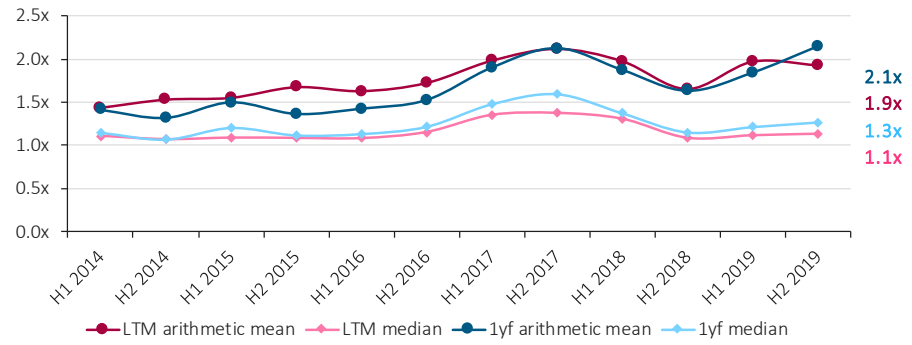
EqV/BV Telecommunication



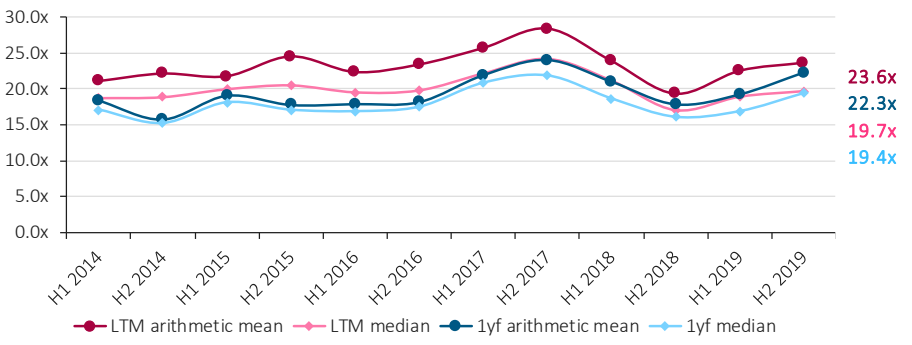
Trading Multiples

Industrials – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

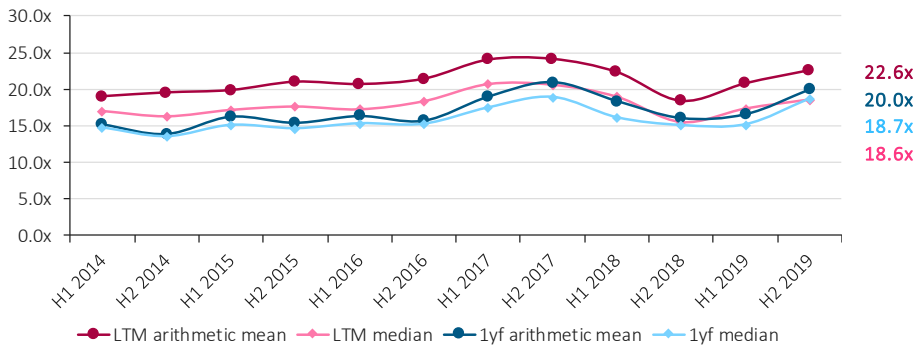
EV/Revenue Industrials



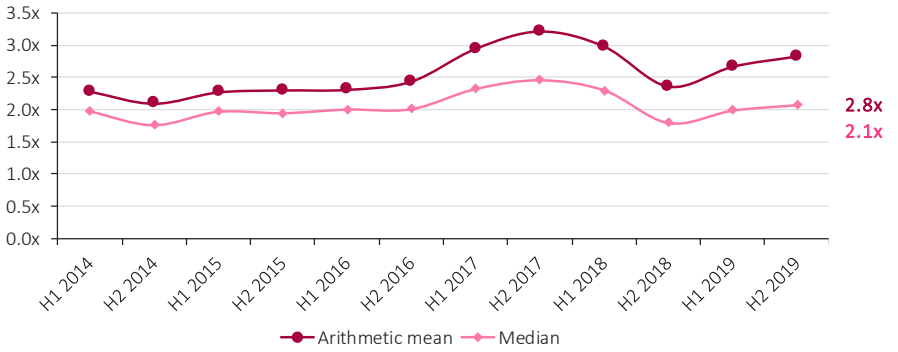
P/E Industrials



EV/EBIT Industrials



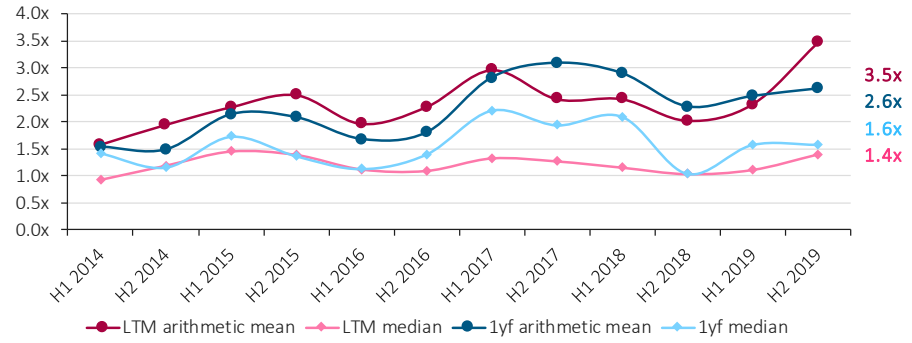
EqV/BV Industrials



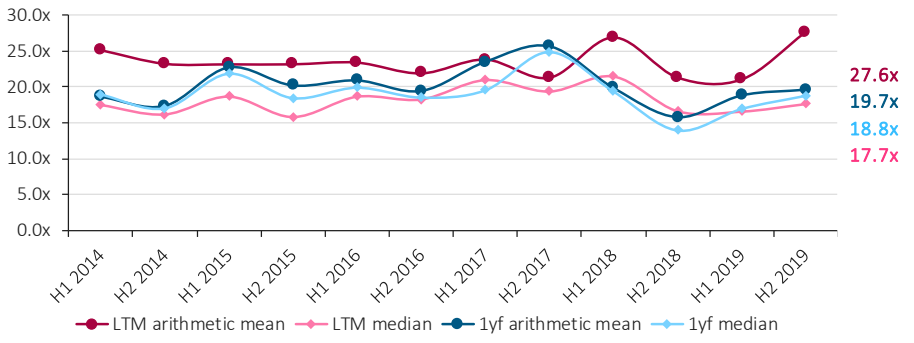
Trading Multiples

Consumer Service – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

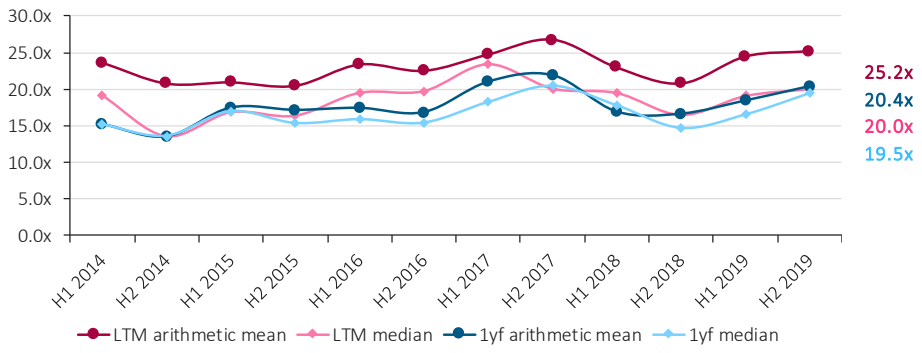
EV/Revenue Consumer Service



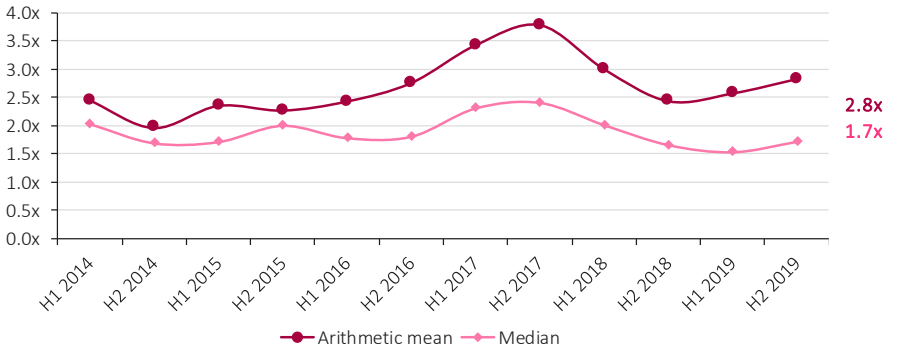
P/E Consumer Service



EV/EBIT Consumer Service



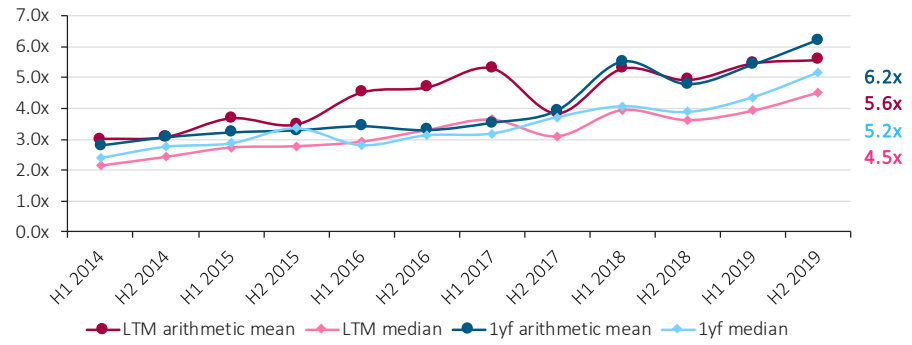
EqV/BV Consumer Service



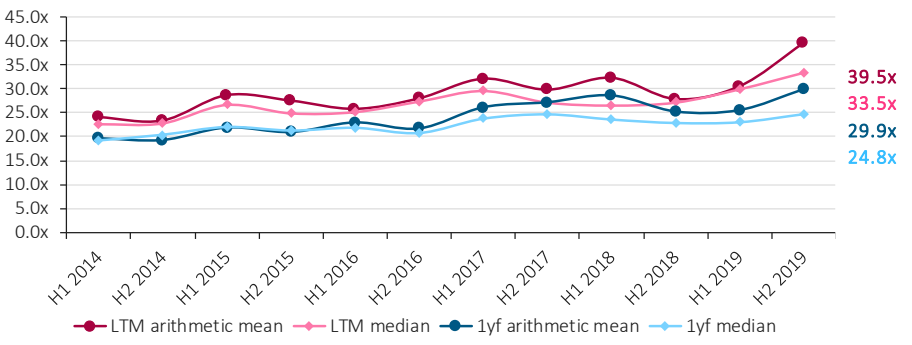
Trading Multiples

Pharma & Healthcare – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

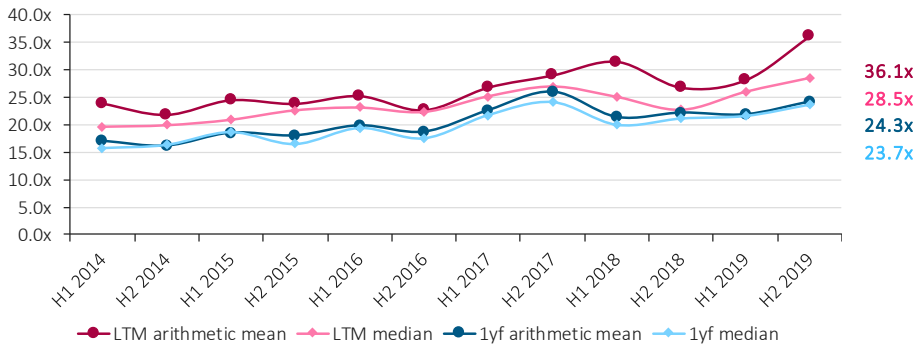
EV/Revenue Pharma & Healthcare



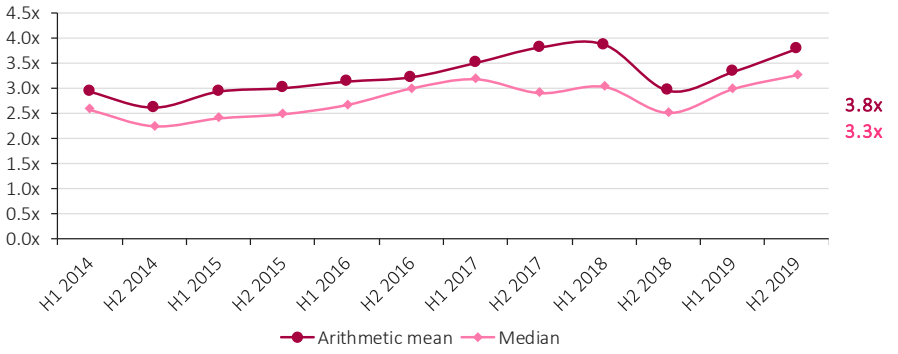
P/E Pharma & Healthcare



EV/EBIT Pharma & Healthcare



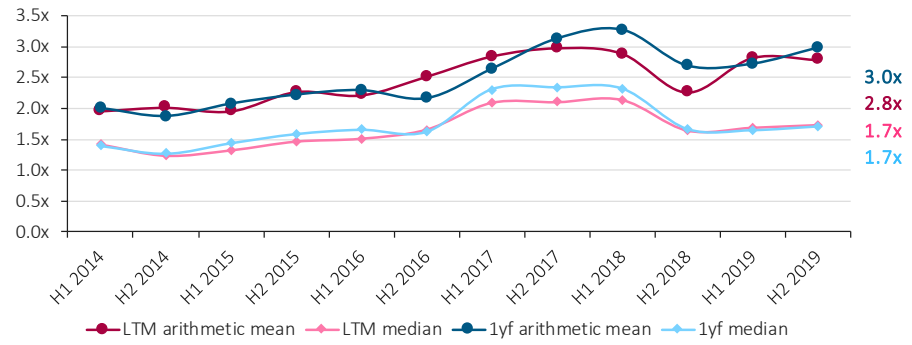
EqV/BV Pharma & Healthcare



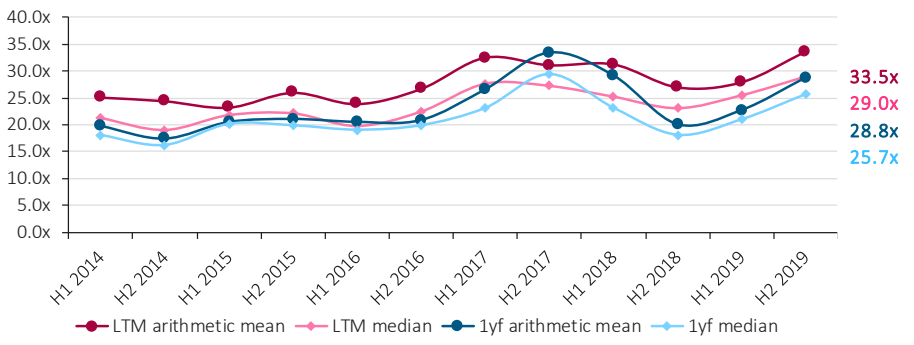
Trading Multiples

Information Technology – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

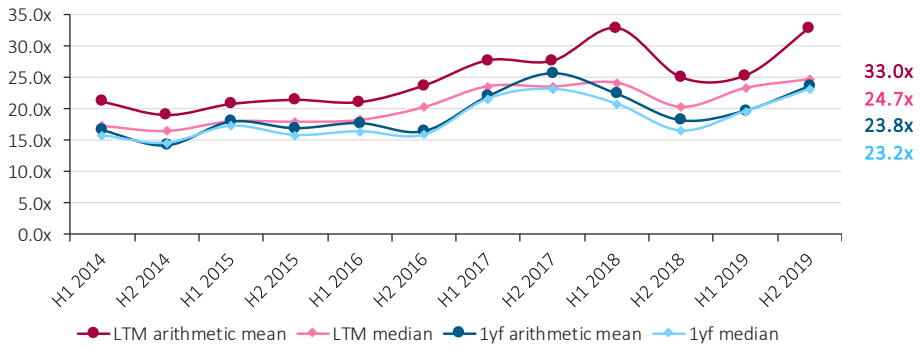
EV/Revenue Information Technology



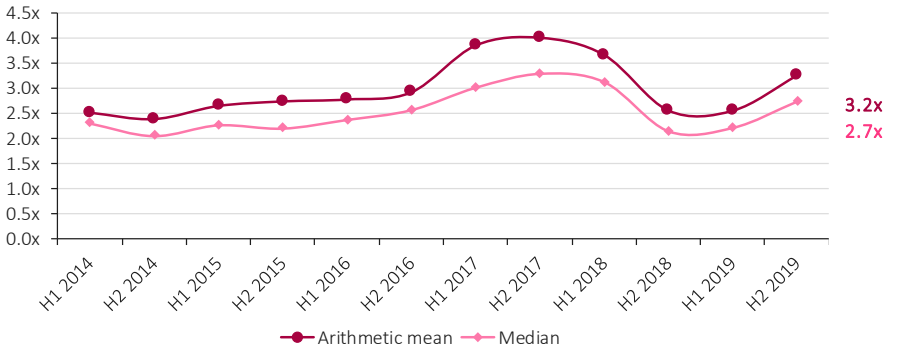
P/E Information Technology



EV/EBIT Information Technology



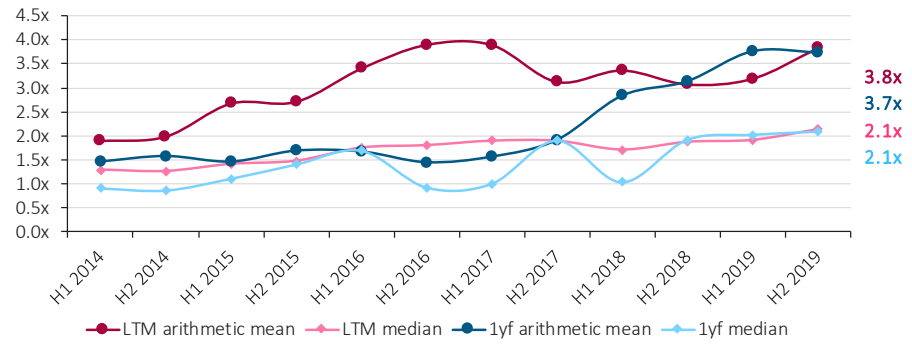
EqV/BV Information Technology



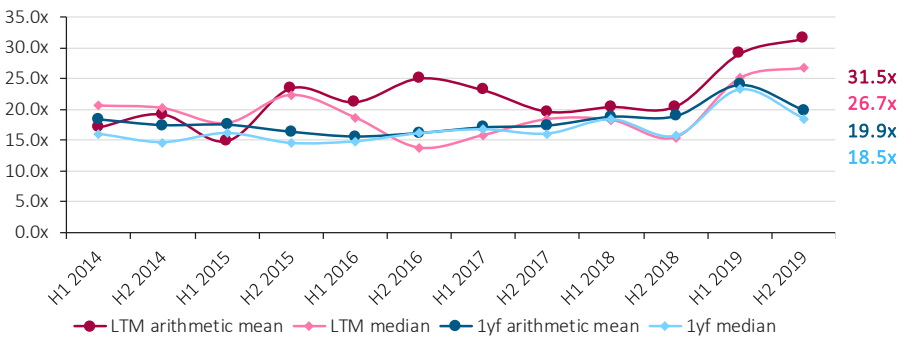
Trading Multiples

Utilities – Revenue-, EBIT-, P/E- and EqV/BV-Multiples Multiples

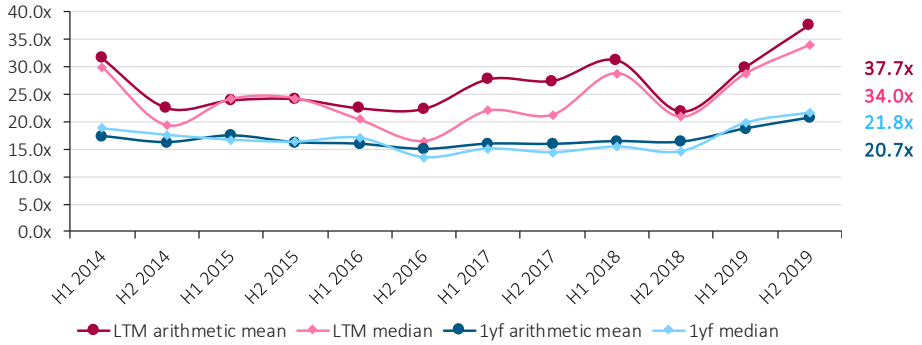
EV/Revenue Utilities



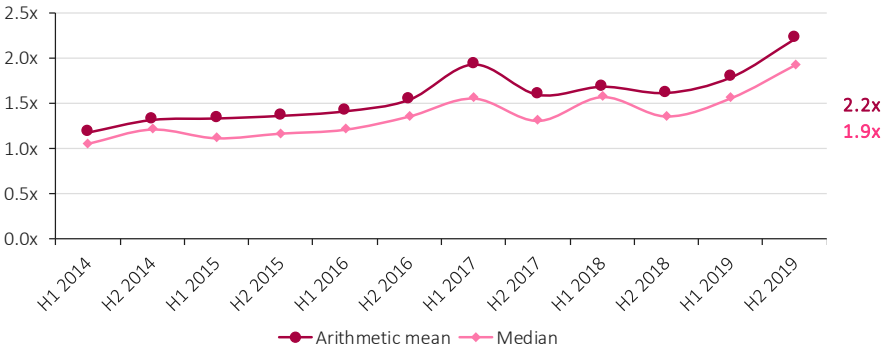
P/E Utilities



EV/EBIT Utilities



EqV/BV Utilities



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