DACH Capital Market Study

June 30, 2019

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

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powered by finexpert *and* JKU JOHANNES KEPLER UNIVERSITÄT LINZ

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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 fifth 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 DAX Sector All Index[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 **June 30, 2013 and June 30, 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) All equities listed in Prime Standard, General Standard, Scale segment. 3) Vienna Stock Index. 4) Swiss Performance Index.

DACH Capital Market Study
People

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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

- In comparison to December 31, 2018, the German risk-free rate almost halved from 1.09% to 0.60% as of June 30, 2019.
- The Austrian risk-free rate decreased even more from 0.95% as of December 31, 2018 to 0.33% as of June 30, 2019, hence reaching its lowest level in the observation period.
- The Swiss risk-free rate recorded a decrease from 0.55% to 0.16% during the period from December 31, 2018 to June 30, 2019, hence, showing a comparable trend as Germany and Austria. Overall, Switzerland has the lowest risk-free rate of the three analyzed markets.

Chapter 3

Market returns and market risk premium

- In all analyzed markets we observed a decrease in the implied market returns. This is mainly due to an increase in market capitalization of the analyzed companies caused by a recovery of stock markets in the first half of 2019.
- The implied yearly market return (ex-ante) of the German market decreased significantly from 10.1% as of December 31, 2018 to 8.5% as of June 30, 2019, with an implied market risk premium of 9.0% and 7.9%, respectively.
- The implied market return of the Austrian market decreased from 10.1% as of December 31, 2018 to 9.5% as of June 30, 2019. The implied market risk premium amounts to 9.2% as of June 30, 2019, nearly unchanged from 9.1% as of December 31, 2018.
- The implied market return of the Swiss market was the lowest in the DACH region with 7.2% as of June 30, 2019 compared to 8.2% as of December 31, 2018. The implied market risk premium decreased from 7.7% to 7.0%.
- The annual total shareholder returns of the Swiss market as of June 30, 2019 were 18.8% and, hence, significantly outperformed the stagnating German market (0.8%) as well as the negatively performing Austrian market (-5.0%).

Chapter 4

Betas

- Companies within the Pharma & Healthcare sector showed the highest unlevered sector specific betas with the arithmetic mean standing at 0.93 for the five-year period ending June 30, 2019, while Real Estate had the lowest unlevered beta (0.44) over the same period.
- The levered sector specific betas were highest for the Basic Materials sector for the five-year period (arithmetic mean) as of June 30, 2019. If we consider the two-year period, the Basic Materials sector showed the highest levered betas, followed by Information Technology. The Real Estate sector had 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 were in the range of 5.7% and 8.9%, the unlevered implied sector returns were between 3.7% and 5.9% (as of June 30, 2019).
- The ex-ante analysis of implied sector returns reveals that unlevered implied sector returns were highest for companies in the Pharma & Healthcare sector at 5.9% (levered 7.1%).
- 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 28.1% in the six-year and 20.6% in the three-year average. Similarly, the Information Technology sector showed high returns at 24.1% in the six-year and 30.0% in the three-year average. The lowest historical returns of the sectors were realized by the Banking sector at 4.9% in the six-year average and by the Telecommunication sector at 5.1% in the three-year average.

Chapter 7

Trading Multiples

- As of June 30, 2019, the sector medians of the EV/Revenue, EV/EBIT, P/E and EqV/BV-Multiples were all lower – except for the Real Estate and Telecommunication sectors – than six months ago.
- The Real Estate sector had by far the highest median Revenue-Multiples compared to all other sectors: the median of the Revenue-Multiples amounted to 11.1x (LTM) and 10.9x (1yf). Opposed to that, the Consumer Goods sector showed the lowest median Revenue-Multiples with values of 0.9x (LTM) and 1.1x (1yf).
- The Pharma & Healthcare sector represented the highest EqV/BV-Multiple with a median of 3.0x as of June 30, 2019. On the other hand, the Banking sector showed the lowest EqV/BV-Multiple with a median of only 0.8x.

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 its 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 June 2013 for all three capital markets.

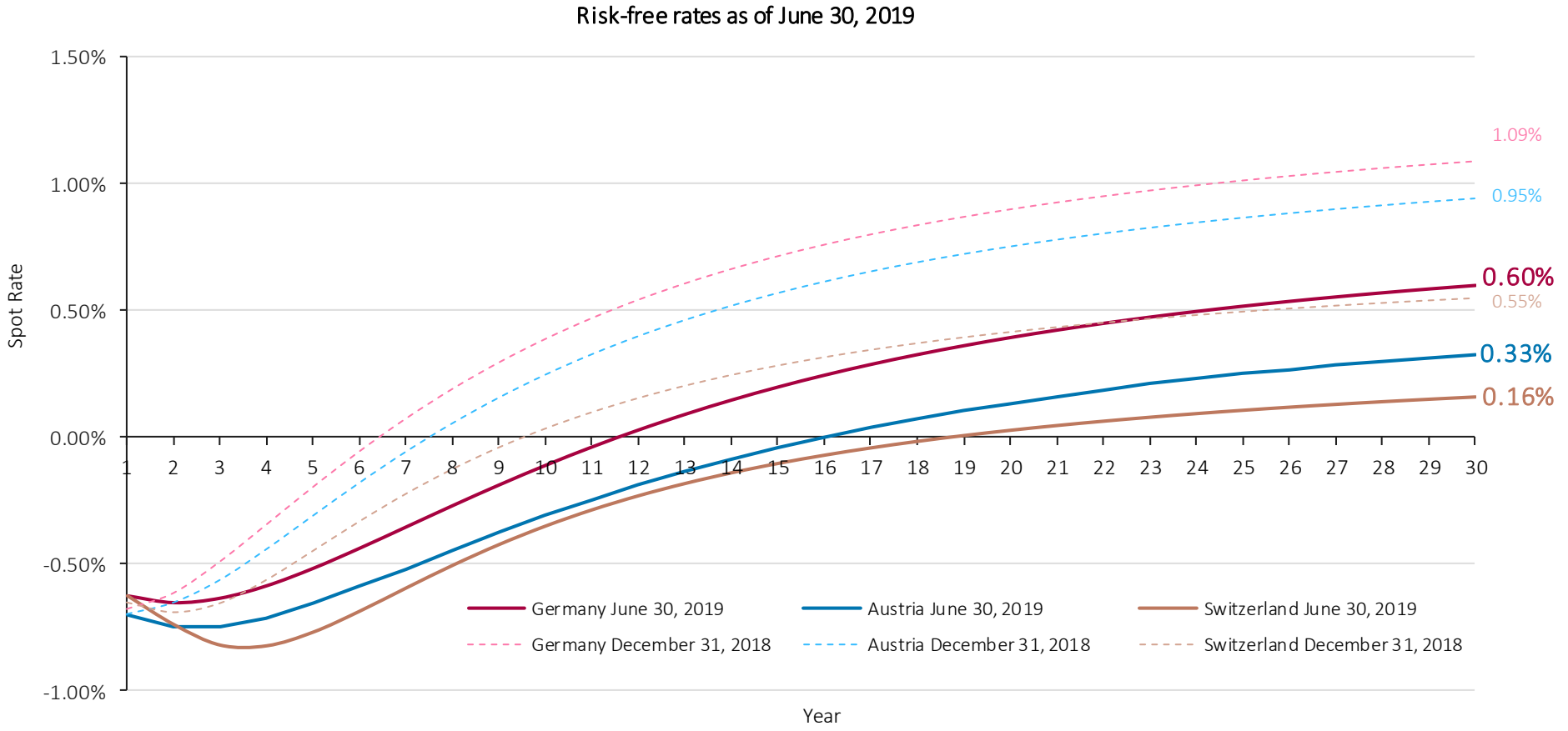
1) www.bundesbank.de.

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

3) ibid., p.13.

Risk-Free Rate – DACH

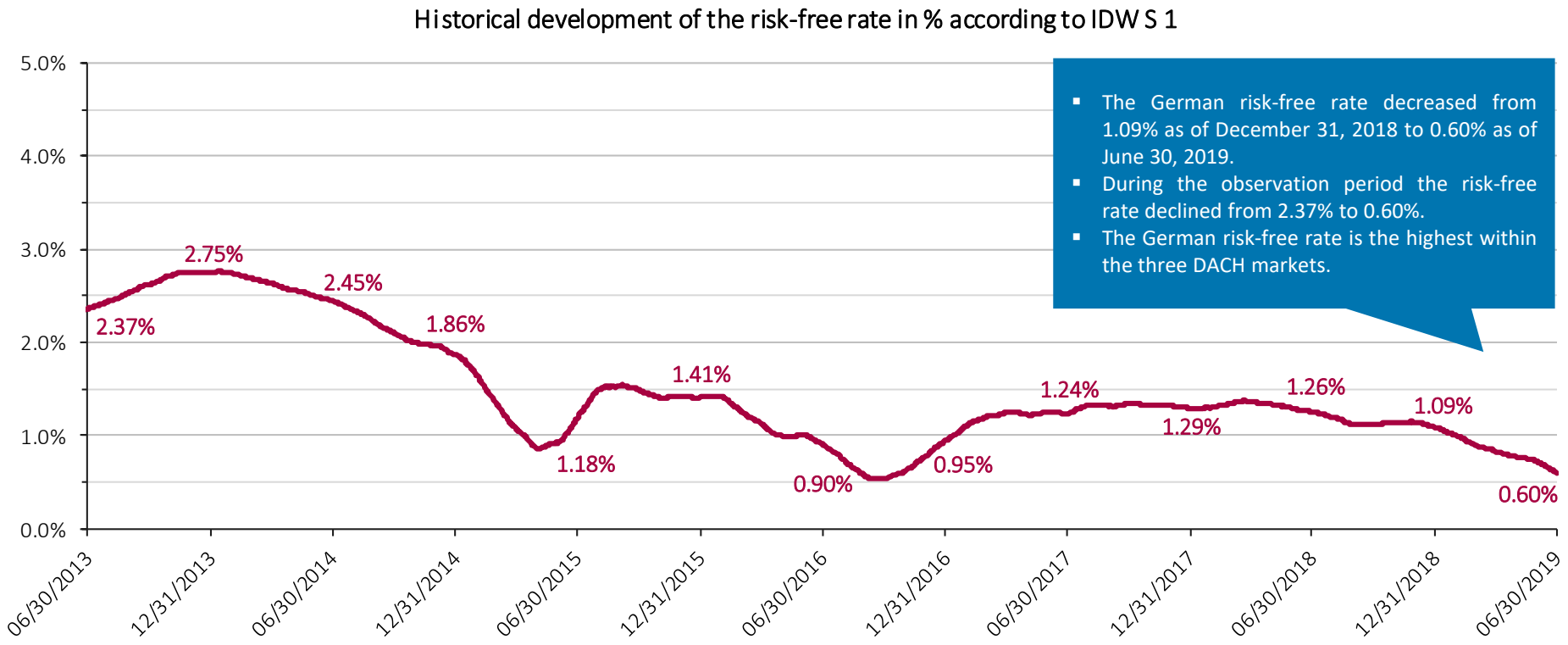
Determination according to country specific recommendations
Interest rate curve based on long-term bonds (Svensson method)



Risk-Free Rate – Germany

Determination following IDW S 1

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



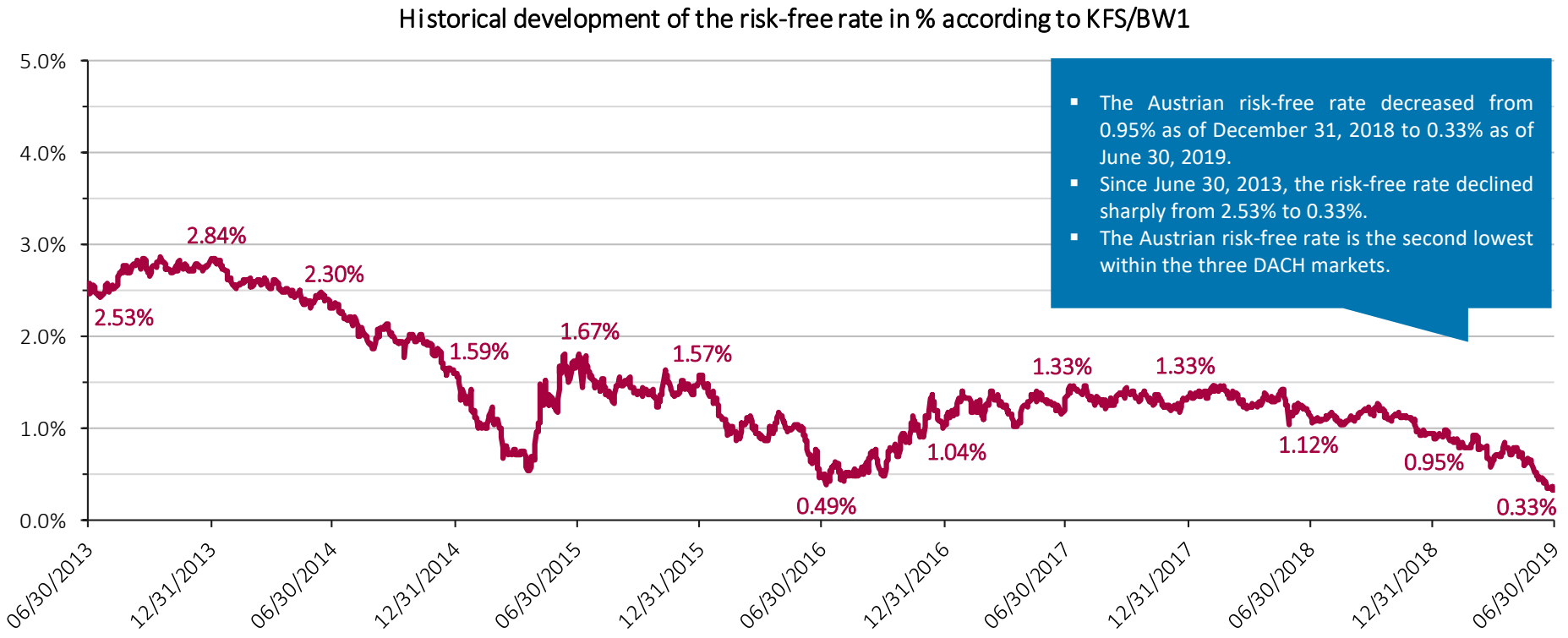
Risk-free rate	January	February	March	April	May	June	July	August	September	October	November	December
2019	1.00%	0.90%	0.83%	0.77%	0.72%	0.60%						
2018	1.30%	1.34%	1.36%	1.34%	1.29%	1.26%	1.19%	1.13%	1.11%	1.14%	1.15%	1.09%
2017	1.10%	1.20%	1.25%	1.22%	1.25%	1.24%	1.32%	1.32%	1.35%	1.33%	1.32%	1.29%
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



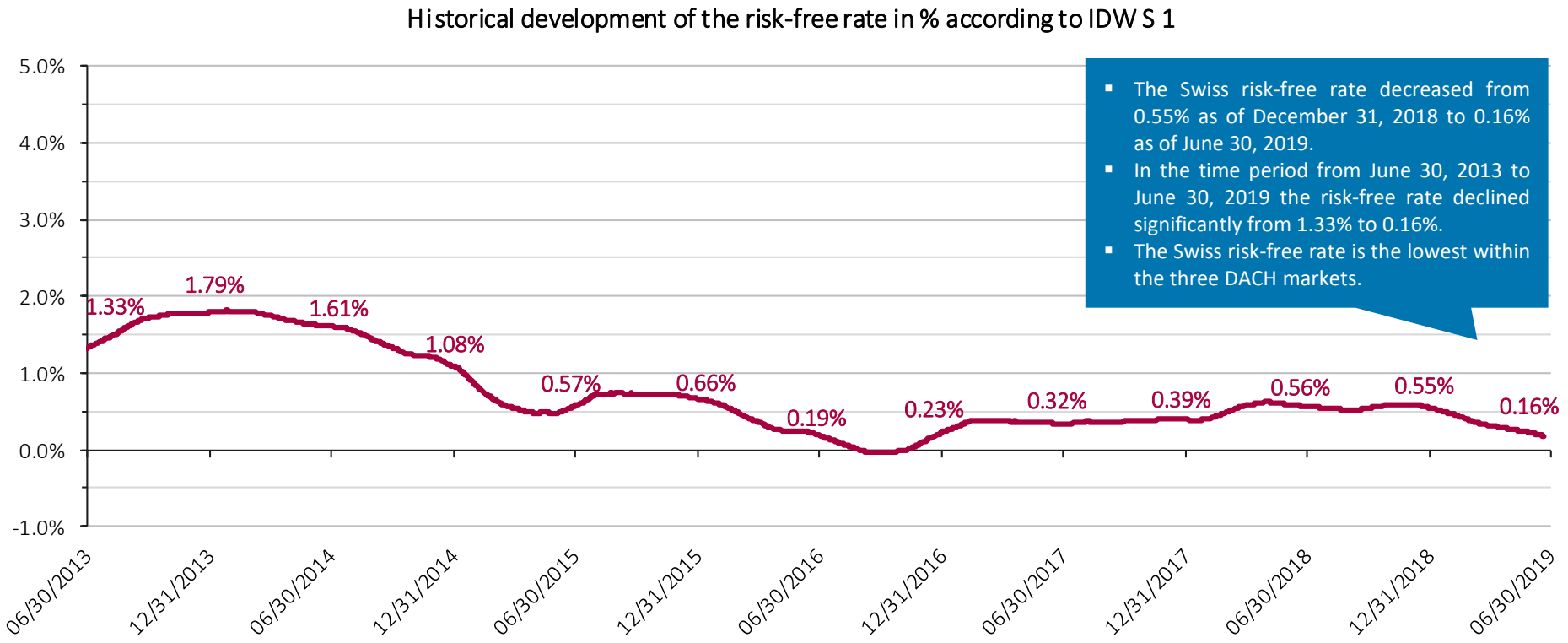
Risk-free rate	January	February	March	April	May	June	July	August	September	October	November	December
2019	0.84%	0.86%	0.65%	0.78%	0.52%	0.33%						
2018	1.37%	1.36%	1.23%	1.30%	1.17%	1.12%	1.15%	1.09%	1.15%	1.12%	1.08%	0.95%
2017	1.33%	1.13%	1.24%	1.25%	1.29%	1.33%	1.45%	1.25%	1.38%	1.33%	1.25%	1.33%
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%						
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.

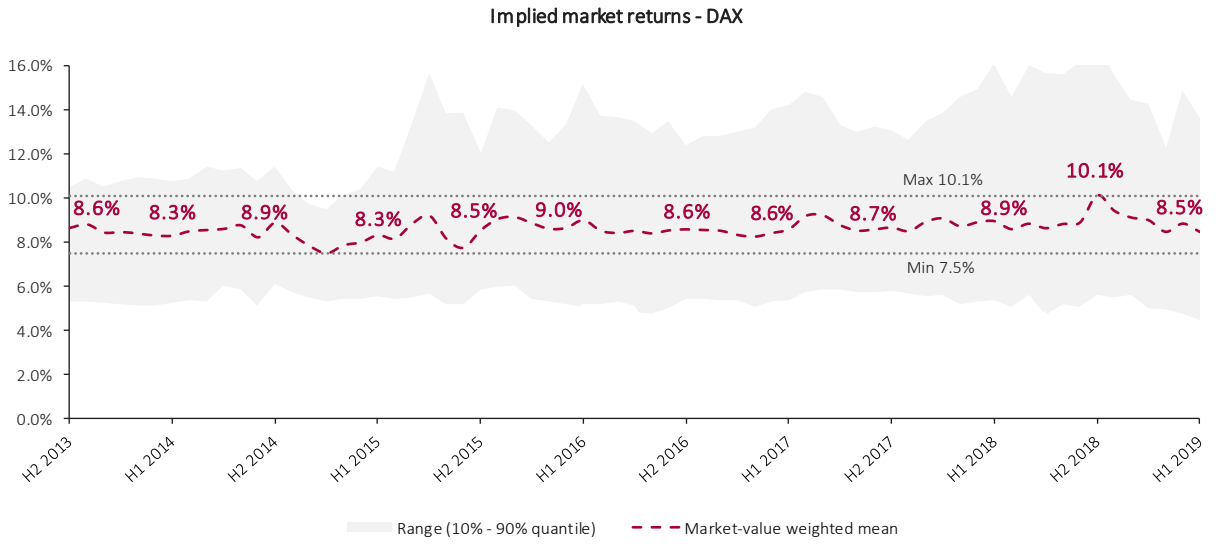
4) cf. Reese, 2007, Estimation of the costs of capital for evaluation purposes; Aders/Aschauer/Dollinger, Die implizite Marktrisikoprämie am österreichischen Kapitalmarkt (RWZ, 6/2016, p. 195-202).

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

Implied Market Returns
German market – DAX

Implied market returns - DAX

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	4.8%	2.9%	5.1%	5.3%	5.2%	3.3%	3.4%	2.6%	4.2%	1.0%	2.7%	0.4%
Lower quantile	5.3%	5.2%	6.1%	5.6%	5.9%	5.0%	5.4%	5.3%	5.8%	5.4%	5.6%	4.5%
Median	7.7%	7.7%	7.8%	7.0%	7.9%	7.6%	7.6%	7.7%	8.0%	7.9%	9.1%	7.8%
Arithmetic mean	8.1%	7.6%	8.3%	7.9%	8.4%	8.7%	8.3%	8.4%	8.4%	8.8%	10.0%	8.3%
Market-value weighted mean	**8.6%**	**8.3%**	**8.9%**	**8.3%**	**8.5%**	**9.0%**	**8.6%**	**8.6%**	**8.7%**	**8.9%**	**10.1%**	**8.5%**
Upper quantile	10.5%	10.7%	11.4%	11.4%	12.0%	15.2%	12.4%	14.3%	13.0%	16.1%	17.5%	13.6%
Maximum	12.0%	11.9%	14.7%	17.0%	18.3%	24.2%	16.3%	16.7%	15.2%	21.5%	20.1%	18.3%
Market-value weighted debt	162.1%	167.5%	175.2%	154.5%	153.6%	200.8%	150.0%	137.0%	123.9%	123.2%	132.3%	124.9%



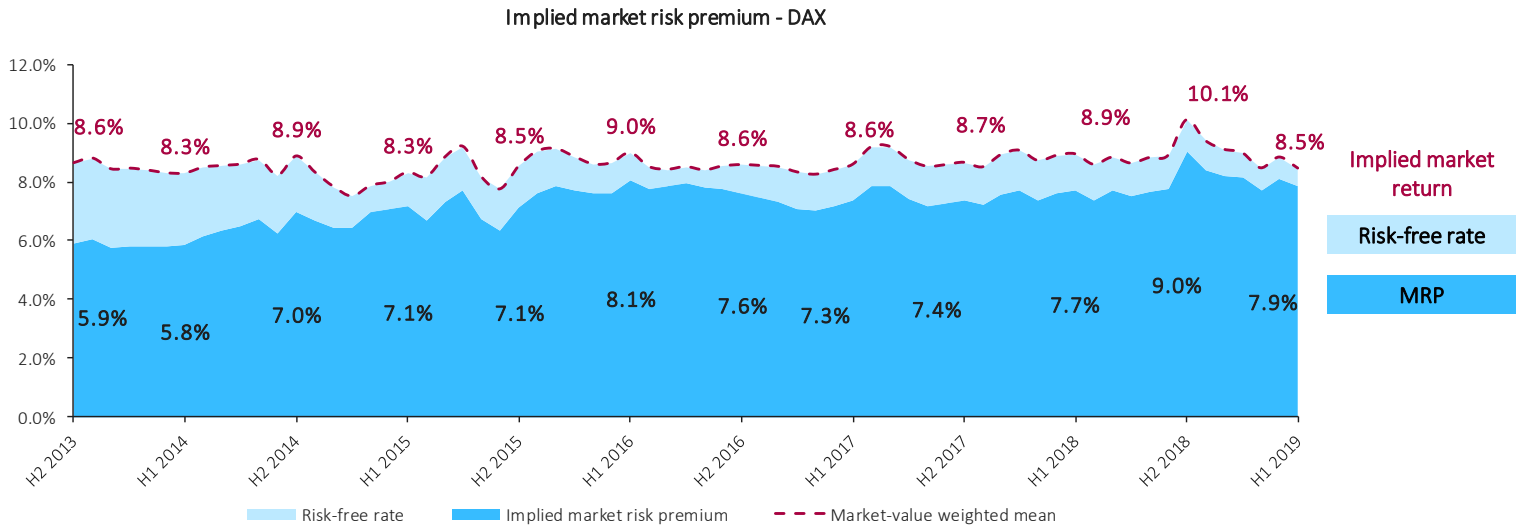
- The implied market return of the German market shows a decreased market-value weighted mean of 8.5% as of June 30, 2019 vs. 10.1% as of December 31, 2018.
- Since December 31, 2013, the implied market return fluctuated between 7.5% and 10.1%.
- In comparison to the Swiss market, the German market showed a higher return as of June 30, 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 December 31, 2013 to June 30, 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 8.5%** as of the reference date June 30, 2019. Taking the **risk-free rate of 0.60%** (cf. slide 13) into account, we determine an **implied market risk premium of 7.9%**. 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.

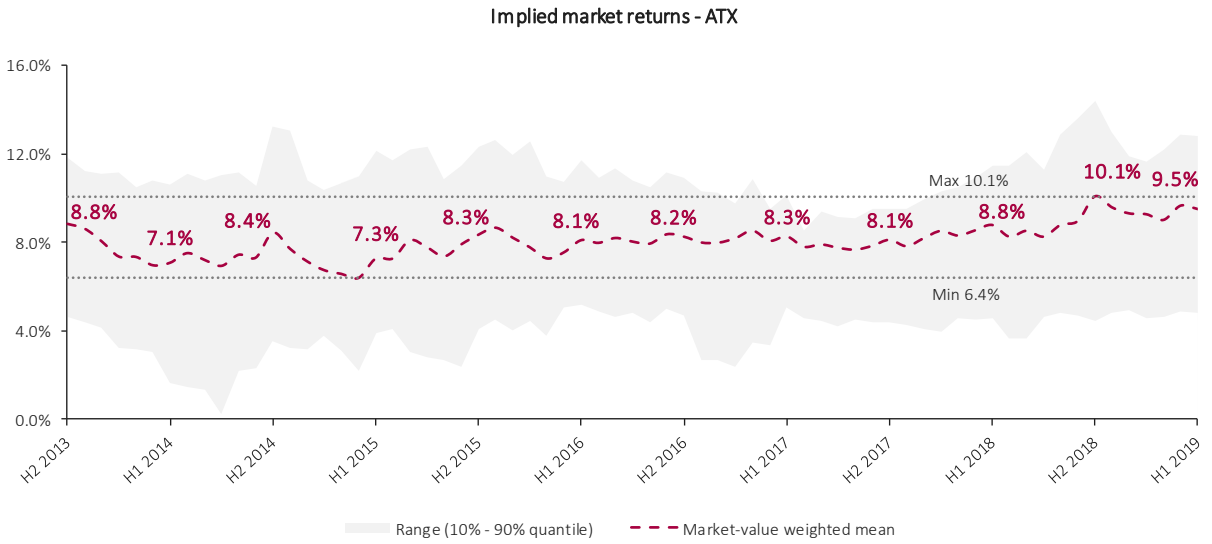


	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
Market-value weighted mean	8.6%	8.3%	8.9%	8.3%	8.5%	9.0%	8.6%	8.6%	8.7%	8.9%	10.1%	8.5%
Risk-free rate	2.8%	2.5%	1.9%	1.2%	1.4%	0.9%	1.0%	1.2%	1.3%	1.3%	1.1%	0.6%
Implied market risk premium - DAX	**5.9%**	**5.8%**	**7.0%**	**7.1%**	**7.1%**	**8.1%**	**7.6%**	**7.3%**	**7.4%**	**7.7%**	**9.0%**	**7.9%**

Implied Market Returns
Austrian market – ATX

Implied market returns - ATX

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	0.0%	0.2%	2.0%	2.0%	3.6%	1.6%	2.1%	1.1%	4.0%	2.8%	4.3%	4.5%
Lower quantile	4.6%	1.6%	3.5%	3.9%	4.1%	5.2%	4.7%	5.1%	4.4%	4.6%	4.4%	4.8%
Median	7.4%	6.4%	7.2%	6.9%	7.7%	8.4%	7.7%	7.7%	7.7%	7.7%	9.8%	9.1%
Arithmetic mean	7.8%	6.4%	7.8%	6.9%	8.0%	8.1%	7.9%	7.5%	7.5%	7.7%	9.6%	9.0%
Market-value weighted mean	**8.8%**	**7.1%**	**8.4%**	**7.3%**	**8.3%**	**8.1%**	**8.2%**	**8.3%**	**8.1%**	**8.8%**	**10.1%**	**9.5%**
Upper quantile	11.9%	10.6%	13.2%	12.1%	12.3%	11.7%	10.9%	10.1%	9.5%	11.5%	14.4%	12.8%
Maximum	11.9%	10.7%	14.4%	13.4%	13.6%	12.3%	11.2%	13.0%	10.3%	12.3%	14.9%	15.1%
Market-value weighted debt	161.2%	136.6%	177.3%	141.8%	149.9%	147.7%	122.7%	101.0%	86.7%	92.3%	99.9%	101.2%



- The implied market return of the Austrian market decreased from 10.1% as of December 31, 2018 to 9.5% as of June 30, 2019.
- Since December 31, 2013, it fluctuated between 6.4% and 10.1%.
- The Austrian market represents a higher implied return than the German market as of June 30, 2019, while also being significantly above the Swiss one.

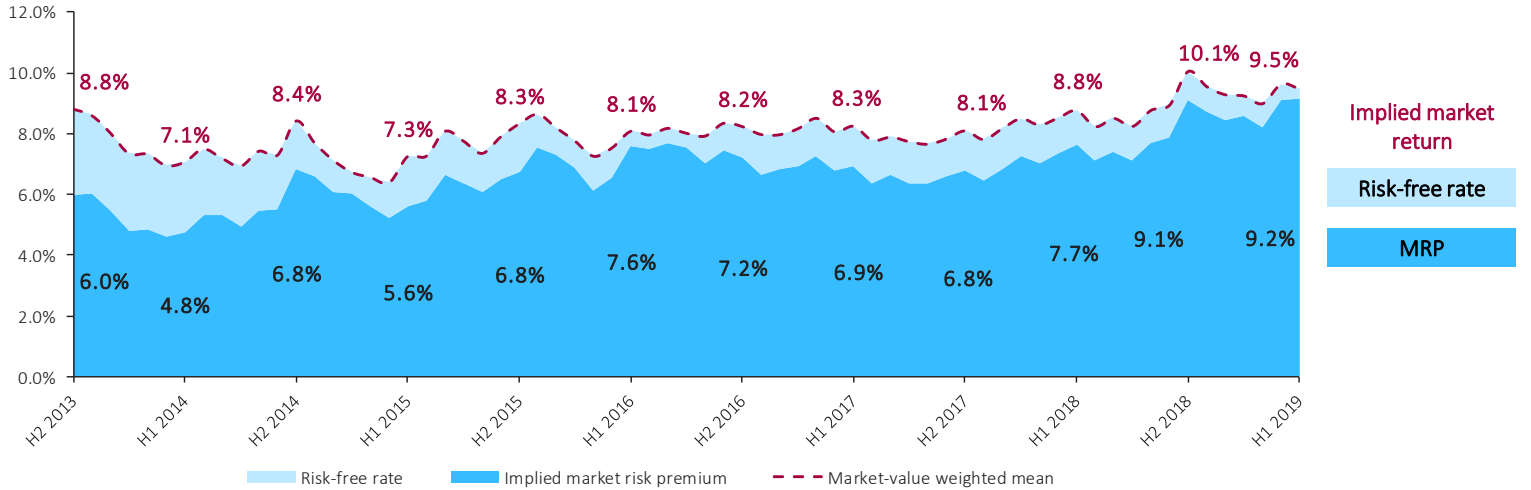
Implied Market Risk Premium
Austrian market – ATX

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 December 31, 2013 to June 30, 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 9.5%** as of the reference date June 30, 2019. Taking the **risk-free rate of 0.33%** (cf. slide 14) into account, we determine an **implied market risk premium of 9.2%**. 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.

Implied market risk premium - ATX

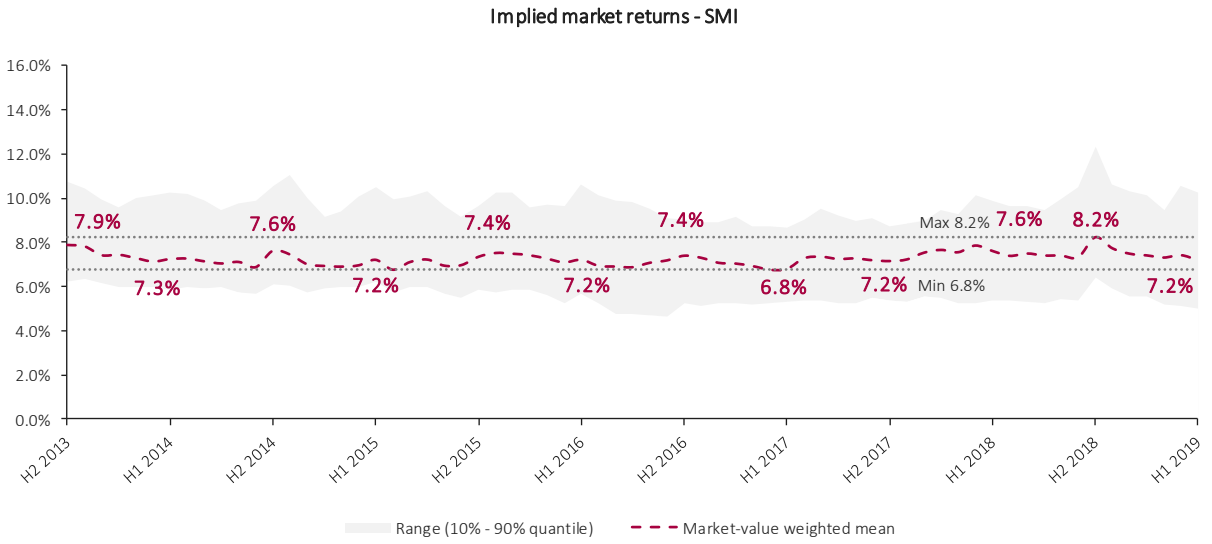


	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
Market-value weighted mean	8.8%	7.1%	8.4%	7.3%	8.3%	8.1%	8.2%	8.3%	8.1%	8.8%	10.1%	9.5%
Risk-free rate	2.9%	2.3%	1.6%	1.7%	1.6%	0.5%	1.0%	1.3%	1.3%	1.1%	0.9%	0.3%
Implied market risk premium - ATX	**6.0%**	**4.8%**	**6.8%**	**5.6%**	**6.8%**	**7.6%**	**7.2%**	**6.9%**	**6.8%**	**7.7%**	**9.1%**	**9.2%**

Implied Market Returns
Swiss market – SMI

Implied market returns - SMI

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	6.2%	5.8%	5.7%	6.0%	5.4%	5.2%	4.5%	5.0%	5.4%	5.3%	5.9%	3.6%
Lower quantile	6.2%	5.9%	6.1%	6.2%	5.9%	5.7%	5.3%	5.3%	5.4%	5.4%	6.4%	5.0%
Median	7.7%	7.4%	7.9%	7.3%	7.7%	7.2%	7.4%	6.3%	7.0%	7.8%	8.1%	7.1%
Arithmetic mean	7.9%	7.5%	7.9%	7.6%	7.6%	7.5%	7.2%	6.8%	7.0%	7.6%	8.7%	7.1%
Market-value weighted mean	**7.9%**	**7.3%**	**7.6%**	**7.2%**	**7.4%**	**7.2%**	**7.4%**	**6.8%**	**7.2%**	**7.6%**	**8.2%**	**7.2%**
Upper quantile	10.7%	10.2%	10.6%	10.5%	9.6%	10.6%	9.1%	8.6%	8.7%	9.9%	12.4%	10.2%
Maximum	10.8%	10.4%	11.0%	10.6%	10.1%	11.0%	9.4%	8.7%	9.1%	10.8%	12.7%	10.3%
Market-value weighted debt	87.0%	81.0%	85.7%	78.3%	74.1%	87.7%	79.4%	71.3%	68.7%	73.3%	73.9%	63.0%



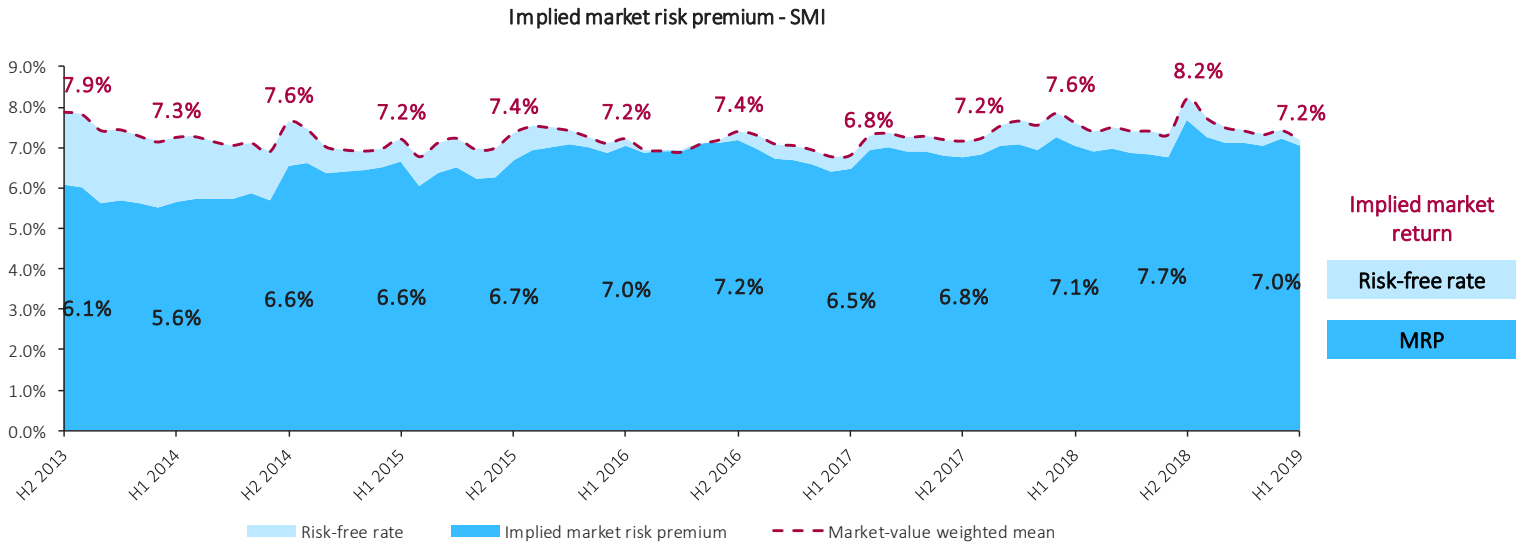
- The market-value weighted mean of the implied market return of the Swiss market decreased from 8.2% as of December 31, 2018 to 7.2% as of June 30, 2019.
- Since December 31, 2013 it fluctuated between 6.8% and 8.2%. In total, it follows a consistent trend.
- Compared to the German and Austrian market, the Swiss market represents the lowest return as of June 30, 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 December 31, 2013 to June 30, 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 7.2%** as of the reference date June 30, 2019. Taking the **risk-free rate of 0.16%** (cf. slide 15) into account, we determine an **implied market risk premium of 7.0%.** To determine the appropriate market risk premium for valuation purposes, it is important to take also the analysis of historical returns into account.



	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
Market-value weighted mean	7.9%	7.3%	7.6%	7.2%	7.4%	7.2%	7.4%	6.8%	7.2%	7.6%	8.2%	7.2%
Risk-free rate	1.8%	1.6%	1.1%	0.6%	0.7%	0.2%	0.2%	0.3%	0.4%	0.6%	0.5%	0.2%
Implied market risk premium - SMI	**6.1%**	**5.6%**	**6.6%**	**6.6%**	**6.7%**	**7.0%**	**7.2%**	**6.5%**	**6.8%**	**7.1%**	**7.7%**	**7.0%**

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 middle of 1994. However, the data of the **SMI Total Return** starts from middle of 1995. All ex-post returns are being calculated by using the **data as of the reference date June 30.**

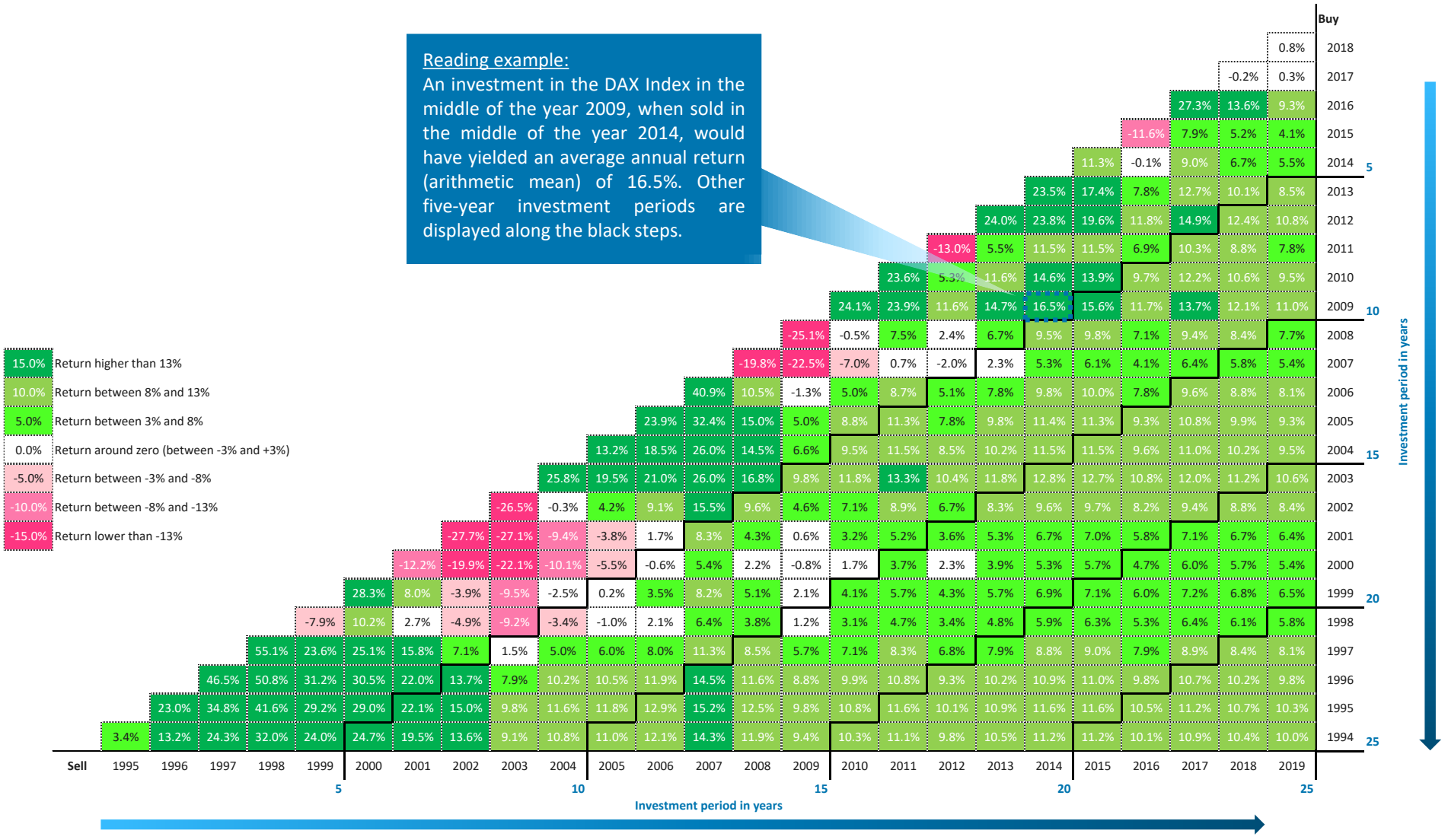
The following slides illustrate how the two calculation methods (arithmetic and geometric) differ from each other for the period between June 30, 1994 and June 30, 2019:

- DAX:
  - the **arithmetic mean** of the historical market returns is **10.0%**
  - the **geometric mean** of the historical market returns is **7.5%**
- ATX:
  - the **arithmetic mean** of the historical market returns is **9.5%**
  - the **geometric mean** of the historical market returns is **6.8%**
- SMI:
  - the **arithmetic mean** of the historical market returns is **10.0%**
  - the **geometric mean** of the historical market returns is **8.2%**

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

Historical Market Returns (Arithmetic Mean) – German Market

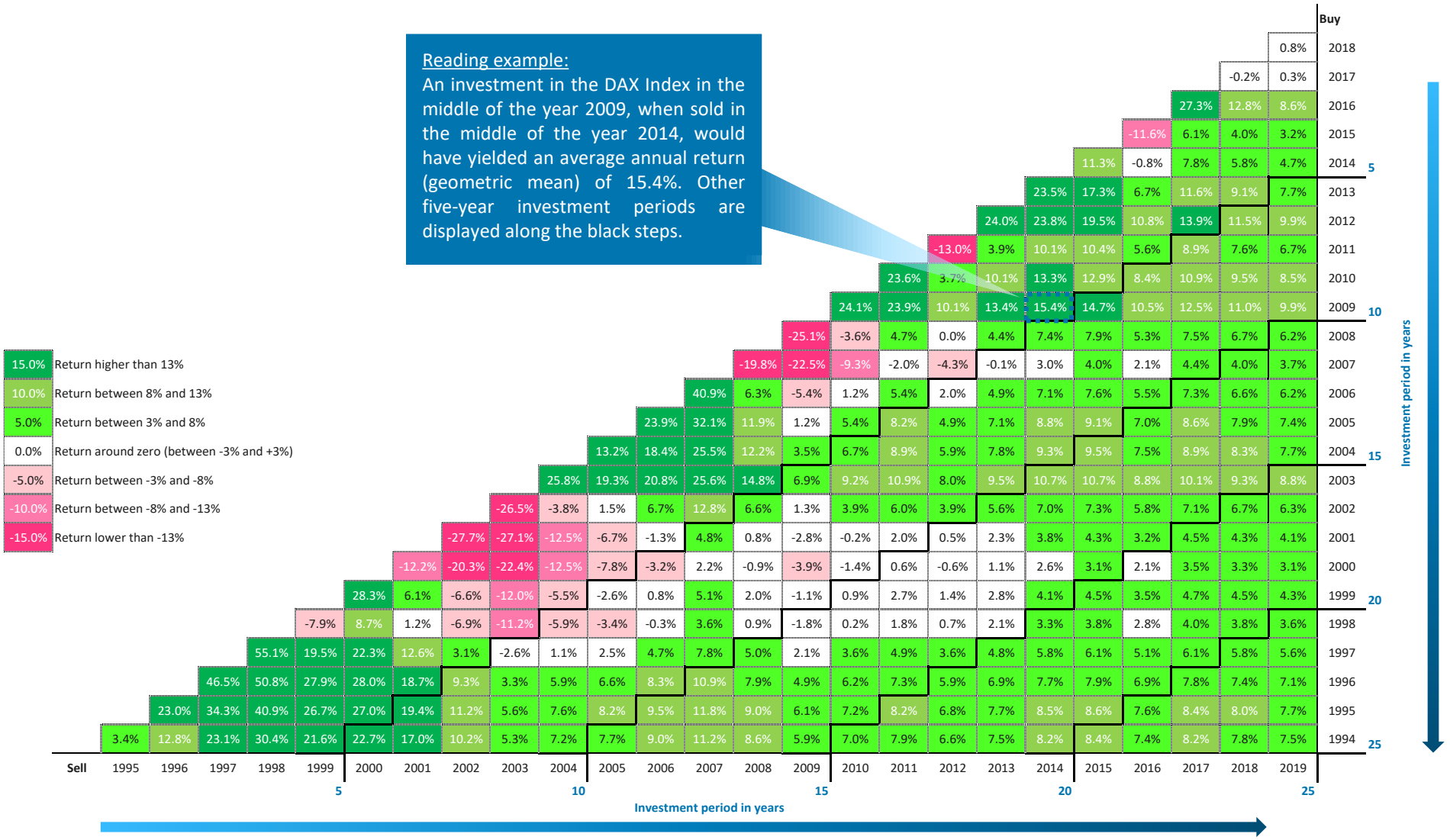
DAX Performance Index Return Triangle



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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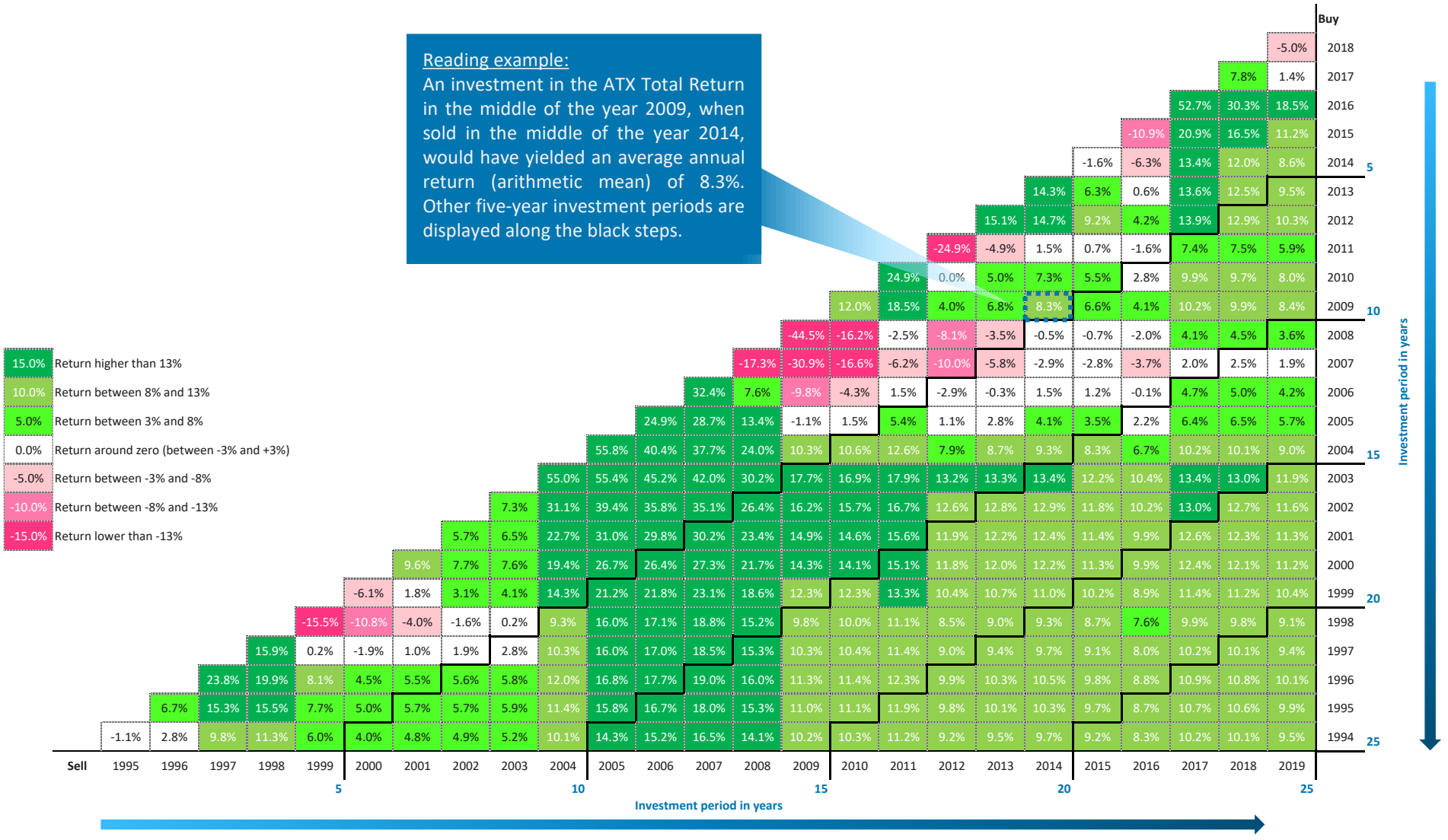
Historical Market Returns (Arithmetic Mean) – Austrian Market

ATX Total Return Index Return Triangle



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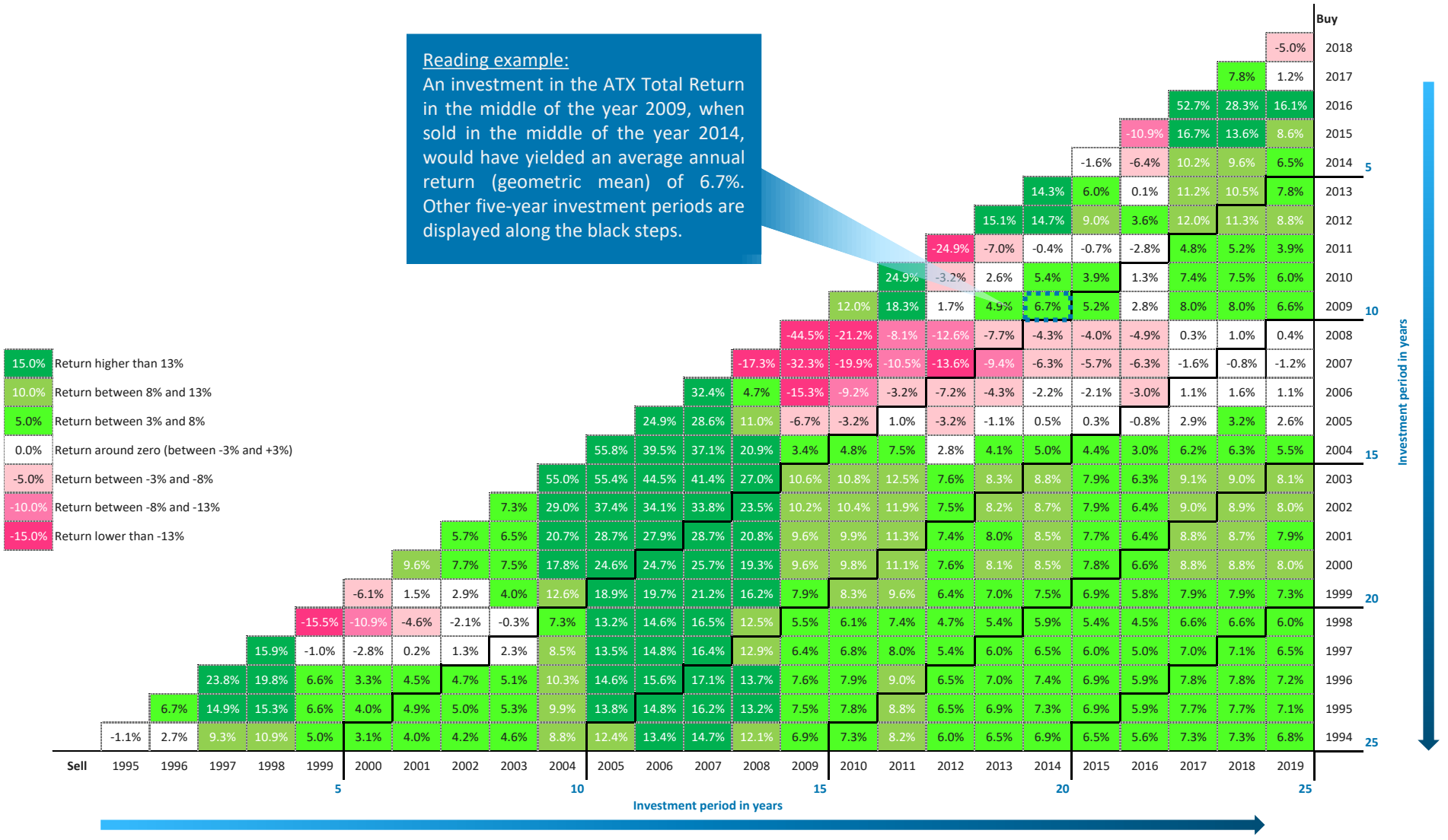
Historical Market Returns (Geometric Mean) – Austrian Market

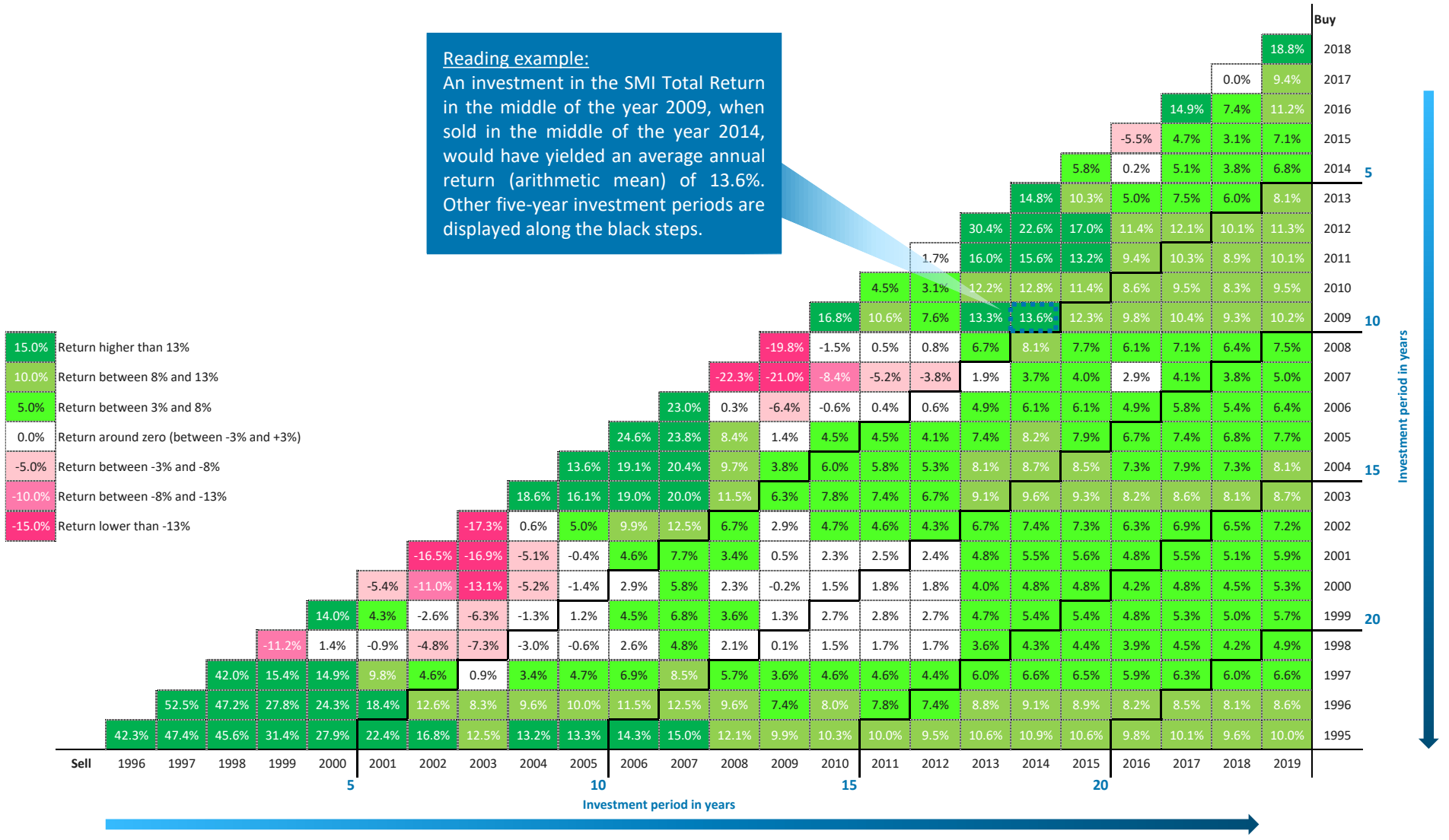
ATX Total Return Index Return Triangle



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

Historical Market Returns (Arithmetic Mean) – Swiss Market

SMI Total Return Index Return Triangle



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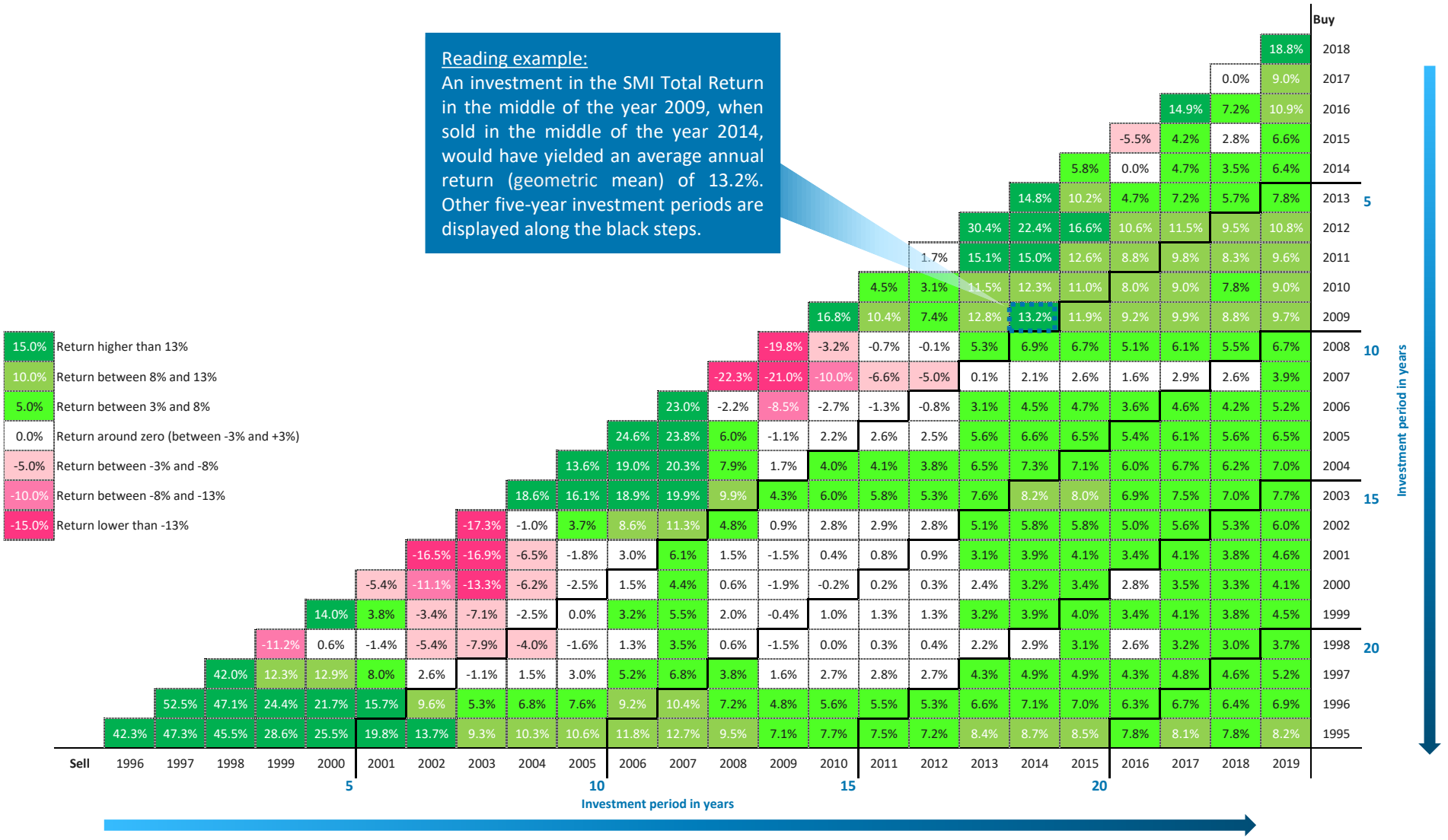
Historical Market Returns (Geometric Mean) – Swiss Market

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 DAX Sector All Index**[1)], **Vienna Stock Exchange Index (WBI)** and **Swiss Performance Index (SPI)**. These three indices contain all shares listed on the **Official** and **Semi-Official Market**.

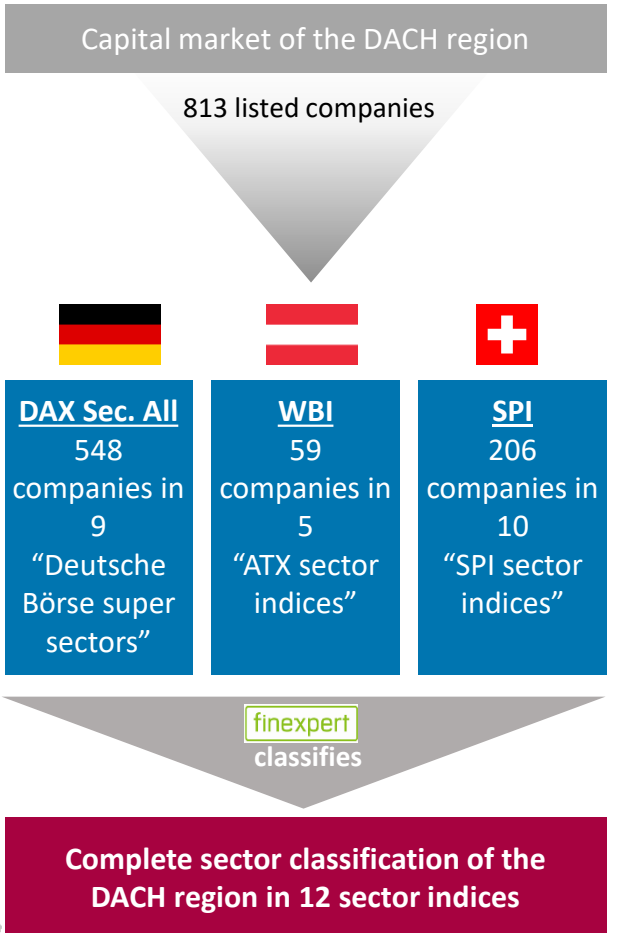
The **813 public companies**, which are listed in the mentioned indices as of June 30, 2019, build the base for the **sector classification** and the **subsequent analyses**:

- The German DAX Sector All Index includes 548 companies listed in the Prime Standard, General Standard and Scale segment 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 206 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:

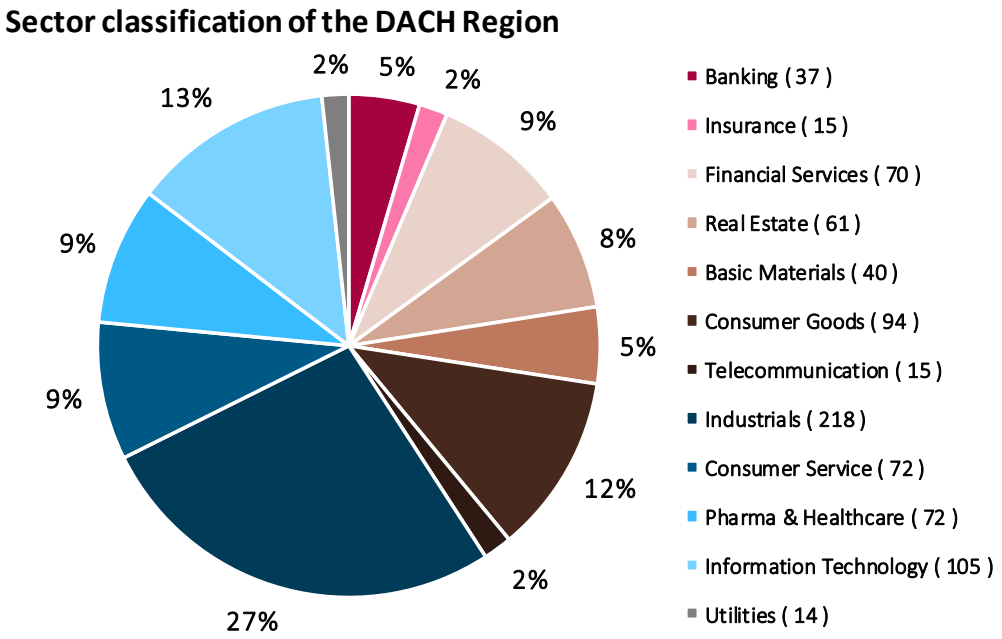
- Banking
- Insurance
- Financial Services
- Real Estate
- Basic Materials
- Consumer Goods
- Telecommunication
- Industrials
- Consumer Service
- Pharma & Healthcare
- Information Technology
- Utilities



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 June 30, 2019

Sector distribution and number of companies



The chart shows the percentage distribution of the 813 listed companies in the twelve "super sectors" (the absolute number of companies is displayed in parenthesis).

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 June 30, 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	0.80	0.86	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic mean	**0.88**	**0.87**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Banking[3]	22/26	Market-value weighted mean	1.32	1.17	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.81	0.78	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic mean	**0.75**	**0.76**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Insurance[3]	14 / 14	Market-value weighted mean	0.82	0.88	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.82	0.91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Arithmetic mean	**1.02**	**0.91**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**n.a.**
Financial Services[3]	31 / 28	Market-value weighted mean	1.10	1.08	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
		Median	0.49	0.44	46%	43%	0.28	0.28	0.40	0.38
		Arithmetic mean	**0.60**	**0.50**	**55%**	**49%**	**0.30**	**0.30**	**0.44**	**0.42**
Real Estate	29/36	Market-value weighted mean	0.45	0.43	48%	45%	0.27	0.27	0.36	0.36
		Median	1.04	1.11	33%	29%	0.30	0.30	0.82	0.87
		Arithmetic mean	**1.06**	**1.09**	**41%**	**33%**	**0.31**	**0.32**	**0.82**	**0.85**
Basic Materials	31/33	Market-value weighted mean	0.98	1.11	25%	25%	0.23	0.23	0.88	0.93
		Median	0.89	0.85	23%	23%	0.19	0.19	0.68	0.65
		Arithmetic mean	**0.99**	**0.89**	**38%**	**34%**	**0.20**	**0.21**	**0.72**	**0.68**
Consumer Goods	51/53	Market-value weighted mean	0.99	0.90	37%	41%	0.18	0.18	0.72	0.66

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 June 30, 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	0.73	0.69	18%	22%	0.19	0.19	0.66	0.58
		Arithmetic mean	**0.90**	**0.74**	**25%**	**28%**	**0.20**	**0.20**	**0.78**	**0.62**
Telecommunication	11 / 14	Market-value weighted mean	0.62	0.63	42%	42%	0.20	0.20	0.45	0.47
		Median	0.97	1.04	18%	17%	0.30	0.30	0.77	0.86
		Arithmetic mean	**0.99**	**1.04**	**34%**	**27%**	**0.32**	**0.33**	**0.82**	**0.89**
Industrials	135 / 155	Market-value weighted mean	1.03	1.09	28%	27%	0.27	0.27	0.84	0.89
		Median	0.86	0.88	17%	10%	0.32	0.32	0.76	0.71
		Arithmetic mean	**1.02**	**0.93**	**23%**	**24%**	**0.33**	**0.33**	**0.88**	**0.84**
Consumer Service	36 / 41	Market-value weighted mean	0.97	0.91	16%	16%	0.32	0.32	0.88	0.84
		Median	0.96	1.03	11%	6%	0.17	0.17	0.89	0.98
		Arithmetic mean	**1.04**	**1.06**	**16%**	**13%**	**0.19**	**0.19**	**0.93**	**0.98**
Pharma & Healthcare	41 / 56	Market-value weighted mean	0.93	1.01	16%	16%	0.17	0.17	0.82	0.89
		Median	0.93	1.01	10%	8%	0.19	0.19	0.79	0.89
		Arithmetic mean	**1.00**	**1.07**	**20%**	**18%**	**0.19**	**0.19**	**0.86**	**0.95**
Information Technology	60 / 72	Market-value weighted mean	0.98	1.12	9%	9%	0.17	0.17	0.90	1.04
		Median	0.68	0.67	46%	34%	0.19	0.19	0.46	0.46
		Arithmetic mean	**0.70**	**0.63**	**51%**	**42%**	**0.19**	**0.20**	**0.47**	**0.48**
Utilities	7 / 9	Market-value weighted mean	0.73	0.74	44%	33%	0.20	0.20	0.51	0.58
DACH[3]		Market-value weighted mean	**0.95**	**0.98**						

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 June 30, 2019, we observe a sector specific, unlevered cost of equity of **4.9%** (market-value weighted mean) of an exemplary company X, which operates in the German Consumer Goods sector. The following assumptions have been made:

- The debt-to-equity ratio of the exemplary company X: **40%**
- The risk-free rate: **0.60%** (cf. slide 12)

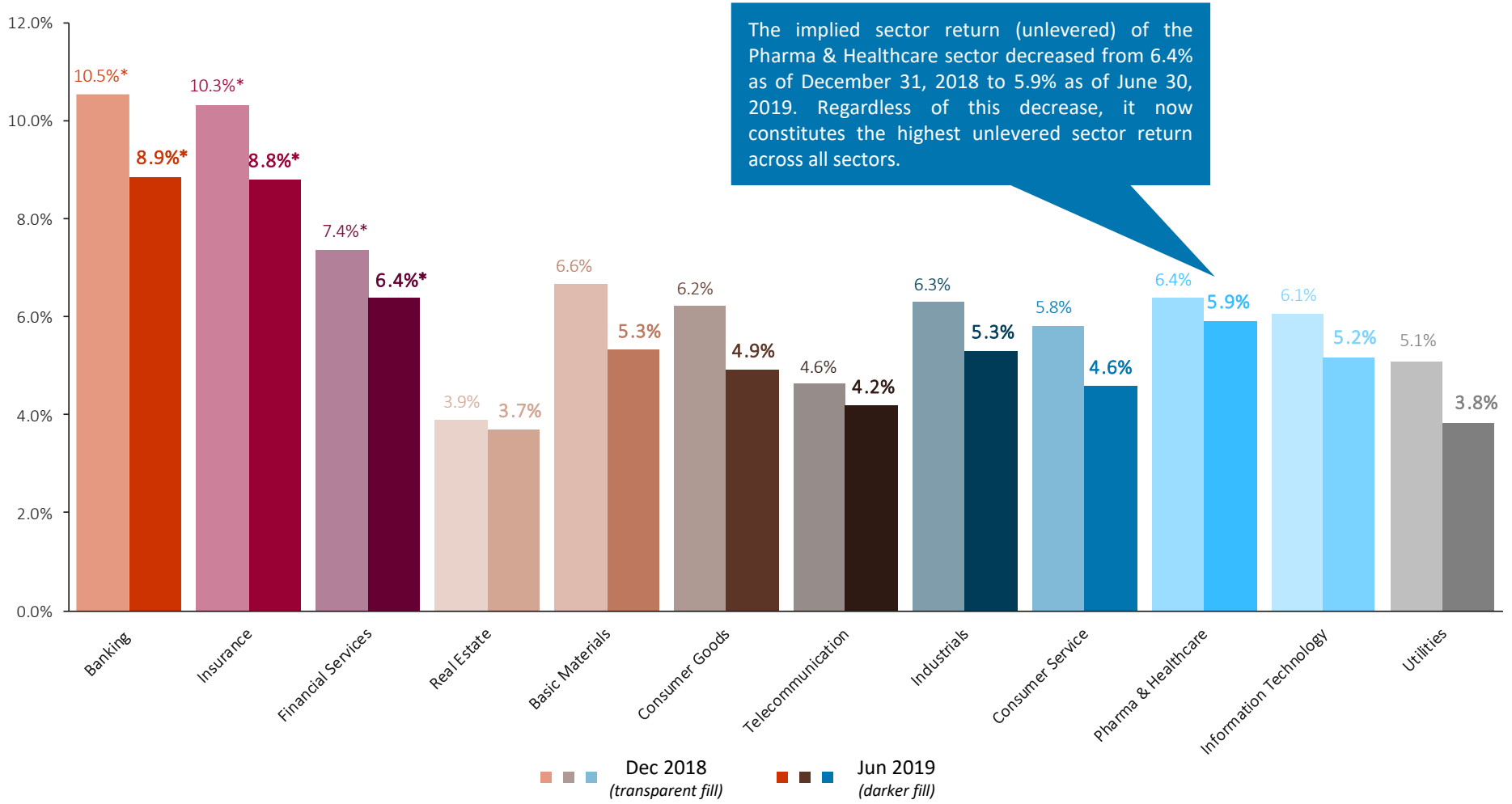
Based on these numbers, we calculate the relevered costs of equity of company X with the adjustment formula:

$$\mathbf{k_E^L} = 4.9\% + (4.9\% - 0.60\%) * 40\% = 6.6\%$$

Thus, **6.6%** is the company's relevered cost of equity. In comparison, the levered cost of equity of the Basic Materials sector is **7.6%**, reflecting the sectors' higher average leverage.

Implied Sector Returns (unlevered)*

Overview as of June 30, 2019 vs. December 31, 2018



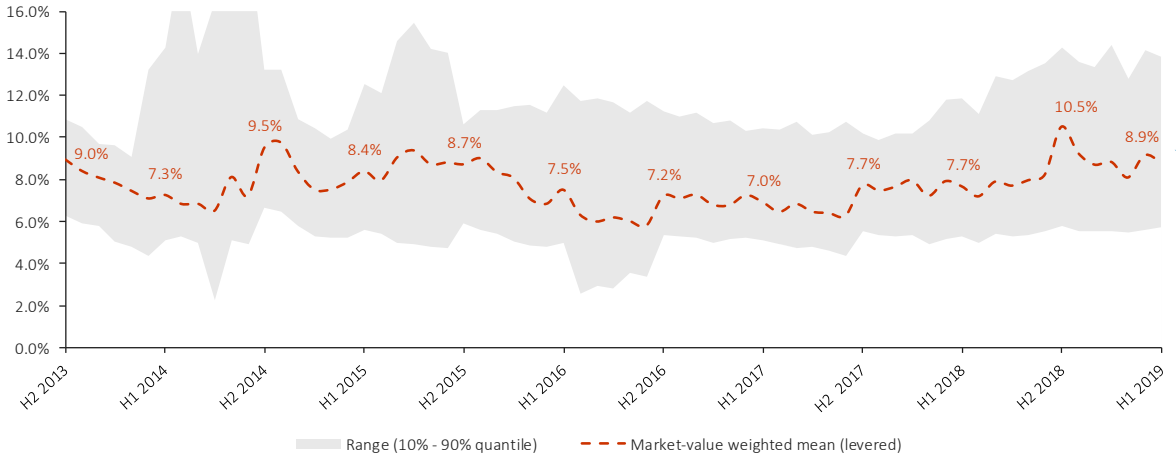
* The returns for the sectors Banking, Insurance and Financial Services are levered sector returns. For all other sectors unlevered returns are displayed.

Implied Sector Returns
Banking

Implied sector returns (levered) - DACH - Banking

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	5.2%	2.9%	6.2%	5.2%	4.8%	3.3%	3.5%	2.6%	4.1%	0.9%	2.7%	0.4%
Lower quantile	6.3%	5.1%	6.7%	5.6%	5.9%	5.0%	5.4%	5.1%	5.6%	5.3%	5.8%	5.7%
Median	8.1%	7.9%	8.8%	7.7%	8.4%	7.0%	6.6%	6.6%	7.2%	7.5%	10.1%	8.9%
Arithmetic mean	8.4%	9.1%	10.3%	8.4%	9.0%	8.5%	8.0%	7.6%	8.0%	8.1%	10.1%	8.9%
Market-value weighted mean	**9.0%**	**7.3%**	**9.5%**	**8.4%**	**8.7%**	**7.5%**	**7.2%**	**7.0%**	**7.7%**	**7.7%**	**10.5%**	**8.9%**
Upper quantile	10.8%	14.3%	13.2%	12.5%	10.6%	12.5%	11.3%	10.4%	10.2%	11.9%	14.3%	13.8%
Maximum	11.3%	35.3%	38.6%	21.8%	29.4%	24.3%	24.3%	23.2%	21.1%	22.4%	23.2%	22.0%
Market-value weighted debt	1059.9%	1068.3%	1157.7%	881.6%	896.6%	1432.2%	931.8%	792.0%	658.5%	731.9%	852.6%	852.6%

Implied sector returns - DACH - Banking



- The implied sector return in the banking sector amounts to 8.9% as of June 30, 2019.
- Thus, the implied sector return normalized after a peak of 10.5% in December 2018.

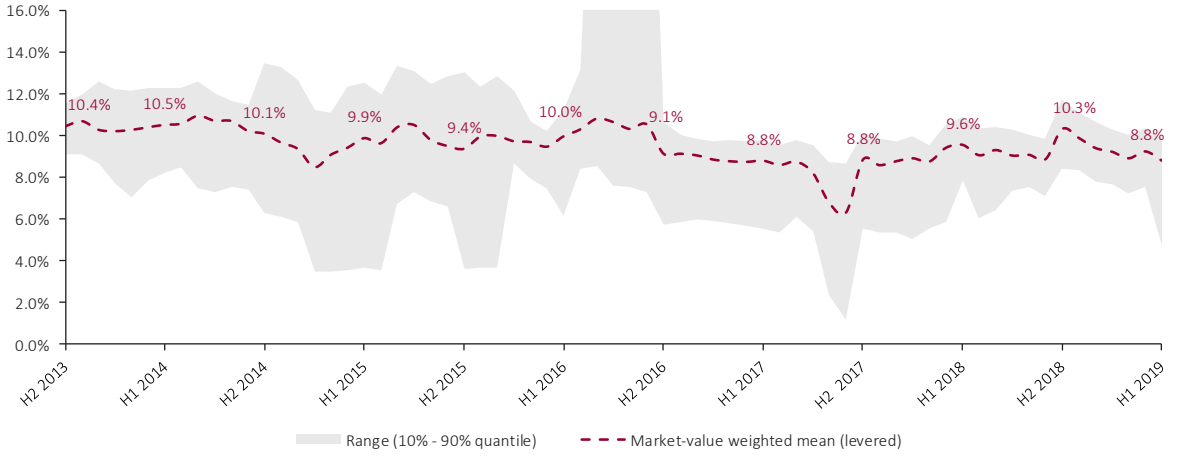
Note: The debt illustration of the companies in the Banking, Insurance and Financial Services sectors only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic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

Implied Sector Returns
Insurance

Implied sector returns (levered) - DACH - Insurance

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	9.0%	7.9%	5.1%	1.8%	1.5%	4.8%	4.2%	4.3%	4.7%	5.4%	8.3%	3.7%
Lower quantile	9.1%	8.3%	6.3%	3.6%	3.6%	6.2%	5.7%	5.6%	5.5%	7.9%	8.4%	4.7%
Median	10.3%	10.3%	10.0%	10.0%	9.3%	9.3%	9.1%	8.5%	8.8%	9.0%	10.0%	8.5%
Arithmetic mean	10.2%	10.4%	10.0%	9.4%	9.2%	9.4%	9.0%	8.3%	8.4%	9.1%	9.9%	8.2%
Market-value weighted mean	**10.4%**	**10.5%**	**10.1%**	**9.9%**	**9.4%**	**10.0%**	**9.1%**	**8.8%**	**8.8%**	**9.6%**	**10.3%**	**8.8%**
Upper quantile	11.5%	12.3%	13.5%	12.5%	13.0%	11.2%	10.7%	9.8%	10.1%	10.9%	11.7%	9.8%
Maximum	11.7%	12.8%	14.4%	13.4%	13.6%	11.4%	10.8%	10.1%	10.4%	11.1%	12.0%	10.0%
Market-value weighted debt	54.9%	49.1%	54.0%	48.0%	56.2%	61.4%	53.1%	42.8%	48.2%	46.8%	41.0%	39.4%

Implied sector returns - DACH - Insurance



- The implied sector return in the insurance sector decreased from 10.3% as of December 31, 2018 to 8.8% as of June 30, 2019.
- Over the course of time, the market-value weighted mean of the implied sector return fluctuated between 8.8% and 10.5%.

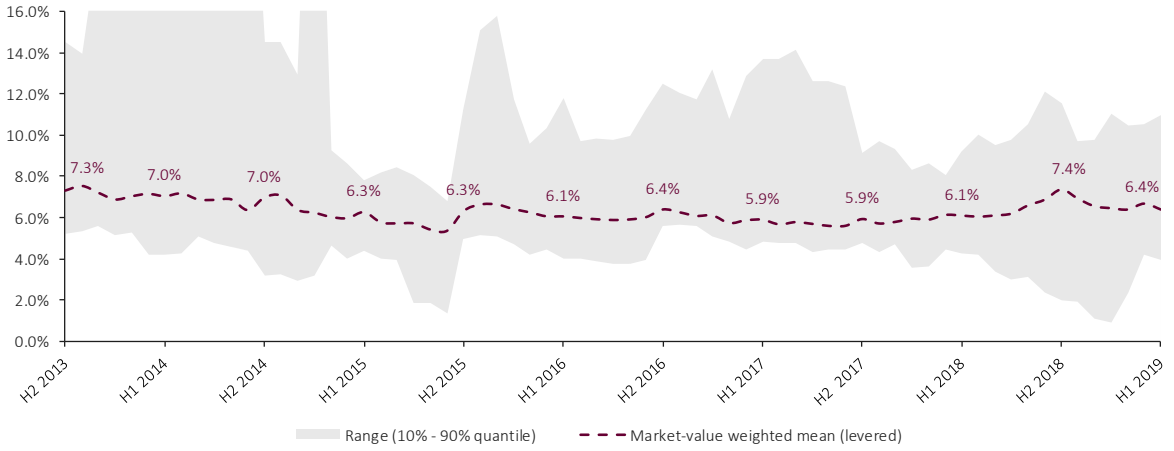
Note: The debt illustration of the companies in the Banking, Insurance and Financial Services sectors only serves an informational purpose. We will not implement an adjustment to these companies' specific debt (unlevered) because their indebtedness is part of their operational activities and economic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

Implied Sector Returns
Financial Services

Implied sector returns (levered) - DACH - Financial Services

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	4.4%	3.5%	0.4%	3.1%	4.6%	3.8%	5.1%	3.6%	4.6%	3.4%	1.9%	0.8%
Lower quantile	5.2%	4.2%	3.2%	4.4%	5.0%	4.0%	5.6%	4.8%	4.7%	4.3%	2.0%	4.0%
Median	7.6%	7.0%	7.8%	6.3%	6.4%	6.7%	7.1%	6.0%	6.7%	6.9%	7.2%	6.6%
Arithmetic mean	8.3%	8.8%	8.2%	8.8%	7.4%	7.1%	7.8%	7.4%	7.0%	7.1%	7.3%	7.4%
Market-value weighted mean	**7.3%**	**7.0%**	**7.0%**	**6.3%**	**6.3%**	**6.1%**	**6.4%**	**5.9%**	**5.9%**	**6.1%**	**7.4%**	**6.4%**
Upper quantile	14.5%	19.6%	14.5%	7.8%	11.3%	11.8%	12.5%	13.7%	9.1%	9.2%	11.6%	10.9%
Maximum	15.9%	32.4%	15.8%	55.8%	15.2%	12.0%	14.9%	14.2%	13.0%	16.9%	17.1%	20.9%
Market-value weighted debt	62.8%	72.8%	68.2%	58.3%	49.4%	58.3%	59.8%	55.4%	44.4%	46.3%	59.9%	62.5%

Implied sector returns - DACH - Financial Services



- The implied market return in the financial services sector decreased from 7.4% as of December 31, 2018 to 6.4% as of June 30, 2019.
- Since the end of 2013, 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)

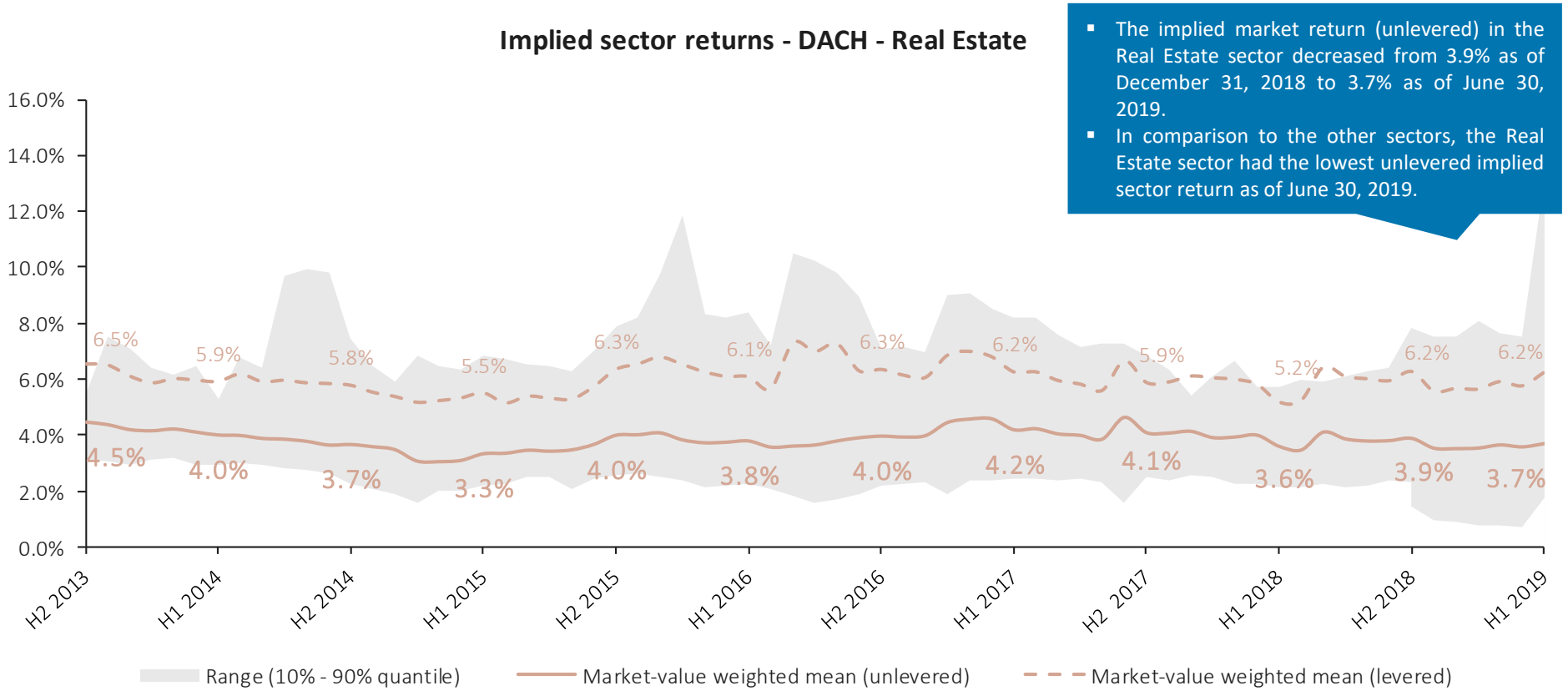
Implied sector returns (levered) - DACH - Real Estate

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	1.8%	2.7%	1.9%	2.5%	2.2%	1.6%	1.5%	-0.2%	3.1%	2.9%	1.7%	2.9%
Lower quantile	4.0%	3.8%	3.2%	3.3%	3.6%	3.4%	3.2%	3.2%	3.8%	3.0%	3.3%	3.7%
Median	6.6%	6.2%	6.2%	5.9%	6.4%	6.4%	6.7%	6.5%	6.1%	5.2%	6.5%	7.7%
Arithmetic mean	6.9%	6.6%	7.9%	7.3%	7.9%	7.6%	7.9%	7.0%	7.0%	6.0%	7.8%	9.2%
Market-value weighted mean	**6.5%**	**5.9%**	**5.8%**	**5.5%**	**6.3%**	**6.1%**	**6.3%**	**6.2%**	**5.9%**	**5.2%**	**6.2%**	**6.2%**
Upper quantile	10.7%	10.2%	14.1%	16.6%	15.9%	15.3%	18.0%	12.4%	11.4%	10.1%	14.7%	14.9%
Maximum	14.2%	14.3%	32.5%	25.4%	17.2%	19.5%	32.4%	20.4%	21.8%	14.6%	23.5%	44.8%
Market-value weighted debt	128.6%	116.3%	109.3%	112.6%	97.5%	91.6%	90.4%	83.6%	76.9%	84.0%	83.3%	83.7%

Implied sector returns (unlevered) - DACH - Real Estate

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	2.5%	2.5%	1.9%	1.5%	2.1%	1.2%	1.6%	0.8%	2.3%	2.0%	1.4%	1.8%
Lower quantile	3.1%	3.0%	2.2%	2.2%	2.6%	2.3%	2.2%	2.5%	2.5%	2.2%	2.4%	2.2%
Median	4.4%	4.0%	3.7%	3.3%	3.8%	3.4%	3.4%	3.7%	3.6%	3.3%	3.9%	4.3%
Arithmetic mean	4.5%	4.1%	4.5%	3.8%	4.8%	4.4%	4.7%	4.6%	4.6%	3.7%	4.5%	5.1%
Market-value weighted mean	**4.5%**	**4.0%**	**3.7%**	**3.3%**	**4.0%**	**3.8%**	**4.0%**	**4.2%**	**4.1%**	**3.6%**	**3.9%**	**3.7%**
Upper quantile	5.4%	5.3%	7.5%	6.8%	7.9%	8.4%	7.1%	8.2%	6.8%	5.7%	7.9%	13.2%
Maximum	8.8%	8.0%	20.0%	7.4%	14.2%	17.4%	17.5%	16.8%	17.9%	6.1%	10.4%	13.7%
Market-value weighted debt	128.6%	116.3%	109.3%	112.6%	97.5%	91.6%	90.4%	83.6%	76.9%	84.0%	83.3%	83.7%

Implied Sector Returns
Real Estate (chart)



- The implied market return (unlevered) in the Real Estate sector decreased from 3.9% as of December 31, 2018 to 3.7% as of June 30, 2019.
- In comparison to the other sectors, the Real Estate sector had the lowest unlevered implied sector return as of June 30, 2019.

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

Implied Sector Returns
Basic Materials (table)

Implied sector returns (levered) - DACH - Basic Materials

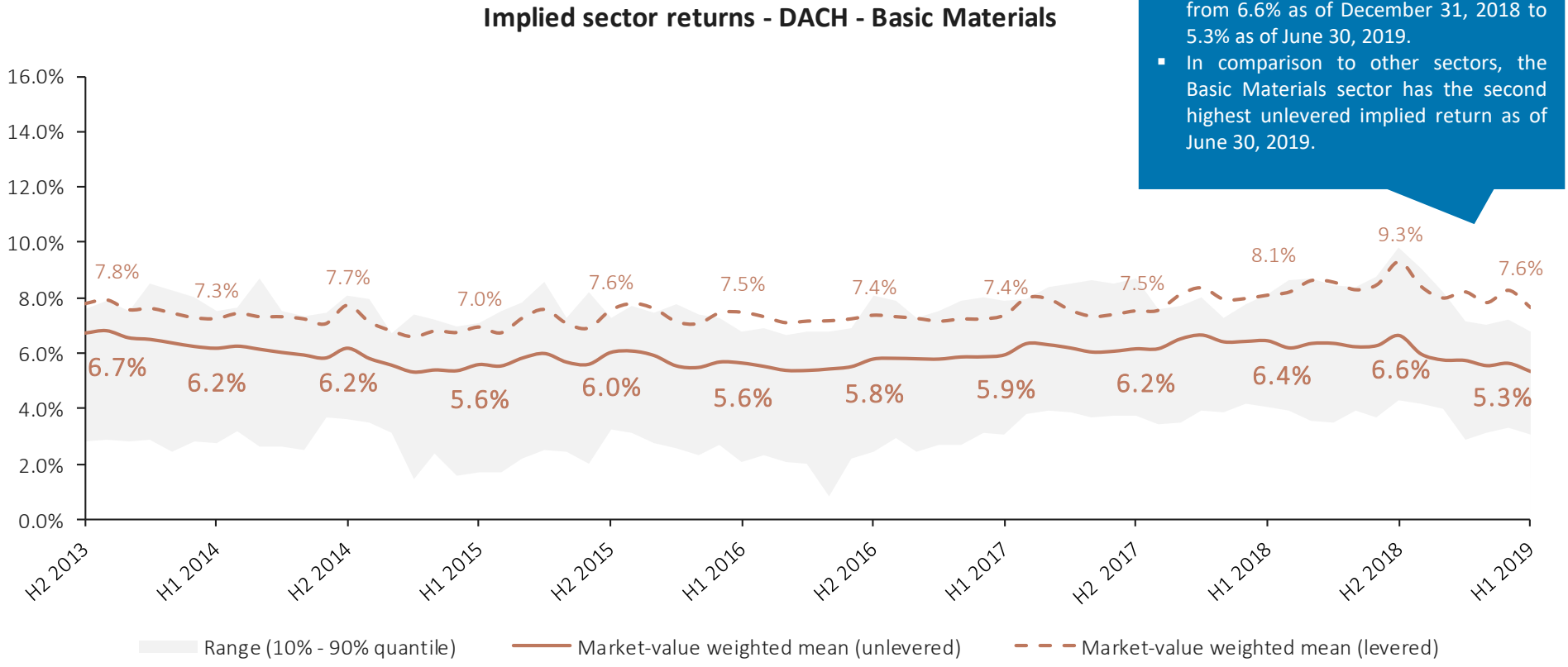
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	-0.4%	-1.8%	0.2%	1.3%	3.6%	0.4%	2.1%	0.6%	1.3%	1.9%	4.9%	2.3%
Lower quantile	2.9%	3.2%	3.8%	1.9%	4.7%	2.6%	4.1%	4.4%	3.3%	4.7%	5.9%	5.0%
Median	7.2%	6.2%	7.6%	6.2%	7.7%	7.6%	6.8%	6.8%	7.0%	7.7%	10.0%	8.4%
Arithmetic mean	8.1%	9.0%	7.8%	6.2%	8.1%	6.7%	7.3%	6.9%	7.6%	8.2%	10.1%	8.1%
Market-value weighted mean	**7.8%**	**7.3%**	**7.7%**	**7.0%**	**7.6%**	**7.5%**	**7.4%**	**7.4%**	**7.5%**	**8.1%**	**9.3%**	**7.6%**
Upper quantile	11.9%	10.1%	11.8%	9.1%	11.1%	9.2%	9.4%	10.6%	9.8%	12.9%	14.5%	11.7%
Maximum	41.7%	73.2%	20.4%	9.9%	20.4%	11.0%	23.3%	13.9%	31.3%	16.8%	19.6%	13.8%
Market-value weighted debt	29.7%	33.0%	38.3%	35.2%	34.9%	43.5%	35.0%	31.9%	29.2%	32.3%	45.8%	45.5%

Implied sector returns (unlevered) - DACH - Basic Materials

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	1.3%	0.9%	1.9%	1.2%	2.6%	0.5%	1.9%	0.9%	2.0%	1.7%	3.1%	1.5%
Lower quantile	2.8%	2.7%	3.6%	1.7%	3.3%	2.1%	2.4%	3.1%	3.7%	4.1%	4.3%	3.1%
Median	6.0%	5.4%	5.9%	5.0%	5.7%	5.4%	5.3%	5.2%	5.9%	5.6%	6.8%	5.3%
Arithmetic mean	5.8%	7.4%	5.9%	4.9%	5.7%	5.0%	5.4%	5.3%	6.0%	5.9%	6.6%	5.1%
Market-value weighted mean	**6.7%**	**6.2%**	**6.2%**	**5.6%**	**6.0%**	**5.6%**	**5.8%**	**5.9%**	**6.2%**	**6.4%**	**6.6%**	**5.3%**
Upper quantile	7.6%	7.5%	8.1%	7.1%	7.3%	6.8%	8.1%	7.9%	8.7%	8.1%	9.8%	6.8%
Maximum	12.9%	57.6%	12.6%	8.3%	12.1%	8.9%	15.0%	9.0%	15.3%	13.0%	11.1%	8.0%
Market-value weighted debt	29.7%	33.0%	38.3%	35.2%	34.9%	43.5%	35.0%	31.9%	29.2%	32.3%	45.8%	45.5%

Implied Sector Returns
Basic Materials (chart)

- The implied sector return (unlevered) of the Basic Materials sector decreased from 6.6% as of December 31, 2018 to 5.3% as of June 30, 2019.
- In comparison to other sectors, the Basic Materials sector has the second highest unlevered implied return as of June 30, 2019.



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

Implied Sector Returns
Consumer Goods (table)

Implied sector returns (levered) - DACH - Consumer Goods

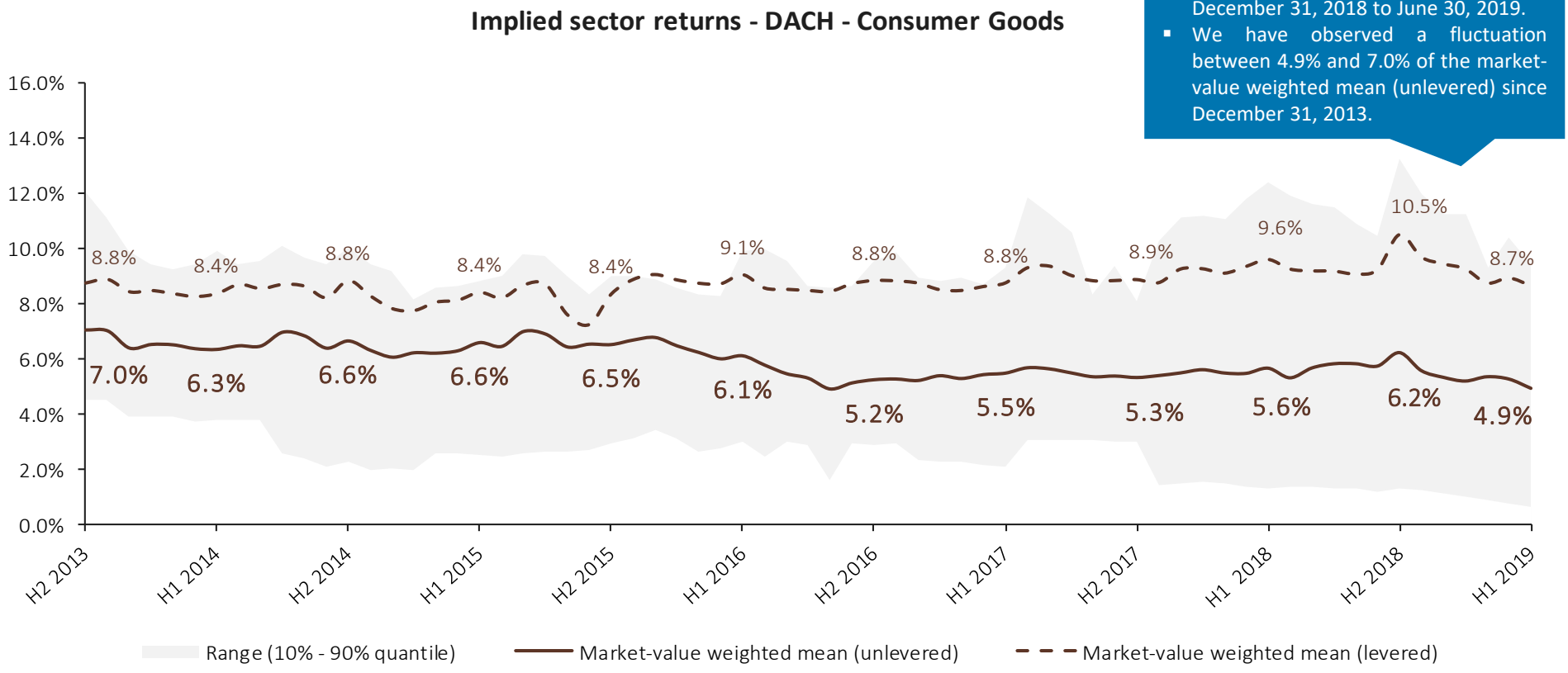
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	4.8%	1.3%	2.2%	0.5%	2.1%	2.6%	2.5%	2.0%	1.7%	1.8%	2.3%	-26.5%
Lower quantile	6.1%	4.8%	4.5%	4.6%	4.4%	4.7%	4.8%	3.4%	4.7%	4.3%	4.8%	3.4%
Median	9.1%	8.0%	7.9%	7.6%	7.9%	7.5%	7.6%	6.9%	7.3%	7.3%	9.0%	7.4%
Arithmetic mean	9.4%	11.2%	8.0%	7.4%	7.8%	8.5%	8.1%	7.4%	7.7%	8.0%	10.0%	7.4%
Market-value weighted mean	**8.8%**	**8.4%**	**8.8%**	**8.4%**	**8.4%**	**9.1%**	**8.8%**	**8.8%**	**8.9%**	**9.6%**	**10.5%**	**8.7%**
Upper quantile	12.6%	11.8%	11.3%	10.2%	11.2%	14.7%	12.8%	12.2%	11.7%	14.6%	17.4%	13.6%
Maximum	31.1%	113.8%	16.6%	15.1%	13.4%	21.3%	16.8%	18.9%	16.7%	22.7%	25.0%	21.9%
Market-value weighted debt	54.7%	58.0%	60.6%	59.8%	61.4%	79.6%	70.0%	67.9%	67.4%	75.1%	85.6%	80.7%

Implied sector returns (unlevered) - DACH - Consumer Goods

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	1.0%	0.6%	0.6%	0.3%	0.4%	0.2%	0.4%	0.5%	1.3%	0.3%	1.1%	-21.0%
Lower quantile	4.5%	3.8%	2.3%	2.5%	3.0%	3.0%	2.9%	2.1%	3.0%	1.3%	1.3%	0.6%
Median	6.6%	5.8%	5.7%	5.0%	5.2%	5.2%	5.1%	4.7%	5.5%	5.1%	5.6%	4.6%
Arithmetic mean	7.6%	7.6%	6.5%	5.8%	6.0%	6.1%	5.9%	5.6%	5.7%	5.8%	6.8%	4.4%
Market-value weighted mean	**7.0%**	**6.3%**	**6.6%**	**6.6%**	**6.5%**	**6.1%**	**5.2%**	**5.5%**	**5.3%**	**5.6%**	**6.2%**	**4.9%**
Upper quantile	12.0%	9.9%	10.1%	8.8%	9.0%	9.9%	9.6%	9.3%	8.1%	12.4%	13.2%	9.5%
Maximum	20.2%	44.8%	12.0%	11.1%	10.6%	13.3%	13.3%	14.6%	12.6%	15.1%	17.4%	12.1%
Market-value weighted debt	54.7%	58.0%	60.6%	59.8%	61.4%	79.6%	70.0%	67.9%	67.4%	75.1%	85.6%	80.7%

Implied Sector Returns
Consumer Goods (chart)

- The implied sector return (unlevered) of the Consumer Goods sector decreased from 6.2% to 4.9% from December 31, 2018 to June 30, 2019.
- We have observed a fluctuation between 4.9% and 7.0% of the market-value weighted mean (unlevered) since December 31, 2013.



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

Implied Sector Returns
Telecommunication (table)

Implied sector returns (levered) - DACH - Telecommunication

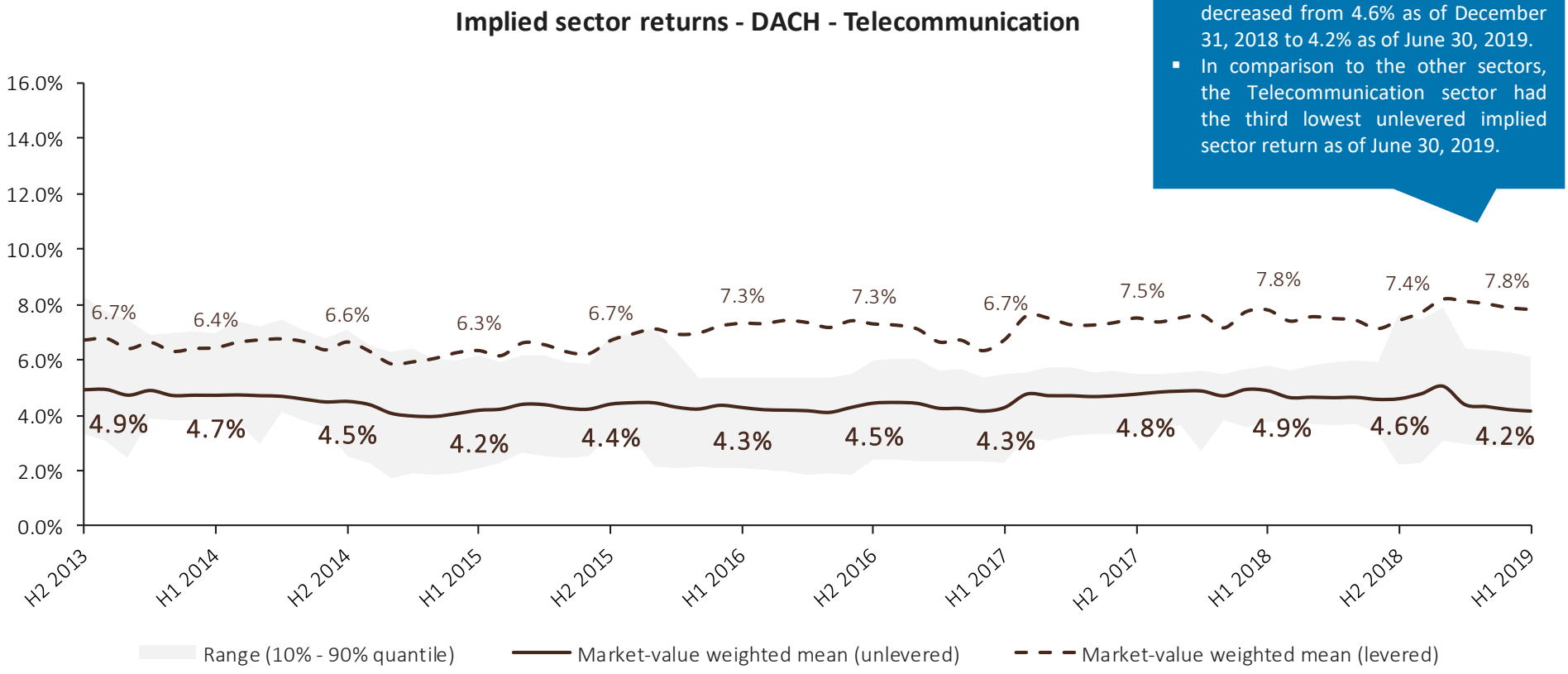
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	1.7%	5.1%	-0.7%	-1.8%	4.0%	2.8%	3.9%	3.4%	3.4%	3.5%	0.7%	4.1%
Lower quantile	4.0%	5.3%	2.8%	1.8%	4.3%	3.2%	4.4%	3.7%	4.8%	4.5%	3.1%	4.1%
Median	6.9%	5.8%	6.4%	6.7%	7.3%	5.9%	6.8%	4.6%	7.1%	7.6%	7.4%	7.8%
Arithmetic mean	6.9%	6.5%	5.9%	5.4%	6.8%	5.9%	6.5%	5.5%	6.5%	7.0%	7.8%	7.7%
Market-value weighted mean	**6.7%**	**6.4%**	**6.6%**	**6.3%**	**6.7%**	**7.3%**	**7.3%**	**6.7%**	**7.5%**	**7.8%**	**7.4%**	**7.8%**
Upper quantile	9.7%	8.5%	8.4%	7.6%	8.4%	8.9%	8.5%	7.8%	7.8%	8.6%	12.4%	11.0%
Maximum	10.0%	9.3%	9.2%	7.7%	9.1%	9.3%	8.7%	8.0%	7.8%	9.5%	12.7%	11.0%
Market-value weighted debt	84.6%	78.7%	79.0%	68.8%	71.3%	80.5%	75.9%	73.1%	70.8%	77.0%	74.7%	100.3%

Implied sector returns (unlevered) - DACH - Telecommunication

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	1.9%	3.5%	0.5%	-0.1%	2.6%	1.6%	2.1%	2.3%	2.6%	2.7%	0.8%	2.6%
Lower quantile	3.3%	3.9%	2.5%	2.1%	3.3%	2.1%	2.4%	2.3%	3.3%	3.8%	2.2%	2.8%
Median	6.4%	5.2%	5.0%	4.5%	4.8%	4.0%	5.3%	4.0%	5.3%	5.3%	5.2%	5.0%
Arithmetic mean	5.8%	5.3%	4.8%	4.3%	4.9%	4.1%	4.7%	4.1%	4.7%	4.9%	5.2%	4.6%
Market-value weighted mean	**4.9%**	**4.7%**	**4.5%**	**4.2%**	**4.4%**	**4.3%**	**4.5%**	**4.3%**	**4.8%**	**4.9%**	**4.6%**	**4.2%**
Upper quantile	8.3%	7.0%	7.1%	6.2%	6.9%	5.4%	6.0%	5.5%	5.5%	5.8%	7.7%	6.1%
Maximum	8.8%	8.0%	8.0%	6.7%	7.1%	6.1%	6.7%	5.7%	5.7%	6.0%	9.5%	6.1%
Market-value weighted debt	84.6%	78.7%	79.0%	68.8%	71.3%	80.5%	75.9%	73.1%	70.8%	77.0%	74.7%	100.3%

Implied Sector Returns
Telecommunication (chart)

- The implied sector return (unlevered) of the Telecommunication sector decreased from 4.6% as of December 31, 2018 to 4.2% as of June 30, 2019.
- In comparison to the other sectors, the Telecommunication sector had the third lowest unlevered implied sector return as of June 30, 2019.



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

Implied Sector Returns
Industrials (table)

Implied sector returns (levered) - DACH - Industrials

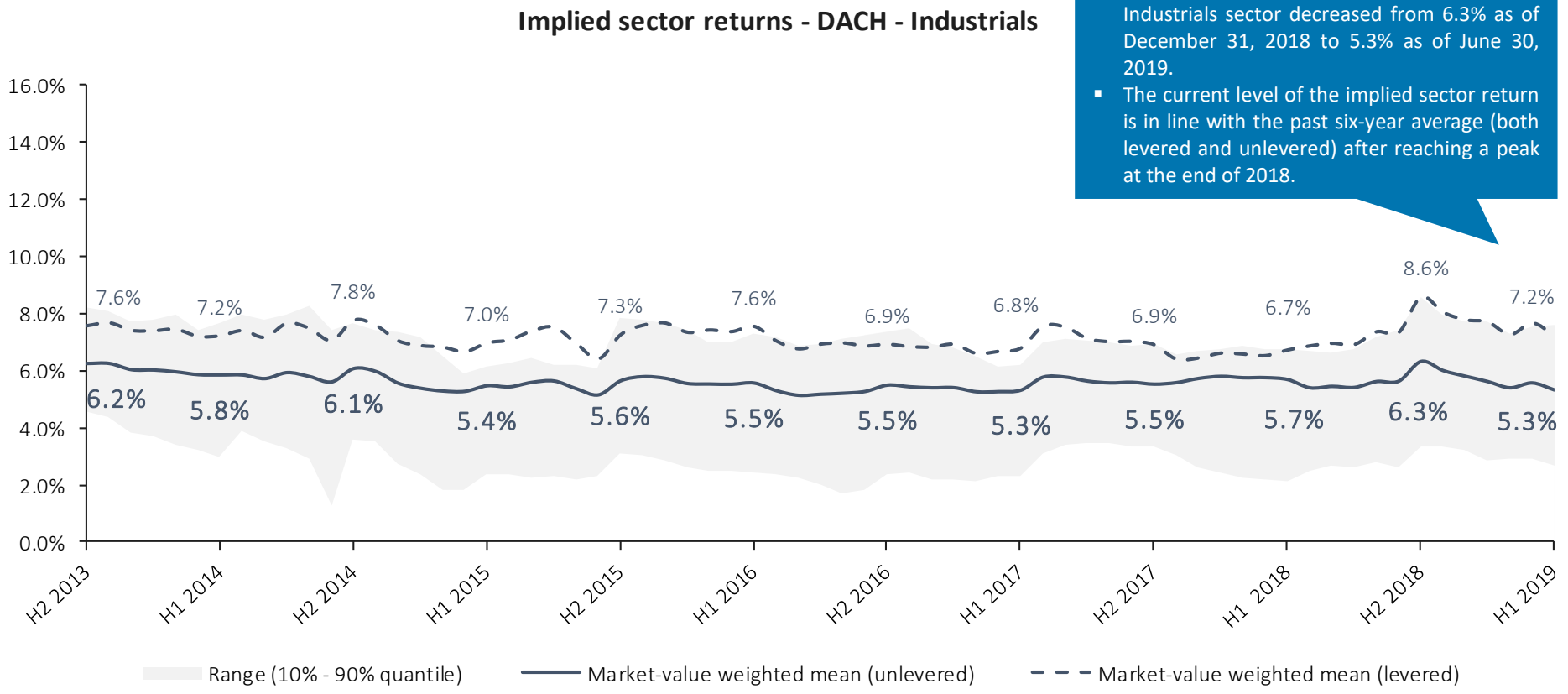
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	0.3%	0.6%	0.2%	-0.4%	1.6%	1.7%	2.1%	0.5%	2.7%	0.9%	0.9%	0.1%
Lower quantile	4.5%	3.5%	3.3%	2.9%	4.4%	4.3%	4.3%	3.2%	3.5%	3.1%	4.9%	4.0%
Median	7.6%	6.8%	8.0%	6.5%	7.2%	7.4%	7.2%	6.2%	6.7%	6.7%	8.0%	6.9%
Arithmetic mean	7.6%	6.5%	7.9%	6.4%	7.7%	7.8%	7.0%	5.7%	6.3%	6.2%	8.1%	6.9%
Market-value weighted mean	**7.6%**	**7.2%**	**7.8%**	**7.0%**	**7.3%**	**7.6%**	**6.9%**	**6.8%**	**6.9%**	**6.7%**	**8.6%**	**7.2%**
Upper quantile	10.3%	8.7%	10.6%	8.8%	10.3%	9.8%	9.4%	7.6%	8.3%	8.4%	11.2%	9.4%
Maximum	16.0%	12.3%	29.1%	12.8%	40.7%	42.5%	18.1%	9.5%	11.5%	10.9%	20.1%	21.2%
Market-value weighted debt	37.6%	39.1%	40.3%	41.7%	42.6%	47.4%	39.0%	37.4%	34.1%	37.6%	47.0%	46.9%

Implied sector returns (unlevered) - DACH - Industrials

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	0.3%	0.6%	0.6%	0.5%	1.5%	1.5%	1.7%	0.4%	2.4%	1.0%	1.0%	0.2%
Lower quantile	4.6%	3.0%	3.6%	2.4%	3.1%	2.4%	2.4%	2.3%	3.3%	2.1%	3.3%	2.7%
Median	6.9%	6.1%	6.4%	4.3%	5.2%	5.1%	5.2%	5.1%	5.4%	5.5%	6.1%	5.5%
Arithmetic mean	6.2%	5.5%	5.9%	4.5%	5.4%	5.1%	5.3%	4.5%	5.2%	4.8%	6.2%	5.3%
Market-value weighted mean	**6.2%**	**5.8%**	**6.1%**	**5.4%**	**5.6%**	**5.5%**	**5.5%**	**5.3%**	**5.5%**	**5.7%**	**6.3%**	**5.3%**
Upper quantile	8.2%	7.6%	7.7%	6.1%	7.9%	7.3%	7.4%	6.2%	6.9%	6.7%	8.6%	7.6%
Maximum	9.4%	8.4%	9.5%	8.0%	8.0%	7.6%	9.7%	6.8%	7.5%	7.7%	10.8%	11.8%
Market-value weighted debt	37.6%	39.1%	40.3%	41.7%	42.6%	47.4%	39.0%	37.4%	34.1%	37.6%	47.0%	46.9%

Implied Sector Returns
Industrials (chart)

- The implied sector return (unlevered) of the Industrials sector decreased from 6.3% as of December 31, 2018 to 5.3% as of June 30, 2019.
- The current level of the implied sector return is in line with the past six-year average (both levered and unlevered) after reaching a peak at the end of 2018.



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

Implied Sector Returns
Consumer Service (table)

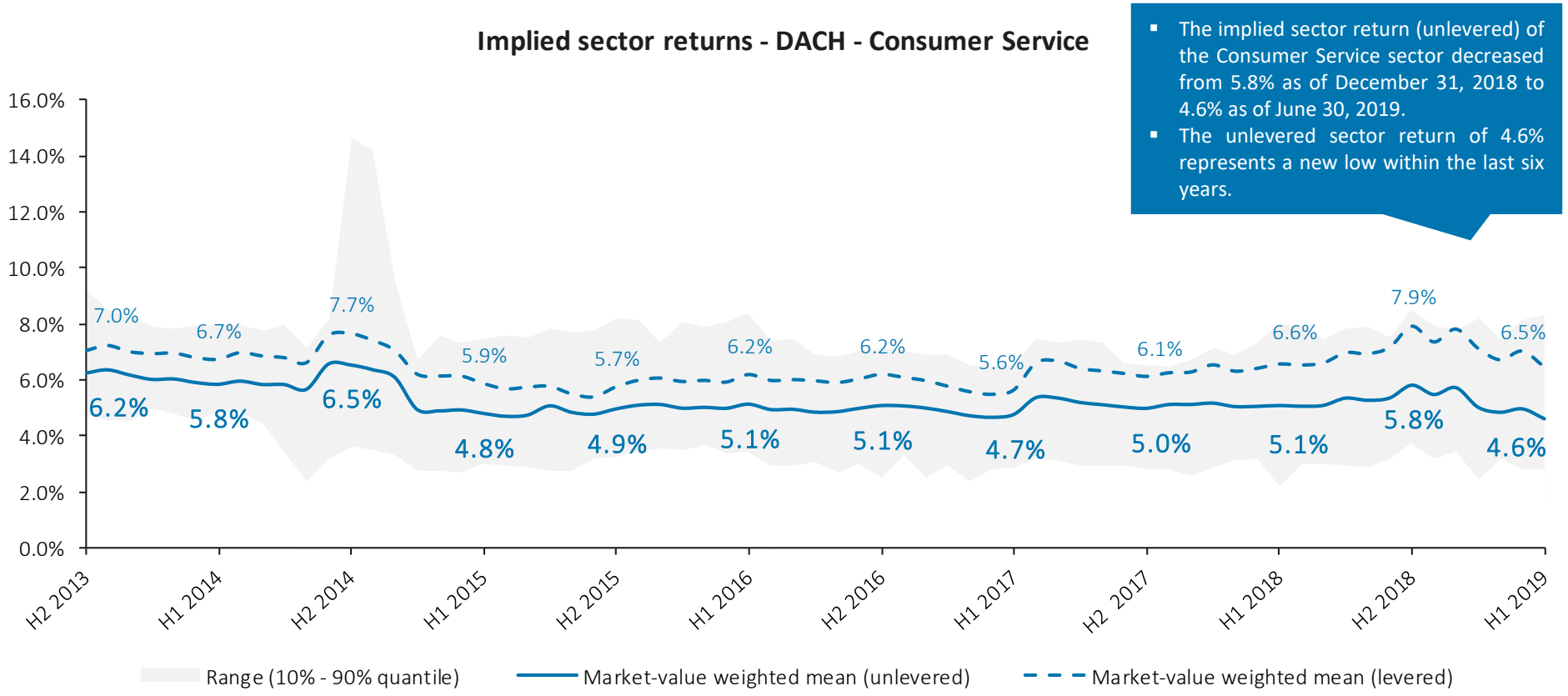
Implied sector returns (levered) - DACH - Consumer Service

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	3.2%	3.6%	2.9%	2.7%	1.6%	1.8%	1.3%	2.1%	2.0%	2.0%	2.5%	1.5%
Lower quantile	4.3%	5.5%	4.3%	3.8%	3.0%	3.4%	3.8%	3.3%	2.9%	2.8%	4.6%	3.4%
Median	7.3%	6.6%	7.5%	5.9%	6.2%	6.4%	6.7%	6.0%	6.2%	6.3%	7.7%	7.3%
Arithmetic mean	8.1%	9.0%	9.8%	7.0%	6.7%	6.6%	6.4%	5.9%	6.1%	6.8%	8.3%	7.6%
Market-value weighted mean	**7.0%**	**6.7%**	**7.7%**	**5.9%**	**5.7%**	**6.2%**	**6.2%**	**5.6%**	**6.1%**	**6.6%**	**7.9%**	**6.5%**
Upper quantile	11.3%	11.3%	20.5%	10.5%	10.7%	8.9%	8.8%	8.2%	8.7%	10.4%	12.0%	10.7%
Maximum	23.5%	39.1%	35.1%	19.0%	14.7%	14.1%	9.5%	10.3%	11.0%	13.8%	17.0%	18.6%
Market-value weighted debt	23.2%	22.8%	20.3%	17.4%	21.5%	25.0%	26.0%	23.9%	32.9%	29.0%	37.0%	41.7%

Implied sector returns (unlevered) - DACH - Consumer Service

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	2.9%	3.6%	2.7%	2.1%	1.9%	1.3%	1.2%	2.1%	1.9%	1.7%	2.2%	1.5%
Lower quantile	4.8%	4.9%	3.6%	3.0%	3.2%	3.4%	2.5%	2.8%	2.8%	2.2%	3.7%	2.8%
Median	6.1%	5.8%	6.4%	5.2%	5.1%	5.0%	5.0%	5.0%	5.2%	5.1%	6.0%	5.1%
Arithmetic mean	6.6%	7.4%	7.9%	5.2%	5.6%	5.3%	5.1%	4.9%	4.9%	5.3%	6.0%	5.7%
Market-value weighted mean	**6.2%**	**5.8%**	**6.5%**	**4.8%**	**4.9%**	**5.1%**	**5.1%**	**4.7%**	**5.0%**	**5.1%**	**5.8%**	**4.6%**
Upper quantile	9.3%	7.9%	14.6%	7.5%	8.2%	8.4%	7.1%	6.5%	6.5%	8.0%	8.5%	8.3%
Maximum	10.3%	38.9%	34.6%	8.3%	11.4%	8.9%	8.3%	8.8%	7.2%	13.1%	9.6%	18.1%
Market-value weighted debt	23.2%	22.8%	20.3%	17.4%	21.5%	25.0%	26.0%	23.9%	32.9%	29.0%	37.0%	41.7%

Implied Sector Returns
Consumer Service (chart)



- The implied sector return (unlevered) of the Consumer Service sector decreased from 5.8% as of December 31, 2018 to 4.6% as of June 30, 2019.
- The unlevered sector return of 4.6% 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

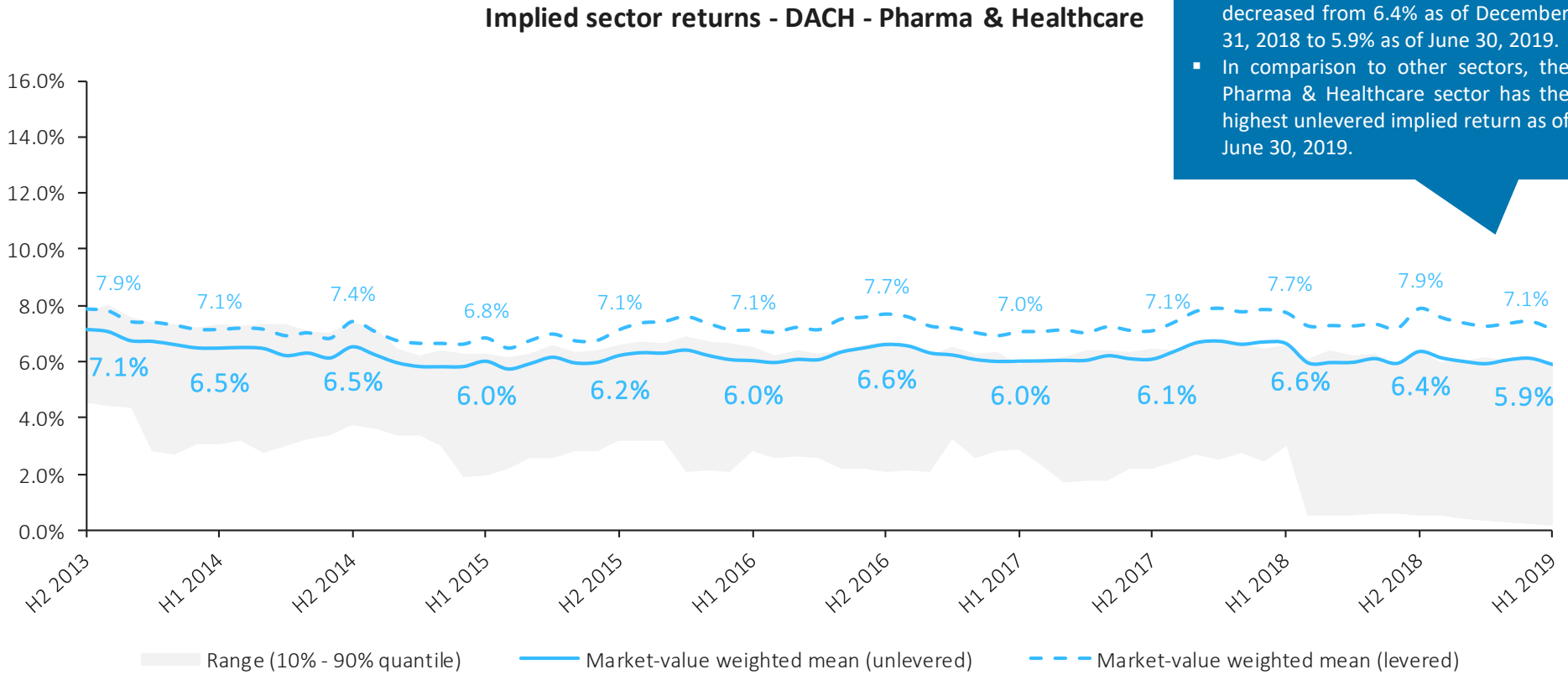
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	2.3%	0.8%	2.0%	1.4%	1.1%	1.4%	1.6%	2.0%	1.9%	1.9%	1.1%	2.4%
Lower quantile	5.4%	2.4%	3.5%	2.0%	3.7%	3.7%	2.7%	2.9%	2.4%	3.2%	3.3%	3.2%
Median	6.7%	6.1%	6.3%	5.8%	6.1%	6.0%	5.6%	5.8%	5.0%	5.2%	5.7%	5.1%
Arithmetic mean	7.0%	5.9%	6.9%	5.6%	6.6%	5.9%	7.9%	5.9%	5.5%	5.7%	5.8%	5.3%
Market-value weighted mean	**7.9%**	**7.1%**	**7.4%**	**6.8%**	**7.1%**	**7.1%**	**7.7%**	**7.0%**	**7.1%**	**7.7%**	**7.9%**	**7.1%**
Upper quantile	9.4%	8.3%	9.3%	7.5%	8.6%	7.9%	8.0%	7.3%	7.7%	7.9%	9.0%	7.8%
Maximum	11.0%	11.7%	22.2%	11.5%	24.8%	9.2%	76.3%	27.9%	20.2%	23.9%	13.2%	8.9%
Market-value weighted debt	16.7%	15.7%	18.2%	16.8%	18.5%	20.3%	20.6%	20.2%	19.6%	20.2%	20.3%	19.5%

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

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2012	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	2.3%	1.3%	2.0%	1.4%	1.2%	1.3%	1.4%	1.5%	1.4%	1.2%	0.5%	0.2%
Lower quantile	4.6%	3.1%	3.8%	1.9%	3.2%	2.8%	2.1%	2.9%	2.2%	3.0%	0.5%	0.2%
Median	6.1%	5.6%	5.8%	5.1%	5.2%	4.9%	5.3%	4.8%	4.5%	4.6%	5.0%	4.3%
Arithmetic mean	6.3%	5.4%	5.7%	4.7%	5.0%	4.9%	5.3%	4.6%	5.1%	5.1%	4.2%	3.7%
Market-value weighted mean	**7.1%**	**6.5%**	**6.5%**	**6.0%**	**6.2%**	**6.0%**	**6.6%**	**6.0%**	**6.1%**	**6.6%**	**6.4%**	**5.9%**
Upper quantile	7.8%	7.3%	7.4%	6.3%	6.6%	6.5%	6.7%	5.9%	6.5%	6.6%	6.4%	5.9%
Maximum	10.6%	10.8%	9.2%	6.6%	7.7%	7.6%	18.6%	7.1%	20.1%	21.9%	12.1%	8.0%
Market-value weighted debt	16.7%	15.7%	18.2%	16.8%	18.5%	20.3%	20.6%	20.2%	19.6%	20.2%	20.3%	19.5%

Implied Sector Returns
Pharma & Healthcare (chart)

- The implied sector return (unlevered) of the Pharma & Healthcare sector decreased from 6.4% as of December 31, 2018 to 5.9% as of June 30, 2019.
- In comparison to other sectors, the Pharma & Healthcare sector has the highest unlevered implied return as of June 30, 2019.



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

Implied Sector Returns
Information Technology (table)

Implied sector returns (levered) - DACH - Information Technology

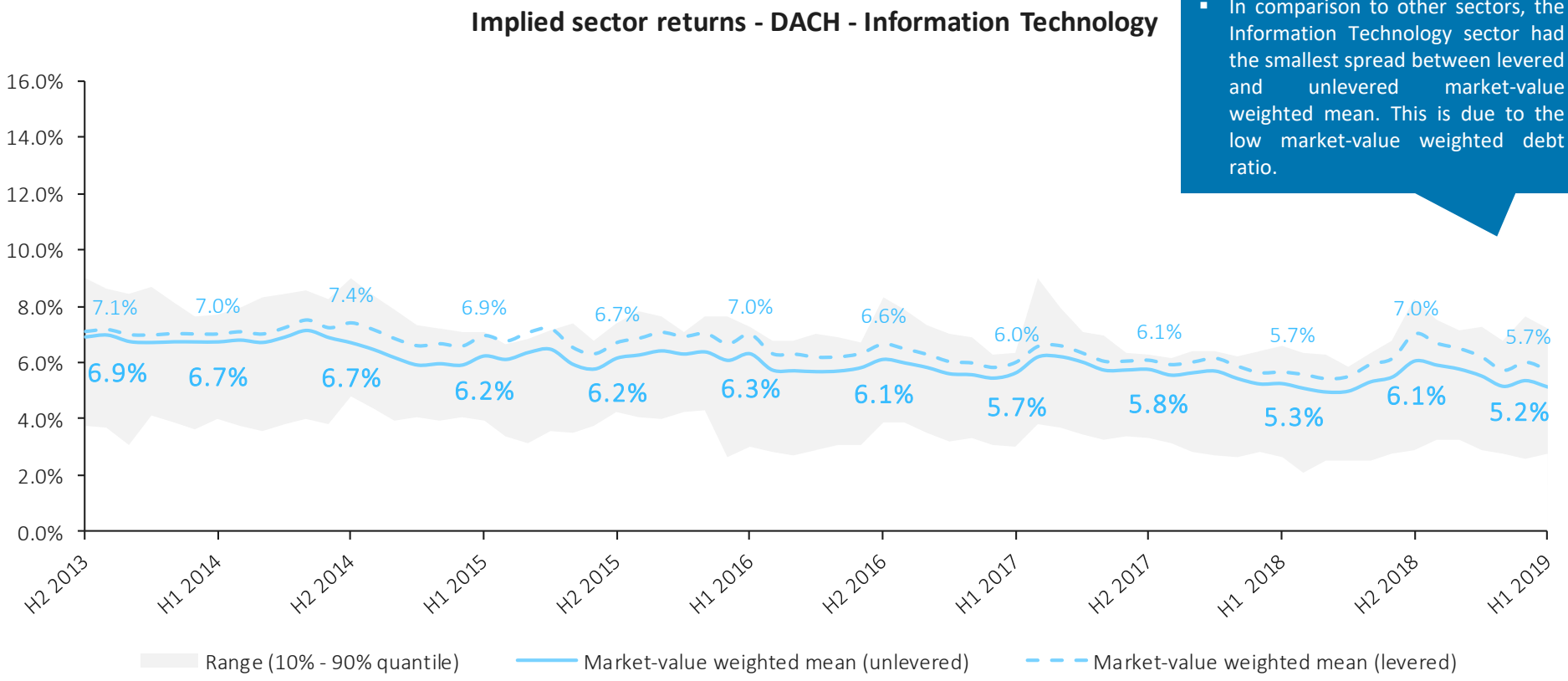
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	1.3%	1.8%	0.9%	-1.4%	1.0%	1.7%	0.2%	2.1%	0.5%	0.2%	1.3%	0.1%
Lower quantile	4.3%	4.2%	5.0%	4.6%	4.4%	3.8%	4.6%	3.6%	3.6%	3.4%	4.3%	3.3%
Median	7.3%	6.4%	7.6%	6.2%	6.5%	6.2%	6.6%	5.5%	5.5%	5.0%	7.3%	5.4%
Arithmetic mean	7.2%	6.4%	7.6%	6.4%	6.6%	6.3%	7.5%	5.7%	5.7%	5.6%	7.8%	5.8%
Market-value weighted mean	**7.1%**	**7.0%**	**7.4%**	**6.9%**	**6.7%**	**7.0%**	**6.6%**	**6.0%**	**6.1%**	**5.7%**	**7.0%**	**5.7%**
Upper quantile	9.8%	9.1%	10.8%	9.2%	8.7%	7.9%	10.1%	7.6%	6.9%	7.6%	12.1%	9.0%
Maximum	15.3%	11.9%	14.1%	11.7%	18.6%	16.5%	35.0%	15.8%	28.2%	28.2%	26.6%	13.0%
Market-value weighted debt	6.5%	7.1%	16.3%	14.1%	10.7%	11.0%	8.5%	6.8%	5.5%	11.9%	18.0%	13.5%

Implied sector returns (unlevered) - DACH - Information Technology

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	1.7%	2.7%	2.2%	1.3%	1.0%	1.2%	0.2%	2.0%	0.5%	0.7%	0.2%	1.7%
Lower quantile	3.8%	4.0%	4.8%	3.9%	4.2%	3.0%	3.9%	3.0%	3.3%	2.6%	2.9%	2.8%
Median	6.5%	5.8%	6.6%	5.4%	5.4%	5.3%	6.0%	5.0%	5.1%	4.9%	5.6%	4.5%
Arithmetic mean	6.5%	5.8%	6.7%	5.5%	5.7%	5.4%	6.6%	5.0%	4.9%	4.6%	5.7%	4.9%
Market-value weighted mean	**6.9%**	**6.7%**	**6.7%**	**6.2%**	**6.2%**	**6.3%**	**6.1%**	**5.7%**	**5.8%**	**5.3%**	**6.1%**	**5.2%**
Upper quantile	9.0%	7.7%	9.0%	7.1%	7.4%	7.3%	8.3%	6.3%	6.3%	6.6%	8.3%	7.2%
Maximum	10.9%	9.0%	10.6%	9.5%	17.6%	15.4%	33.4%	11.2%	9.5%	7.6%	10.1%	10.6%
Market-value weighted debt	6.5%	7.1%	16.3%	14.1%	10.7%	11.0%	8.5%	6.8%	5.5%	11.9%	18.0%	13.5%

Implied Sector Returns
Informational Technology (chart)

- The implied sector return (unlevered) of the Information Technology sector decreased from 6.1% as of December 31, 2018 to 5.2% as of June 30, 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 market-value weighted debt ratio.



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

Implied Sector Returns
Utilities (table)

Implied sector returns (levered) - DACH - Utilities

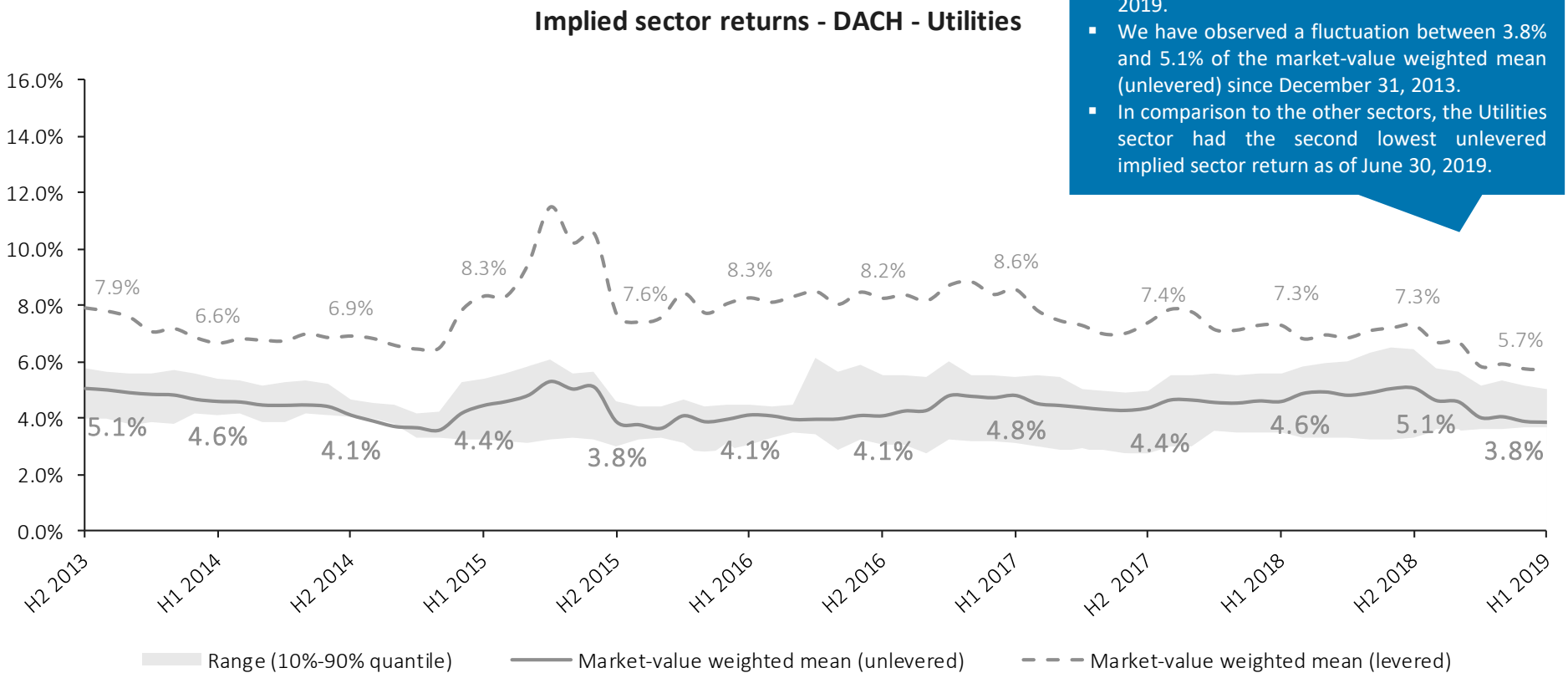
	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**06/30/2014**	**12/31/2014**	**06/30/2015**	**12/31/2015**	**06/30/2016**	**12/31/2016**	**06/30/2017**	**12/31/2017**	**06/30/2018**	**12/31/2018**	**06/30/2019**
Minimum	4.2%	3.7%	3.8%	3.9%	4.9%	5.2%	4.8%	5.5%	4.5%	4.8%	5.3%	3.9%
Lower quantile	5.5%	4.0%	4.9%	5.4%	5.2%	6.8%	5.7%	5.5%	5.2%	5.6%	5.7%	4.2%
Median	7.3%	7.0%	7.1%	6.5%	7.0%	7.5%	7.4%	7.5%	6.2%	6.6%	7.0%	5.0%
Arithmetic mean	7.5%	6.8%	7.0%	7.8%	7.0%	7.6%	7.7%	7.7%	6.8%	6.9%	7.2%	5.6%
Market-value weighted mean	**7.9%**	**6.6%**	**6.9%**	**8.3%**	**7.6%**	**8.3%**	**8.2%**	**8.6%**	**7.4%**	**7.3%**	**7.3%**	**5.7%**
Upper quantile	9.9%	8.9%	9.4%	11.5%	8.7%	8.9%	10.2%	9.7%	8.6%	8.6%	9.3%	7.4%
Maximum	10.1%	9.9%	10.1%	14.6%	9.7%	9.4%	10.5%	11.8%	10.7%	9.0%	9.6%	8.9%
Market-value weighted debt	113.1%	87.8%	118.4%	107.9%	158.5%	124.5%	139.9%	101.6%	89.8%	80.7%	61.3%	60.2%

Implied sector returns (unlevered) - DACH - Utilities

	H2 2013	H1 2014	H2 2014	H1 2015	H2 2015	H1 2016	H2 2016	H1 2017	H2 2017	H1 2018	H2 2018	H1 2019
	12/31/2013	**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**
Minimum	3.5%	3.1%	2.8%	3.0%	2.6%	2.9%	2.6%	2.7%	3.0%	2.8%	3.1%	2.5%
Lower quantile	4.0%	3.3%	3.0%	3.0%	3.0%	3.1%	2.7%	3.5%	3.3%	3.6%	3.5%	2.7%
Median	4.8%	4.5%	4.2%	4.0%	3.8%	3.6%	4.1%	4.2%	4.1%	4.1%	4.6%	3.3%
Arithmetic mean	4.9%	4.5%	4.0%	4.2%	3.7%	3.7%	4.1%	4.5%	4.1%	4.4%	4.8%	3.7%
Market-value weighted mean	**5.1%**	**4.6%**	**4.1%**	**4.4%**	**3.8%**	**4.1%**	**4.1%**	**4.8%**	**4.4%**	**4.6%**	**5.1%**	**3.8%**
Upper quantile	5.8%	5.4%	4.7%	5.4%	4.6%	4.5%	5.5%	5.4%	5.0%	5.6%	6.5%	5.0%
Maximum	6.0%	5.6%	4.8%	7.2%	4.7%	4.9%	6.0%	6.9%	5.3%	5.6%	7.6%	5.5%
Market-value weighted debt	113.1%	87.8%	118.4%	107.9%	158.5%	124.5%	139.9%	101.6%	89.8%	80.7%	61.3%	60.2%

Implied Sector Returns
Utilities (chart)

- The implied sector return (unlevered) of the Utilities sector decreased from 5.1% as of December 31, 2018 to 3.8% as of June 30, 2019.
- We have observed a fluctuation between 3.8% and 5.1% of the market-value weighted mean (unlevered) since December 31, 2013.
- In comparison to the other sectors, the Utilities sector had the second lowest unlevered implied sector return as of June 30, 2019.



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

7 Sector returns

b. Historical returns (ex-post analysis)

Historical Sector Returns
Background & approach

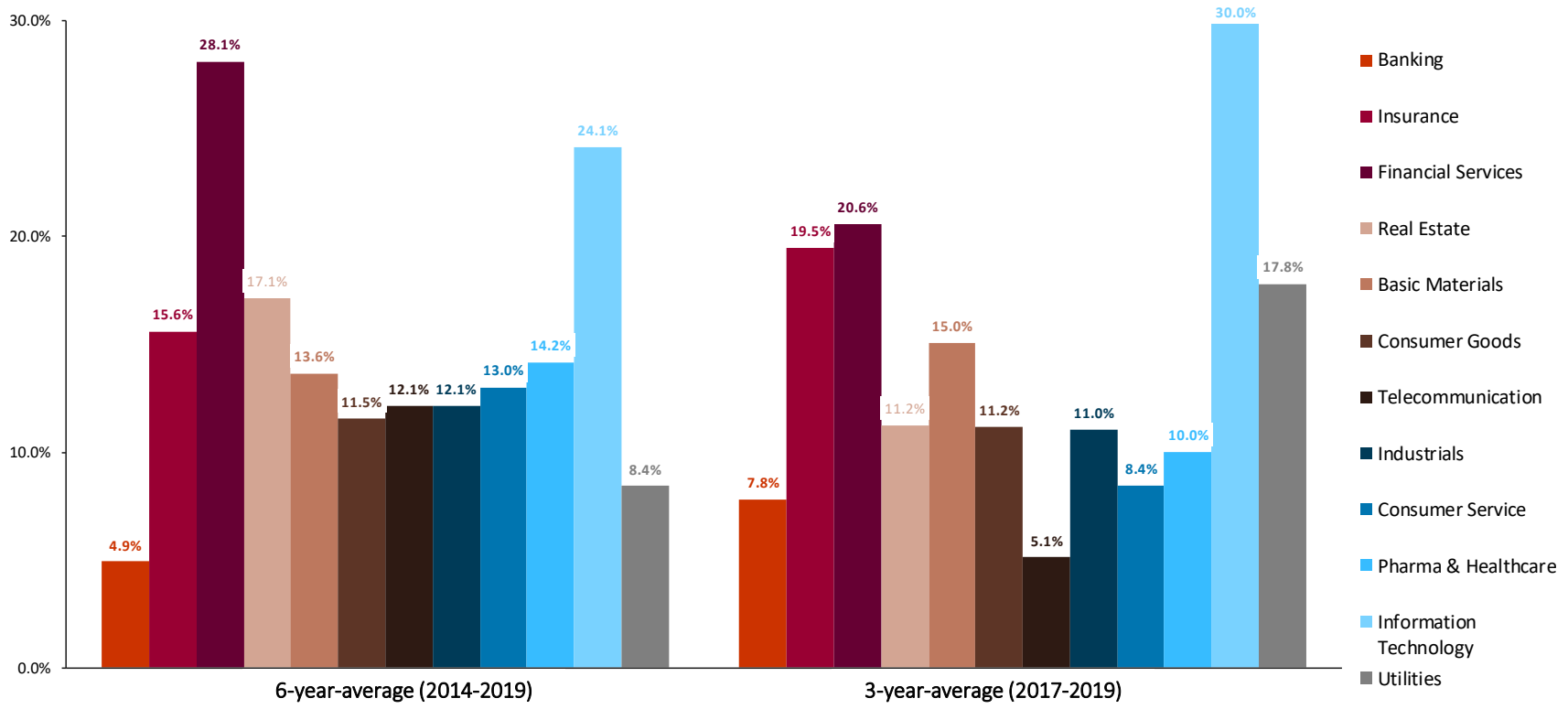
In **addition** to the **determination of historical market returns**, we calculate **historical sector returns**. This option creates an **alternative approach**, like the implied sector returns, to the ex-post analysis of the determination of costs of capital based on regression analyses following 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 June 30,** 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 June 30, 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
June 30, 2014	7.2%	17.3%	33.0%	17.0%	28.3%	25.9%	44.0%	23.8%	30.0%	24.0%	23.3%	22.9%
June 30, 2015	27.8%	21.6%	45.9%	27.2%	24.0%	14.6%	17.4%	12.0%	23.4%	32.6%	19.8%	-13.3%
June 30, 2016	-29.1%	-3.7%	28.0%	24.9%	-15.6%	-4.8%	-4.0%	3.9%	-0.7%	-1.6%	11.8%	-12.5%
June 30, 2017	35.2%	28.0%	34.7%	10.9%	42.8%	17.5%	11.7%	32.0%	19.7%	9.6%	47.8%	9.7%
June 30, 2018	-2.1%	4.5%	19.9%	16.5%	1.3%	0.6%	-8.7%	-1.1%	9.2%	-3.0%	25.5%	24.1%
June 30, 2019	-9.7%	25.9%	7.2%	6.3%	1.0%	15.5%	12.4%	2.2%	-3.6%	23.4%	16.6%	19.6%

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 (June 30, 2019).

We present historical multiples since June 30, 2013 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 June 30, 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.

1) Enterprise Value.

2) Equity Value.

Trading Multiples

Sector multiples – Median
LTM and 1yf as of June 30, 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.	15.0x	10.6x	0.8x
Insurance	n.a.	n.a.	n.a.	n.a.	15.3x	13.2x	1.1x
Financial Services	n.a.	n.a.	n.a.	n.a.	17.4x	17.2x	1.1x
Real Estate	11.1x	10.9x	29.5x	19.6x	15.3x	18.6x	1.1x
Basic Materials	1.4x	1.5x	18.3x	15.3x	17.1x	12.9x	1.3x
Consumer Goods	0.9x	1.1x	20.5x	17.2x	17.4x	20.0x	1.4x
Telecommunication	1.6x	1.8x	17.6x	16.1x	22.0x	14.5x	1.9x
Industrials	1.1x	1.2x	17.3x	15.2x	18.9x	16.9x	2.0x
Consumer Service	1.1x	1.6x	19.1x	16.5x	16.6x	17.0x	1.5x
Pharma & Healthcare	3.9x	4.4x	26.0x	21.6x	30.0x	23.1x	3.0x
Information Technology	1.7x	1.7x	23.3x	19.7x	25.5x	21.0x	2.2x
Utilities	1.9x	2.0x	28.8x	19.9x	25.0x	23.3x	1.6x
DACH	1.5x	1.6x	20.7x	16.4x	18.4x	16.9x	1.6x

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 17.3x as of June 30, 2019.

EUR 200 m in EBIT over the last twelve months would hence result in an enterprise value of EUR 3,460 m.

Trading Multiples

Sector multiples ranking based on median (LTM and 1yf as of June 30, 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.	12	12	12	12.0
Insurance	n.a.	n.a.	n.a.	n.a.	10	10	10	10.0
Financial Services	n.a.	n.a.	n.a.	n.a.	7	6	9	7.3
Real Estate	1	1	1	4	11	5	11	4.9
Basic Materials	6	7	7	8	8	11	8	7.9
Consumer Goods	9	9	5	5	6	4	7	6.4
Telecommunication	5	4	8	7	4	9	4	5.9
Industrials	7	8	9	9	5	8	3	7.0
Consumer Service	8	6	6	6	9	7	6	6.9
Pharma & Healthcare	2	2	3	1	1	2	1	1.7
Information Technology	4	5	4	3	2	3	2	3.3
Utilities	3	3	2	2	3	1	5	2.7

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 Utilities sector.

The EqV/BV-Multiple of the Utilities sector ranks 5th highest in a comparison of all sectors. Overall, the average ranking of the Utilities sector is 2.7, 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 June 30, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
DACH	Min	0.3x	0.5x	8.0x	9.6x	3.9x	7.9x	0.3x
	Arithmetic mean	**3.2x**	**2.8x**	**24.3x**	**18.1x**	**22.3x**	**19.3x**	**2.2x**
	Median	**1.5x**	**1.6x**	**20.7x**	**16.4x**	**18.4x**	**16.9x**	**1.6x**
	Max	24.7x	18.1x	85.3x	35.7x	68.2x	50.5x	8.4x
	Standard deviation	4.1x	3.2x	13.4x	6.1x	13.3x	8.6x	1.8x
	Number of companies	604	342	471	300	539	304	655
Banking	Min	-	-	-	-	6.3x	8.2x	0.4x
	Arithmetic mean	**-**	**-**	**-**	**-**	**15.6x**	**11.4x**	**1.1x**
	Median	**-**	**-**	**-**	**-**	**15.0x**	**10.6x**	**0.8x**
	Max	-	-	-	-	47.7x	18.3x	4.8x
	Standard deviation	-	-	-	-	7.7x	2.9x	0.8x
	Number of companies	-	-	-	-	34	14	31
Insurance	Min	-	-	-	-	11.4x	11.4x	0.7x
	Arithmetic mean	**-**	**-**	**-**	**-**	**20.8x**	**13.3x**	**1.2x**
	Median	**-**	**-**	**-**	**-**	**15.3x**	**13.2x**	**1.1x**
	Max	-	-	-	-	68.2x	16.4x	2.5x
	Standard deviation	-	-	-	-	15.4x	1.4x	0.5x
	Number of companies	-	-	-	-	14	11	13
Financial Services	Min	-	-	-	-	4.0x	9.2x	0.3x
	Arithmetic mean	**-**	**-**	**-**	**-**	**20.8x**	**17.2x**	**1.5x**
	Median	**-**	**-**	**-**	**-**	**17.4x**	**17.2x**	**1.1x**
	Max	-	-	-	-	67.6x	29.1x	6.7x
	Standard deviation	-	-	-	-	14.3x	6.4x	1.1x
	Number of companies	-	-	-	-	36	11	57

Reading example:

The average (arithmetic mean) DACH EV/Revenue-ratio calculated on the basis of the last 12 months is 3.2x as of the reference date June 30, 2019.

EUR 300 m in revenues over the last twelve months would result in an enterprise value of EUR 960 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 June 30, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Real Estate	Min	0.5x	0.5x	4.2x	7.9x	4.2x	7.9x	0.5x
	Arithmetic mean	**10.9x**	**9.6x**	**31.7x**	**20.4x**	**16.3x**	**17.2x**	**1.4x**
	Median	**11.1x**	**10.9x**	**29.5x**	**19.6x**	**15.3x**	**18.6x**	**1.1x**
	Max	24.7x	18.1x	53.9x	29.0x	53.9x	29.0x	5.2x
	Standard deviation	5.6x	6.3x	9.8x	6.6x	9.8x	6.6x	0.8x
	Number of companies	51	14	51	27	48	20	53
Basic Materials	Min	0.3x	0.5x	8.0x	10.8x	4.5x	8.0x	0.4x
	Arithmetic mean	**2.1x**	**2.2x**	**25.8x**	**16.9x**	**20.8x**	**16.2x**	**1.9x**
	Median	**1.4x**	**1.5x**	**18.3x**	**15.3x**	**17.1x**	**12.9x**	**1.3x**
	Max	10.6x	6.4x	75.9x	28.6x	58.1x	35.5x	6.9x
	Standard deviation	2.2x	1.6x	16.9x	5.2x	13.1x	7.5x	1.7x
	Number of companies	36	25	30	24	33	23	38
Consumer Goods	Min	0.3x	0.5x	8.2x	9.6x	4.6x	9.8x	0.4x
	Arithmetic mean	**1.8x**	**1.4x**	**23.0x**	**17.0x**	**21.0x**	**20.3x**	**1.9x**
	Median	**0.9x**	**1.1x**	**20.5x**	**17.2x**	**17.4x**	**20.0x**	**1.4x**
	Max	24.3x	4.3x	79.8x	28.5x	63.7x	35.5x	7.8x
	Standard deviation	3.1x	1.0x	12.7x	4.9x	11.9x	7.6x	1.4x
	Number of companies	81	39	69	40	67	29	74

Reading example:

The median Real Estate EV/EBIT ratio calculated on the basis of the expected EBIT (1-year forward) is 19.6x as of the reference date June 30, 2019.

An expected EBIT of EUR 30 m would result in an enterprise value of EUR 588 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 June 30, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Telecommunication	Min	0.5x	1.4x	9.1x	14.2x	9.6x	9.8x	0.5x
	Arithmetic mean	**1.9x**	**2.1x**	**22.2x**	**18.1x**	**23.4x**	**16.7x**	**2.3x**
	Median	**1.6x**	**1.8x**	**17.6x**	**16.1x**	**22.0x**	**14.5x**	**1.9x**
	Max	3.8x	3.1x	42.1x	26.5x	41.5x	33.5x	5.9x
	Standard deviation	0.8x	0.6x	9.7x	4.4x	10.4x	8.2x	1.6x
	Number of companies	14	9	9	5	9	6	14
Industrials	Min	0.3x	0.5x	8.5x	9.8x	3.9x	9.6x	0.5x
	Arithmetic mean	**2.0x**	**1.8x**	**20.8x**	**16.6x**	**22.5x**	**19.3x**	**2.7x**
	Median	**1.1x**	**1.2x**	**17.3x**	**15.2x**	**18.9x**	**16.9x**	**2.0x**
	Max	16.7x	12.2x	67.0x	35.7x	66.9x	50.5x	8.4x
	Standard deviation	2.3x	1.7x	10.9x	5.7x	11.9x	8.1x	1.9x
	Number of companies	199	130	164	116	153	103	169
Consumer Service	Min	0.4x	0.6x	8.7x	9.9x	6.5x	9.9x	0.3x
	Arithmetic mean	**2.3x**	**2.5x**	**24.5x**	**18.5x**	**21.1x**	**18.9x**	**2.6x**
	Median	**1.1x**	**1.6x**	**19.1x**	**16.5x**	**16.6x**	**17.0x**	**1.5x**
	Max	11.2x	9.4x	78.8x	33.0x	60.8x	31.9x	8.1x
	Standard deviation	2.7x	2.2x	16.6x	6.2x	12.9x	7.0x	2.1x
	Number of companies	58	26	39	18	33	16	52

Reading example:

The average (arithmetic mean) Industrials P/E ratio calculated on the basis of expected earnings (1-year forward) is 19.3x as of the reference date June 30, 2019.

Expected earnings of EUR 20 m would result in an equity value of EUR 386 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 June 30, 2019

		EV/Revenue		EV/EBIT		P/E		EqV/BV
		LTM	1yf	LTM	1yf	LTM	1yf	
Pharma & Healthcare	Min	0.5x	0.5x	9.9x	12.0x	4.8x	14.2x	0.4x
	Arithmetic mean	**5.5x**	**5.4x**	**28.2x**	**21.9x**	**30.5x**	**25.6x**	**3.3x**
	Median	**3.9x**	**4.4x**	**26.0x**	**21.6x**	**30.0x**	**23.1x**	**3.0x**
	Max	20.8x	17.7x	51.0x	33.9x	62.9x	49.2x	8.2x
	Standard deviation	4.6x	4.1x	10.2x	6.8x	15.5x	9.6x	2.2x
	Number of companies	56	40	33	24	36	23	60
Information Technology	Min	0.3x	0.5x	9.3x	10.2x	5.3x	8.5x	0.4x
	Arithmetic mean	**2.8x**	**2.7x**	**25.4x**	**19.9x**	**27.9x**	**22.8x**	**2.5x**
	Median	**1.7x**	**1.7x**	**23.3x**	**19.7x**	**25.5x**	**21.0x**	**2.2x**
	Max	18.1x	13.2x	72.0x	35.6x	64.0x	49.0x	8.0x
	Standard deviation	3.2x	2.7x	13.3x	6.5x	14.9x	10.2x	1.6x
	Number of companies	96	53	65	40	63	40	80
Utilities	Min	1.0x	1.2x	15.4x	12.6x	8.6x	13.7x	0.6x
	Arithmetic mean	**3.2x**	**3.8x**	**29.9x**	**18.8x**	**29.1x**	**24.1x**	**1.8x**
	Median	**1.9x**	**2.0x**	**28.8x**	**19.9x**	**25.0x**	**23.3x**	**1.6x**
	Max	9.5x	10.1x	64.3x	22.9x	62.7x	39.7x	3.8x
	Standard deviation	2.9x	3.2x	13.2x	3.5x	15.2x	8.2x	0.9x
	Number of companies	13	6	11	6	13	8	14

Reading example:

The median Utilities EqV/BV is 1.6x as of the reference date June 30, 2019.

A BV of EUR 100 m would result in an equity value of EUR 160 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.).

Appendix

Composition of the sectors of DAX Sector All Index, WBI and SPI as of June 30, 2019

Appendix

Composition of each finexpert sector as of June 30, 2019

Banking

Germany

AAREAL BANK AG
AUTOBANK AG
COMMERZBANK AG
DEUTSCHE BANK AG
DT.PFANDBRIEFBK AG
PROCREDIT HLDG AG
QUIRIN BANK AG
WUESTENROT & WUERTTEMBERG AG

Austria

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
NUERNBERGER BET. 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

ADCAPITAL AG
ALBIS LEASING AG
BASIC RESOURCES AG
BERLINER EFFEKTENGESELLSCHAFT AG
CAPSENIXX AG
COMDIRECT BANK AG
CREDITSHELF AG
DEUTSCHE BALATON AG
DEUTSCHE BETEILIGUNGS AG
DEUTSCHE CANNABIS AG
DEUTSCHE EFFECTEN-UND WECHSEL-BET. AG
DEUTSCHE TECHNISCHE BET. AG
DF DEUTSCHE FORFAIT AG
DWS GROUP GMBH & CO KGAA
ERNST RUSS AG
ERWE IMMOBILIEN AG
FINLAB AG
FINTECH GROUP AG
FORIS AG
FRITZ NOLS AG
GRENKE AG
GXP GERMAN PROEPRTIES AG
HEIDELBERGER BET. HOLDING AG
HELIAD EQUITY PARTNERS GMBH & CO. KGAA
HESSE NEWMAN CAPITAL AG
HYPOPORT AG
JDC GROUP AG
KAP BETEILIGUNGS-AG
KST BETEILIGUNGS AG
LANG & SCHWARZ AG
L-KONZEPT HOLDING AG
LLOYD FONDS AG
MAIER & PARTNER AG
MAX21 AG
MIC AG
MLP AG
MPC CAPITAL AG
MUTARES AG
ÖKOWORLD AG
OVB HOLDING AG
PEARL GOLD AG
PONGS & ZAHN AG
SCHERZER & CO. AG
SHAREHOLDER VALUE BET. AG
SIXT LEASING
SM WIRTSCHAFTSBERATUNGS AG
SPARTA AG
SPOBAG
THE NAGA GROUP AG
TRADEGATE AG
VALUE MGMT & RESEARCH AG
VARENGOLD BANK AG
VDN AG
VPE WERTPAPIERHANDELSBANK 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
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 June 30, 2019

Real Estate

Germany
A.A.A. AG
ACCENTRO REAL ESTATE AG
ADLER REAL ESTATE AG
ALSTRIA OFFICE REIT-AG
CR CAPITAL REAL ESTATE AG
DEMIRE DT.MTS.RE AG
DEUTCSHE GRUNDSTÜCKSAKTIONEN 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
HAEMATO AG
HAMBORNER REIT AG
INCITY IMMOBILIEN AG
INSTONE REAL ESTATE GROUP N.V.
LEG IMMOBILIEN AG
NORATIS AG
PATRIZIA IMMOBILIEN AG
PRIMAG AG
PUBLITY AG
RCM BETEILIGUNGS AG
SINNER AG
TAG IMMOBILIEN AG
TLG IMMOBILIEN AG
UNIPROF REAL ESTATE HLD AG
VERIANOS REAL ESTATE 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
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
ASIAN BAMBOO AG
AURUBIS AG
B.R.A.I.N. AG
BASF SE
BAYER AG
COVESTRO AG
DE RAJ GROUP AG
DECHENG TECHNOLOGY AG
DEUTSCHE ROHSTOFF AG
EISEN- & HUETTENWERKE AG
EVONIK INDUSTRIES AG
FUCHS PETROLUB SE
H & R GMBH & CO KGAA
K & S AG
KHD HUMBOLDT WEDAG AG
LANXESS AG
LINDE AG
PETRO WELT TECHNOLOGIE AG
SALZGITTER AG
SGL CARBON SE
SIMONA AG
SKW STAHL-METALLURGIE HOLDING 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
CHAM PAPER GROUP HOLDING AG
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 June 30, 2019

Consumer Goods

Germany

A.S.CREATION TAPETEN AG
ADIDAS AG
ADLER MODEMAERKTE AG
ADM HAMBURG AG
AGRARIUS AG
AKASOL AG
ALNO 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
FROSTA AG
GERRY WEBER INTERNATIONAL AG
GRAMMER AG
HELLA KGAA HUECK & CO.
HELMA EIGENHEIMBAU AG
HENKEL AG & CO. KGAA
HUGO BOSS AG
HWA AG
IFA HOTEL & TOURISTIK AG
JJ AUTO AG
KAMPA AG
LEIFHEIT AG
LEONI AG
MINERALBR. UEBER. GMBH & CO. KGAA
MING LE SPORTS AG
MUEHL PRODUKT & SERVICE AG
PARK U.BELLHEIMER AG
PFERDEWETTEN.DE AG
PORSCHE AUTOMOBIL HLD. SE
PROGRESS-WERK OBERKIRCH AG
PUMA SE
REGENBOGEN AG
ROY CERAMICS SE
SCHAEFFLER AG
SCHLOSS WACHENHEIM AG
SCHWAELBCHEN MOLKEREI J.B. AG
SHW AG
STEILMANN SE
STO SE & CO. KGAA
STS GROUP AG
SUEDZUCKER AG
TC UNTERHALTUNGSELEKTRONIK AG
TOM TAILOR HOLDING AG
TONKENS AGRAR AG
ULTRASONIC 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
DRILLISCH AG O.N.
DT.TELEKOM AG NA
ECOTEL COMMUNICATION AG
FREENET AG NA O.N.
LS TELCOM AG
MVISE AG O.N.
NFON AG
STARDSL AG
TELEFONICA DTLD HLDG AG

Austria

TELEKOM AUSTRIA AG

Switzerland

SUNRISE N
SWISSCOM N

Appendix

Composition of each finexpert sector as of June 30, 2019

Industrials (1/2)

Germany

2G ENERGY AG
7C SOLARPARKEN AG
A.I.S. AG
ADINOTEC AG
ALBA SE
AMADEUS FIRE AG
ASKNET AG
AUMANN AG
AVES ONE AG
BASLER AG
BAUER AG
BAUMOT GROUP AG
BAVARIA INDUSTRIALS GROUP AG
BAYWA AG
BILFINGER SE
BLUE CAP AG
BOEWE SYSTEC AG
BRENNTAG AG
CENTROTEC SUSTAINABLE AG
CENTROTHERM PHOTOVOLTAICS AG
CHINA SPECIALITY GLASS AG
COREO AG
CROPENERGIES AG
DALDRUP & SOEHNE AG
DATRON AG
DELIGNIT AG
DEUTSCHE POST AG
DEUTZ AG
DISKUS WERKE AG
DMG MORI AG
DR. HOENLE AG
DUERKOPP ADLER AG
DUERR AG
ELEXXION AG
ENERGIEKONTOR AG
ENVITEC BIOGAS 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
HMS BERGBAU AG
HOCHTIEF AG
HOMAG GROUP AG
IBU-TEC ADVANCED MATERIALS AG
IFA SYSTEMS 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
MUEHLHAN AG
MUELLER-DIE LILA LOGISTIK AG
M-U-T AG
NABALTEC AG
NANOFOCUS AG
NANOGATE 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
PLAN OPTIK AG
PNE WIND AG
PVA TEPLA AG
R. STAHL AG
RATIONAL AG
RHEINMETALL AG
RINGMETALL AG
S & O AGRAR AG
SCHALTBAU HOLDING
SCHUMAG AG
SCY BETEILIGUNG 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
SOLARWORLD AG
STEICO SE
STINAG STUTTGART INVEST AG
TECHNOTRANS AG
THYSSENKRUPP AG
TRATON SE
TUFF GROUP AG
TURBON AG
UET AG
UTD POWER TECHNOLOGY AG
UZIN UTZ AG
VA-Q-TEC AG
VARTA AG
VECTRON SYSTEMS AG
VERBIO VEREINIGTE BIOENERGIE AG
VISCOM AG
VOLTABOX AG
VOSSLOH AG
VTG 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

Appendix

Composition of each finexpert sector as of June 30, 2019

Industrials (2/2)

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
CEVA LOGISTICS 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
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
CLIQ DIGITAL AG
CONSTANTIN MEDIEN AG
CTS EVENTIM AG & CO. KGAA
DEAG DEUTSCHE ENTERTAINMENT AG
DELIVERY HERO AG
DELTICOM AG
ECOMMERCE ALLIANCE AG
EDEL 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
PANTALEON ENTERTAIN. AG
PROSIEBENSAT.1 MEDIA SE
ROCKET INTERNET SE
SCOUT24 AG
SENDR SE
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
UHR.DE AG
UNITED LABELS AG
WALLSTREET ONLINE AG
WESTWING GROUP AG
WIGE MEDIA AG
WILD BUNCH AG
WINDELN.DE SE
XIN RUI KE AG
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 June 30, 2019

Pharma & Healthcare

Germany

4 SC AG
AAP IMPLANTATE AG
AGENNIX AG
BB BIOTECH AG
BIOFRONTERA AG
BIOTEST AG.
CARL ZEISS MEDITEC AG
CO.DON AG
CURASAN AG
CYTOTOOLS AG
DERMAPHARM HOLDING SE
DRAEGERWERK AG & CO. KGAA
ECKERT & ZIEGLER AG
EPIGENOMICS AG
EVOTEC AG
FORMYCON AG
FRESEN.MED.CARE AG & CO. KGAA
FRESENIUS SE & CO.KGAA
GERATHERM MEDICAL AG
GERRESHEIMER AG
HUMANOPTICS AG
M1 KLINIKEN AG
MAGFORCE AG
MATERNUS-KLINK AG
MEDICLIN AG
MEDIGENE AG
MEDIOS AG
MERCK AG & CO. KGAA
MOLOGEN AG
MORPHOSYS AG
MPH HEALTH CARE AG
NANOREPRO AG
PAION AG
PAUL HARTMANN AG
RHOEN-KLINIKUM AG
SANOCHEMIA PHARMAZEUTIKA AG
SARTORIUS AG
SIEMENS HEALTHINEER AG
STADA ARZNEIMITTEL AG
STRATEC BIOMEDICAL AG
SYGNIS AG
UMS INTERNATIONAL AG
VITA 34 AG
WILEX AG

Austria

MARINOMED BIOTECH AG
VALNEVA SE

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
AMALPHI AG
AMATECH AG
ARTEC TECHNOLOGIES AG
ATOSS SOFTWARE AG
B & S BANKSYSTEME AG
BECHTLE AG
BETA SYSTEMS SOFTWARE AG
CANCOM SE
CENIT AG
CEOTRONICS AG
COMPUGROUP MEDICAL SE
CYAN AG
DATA MODUL AG
DATAGROUP SE
DOCCHECK AG
EASY SOFTWARE AG
ELMOS SEMICONDUCTOR AG
EQS GROUP AG
EUROMICRON AG
FABASOFT AG
FIRST SENSOR AG
FORTEC ELEKTRONIK AG
GBS SOFTWARE AG
GERM. STARTUPS GRP GMBH & CO. KGAA
GFT TECHNOLOGIES SE
GIGASET AG
GK SOFTWARE
HOLIDAYCHECK GROUP AG
INFINEON TECHNIK AG
INIT INNOVATION SE
INTERCARD AG
INTERSHOP COMMUNICATIONS AG
INTICA SYSTEMS AG
INVISION AG
ISC BUSINESS TECHNOLOGY
ISRA VISION
IVU TRAFFIC TECHNOLOGIE AG
KPS AG
M & S ELEKTRONIK AG
MEDICAL COLUMBUS AG
MENSCH UND MASCHINE SE
METRIC MOBILITY SOLUTIONS AG
MEVIS MEDICAL SOLUTIONS AG
MOBOTIX AG
MUEHLBAUER HOLDING AG
MYHAMMER HOLDING AG
MYNARIC AG
NEMETSCHEK SE
NEXUS AG
NORCOM INFORMATION TECHN. AG
OHB SE
OPENLIMIT HOLDING AG
OTRS AG
PA POWER AUTOMATION 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
SEVEN PRINCIPLES AG
SHF COMMUNICATION TECHNOLOGIES AG
SILTRONIC AG
SINNERSCHRADER AG
SNP AG
SOFTWARE AG
STEMMER IMAGING AG

Appendix
Composition of each finexpert sector as of June 30, 2019

Information Technology (2/2)

SUESS MICROTEC AG
SYZYGY AG
TDMI AG
TELES AG
TISCON AG
TTL INFORMATION TECHN. AG
UMT UTD MOBILITY TECHN. AG
USU SOFTWARE AG
UTD. INTERNET AG
VIVANCO GRUPPE AG
WIRECARD AG
XING AG
Austria
AT&S AUSTRIA TECH.& SYSTEMTECH. AG
FREQUENTIS AG
KAPSCH TRAFFICCOM AG
MASCHINENFABRIK HEID AG
RATH AG
Switzerland
AIROPACK TECHNOLOGY GROUP AG
ALSO HOLDING AG
AMS AG
ASCOM HOLDING AG
CREALOGIX HOLDING AG
HUBER+SUHNER AG
KUDELSKI SA
LOGITECH INTERNATIONAL SA
TEMENOS GROUP AG
U-BLOX HOLDING AG
WISEKEY INTERNATIONAL HOLDING AG

Utilities

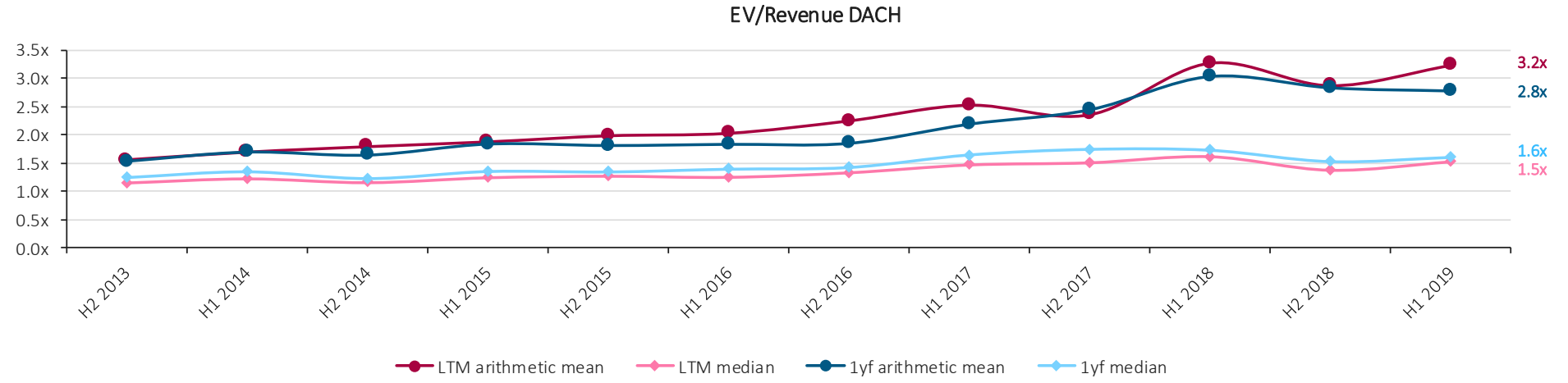
Germany
CAPITAL STAGE AG
E.ON SE
ENBW ENERGIE B./W. AG
GELSENWASSER AG
INNOGY SE
MAINOVA AG
MVV ENERGIE AG
RWE AG
UNIPER SE
Austria
EVN AG
VERBUND AG
Switzerland
BKW ENERGIE AG
EDISUN POWER EUROPE AG
ROMANDE ENERGIE HOLDING SA

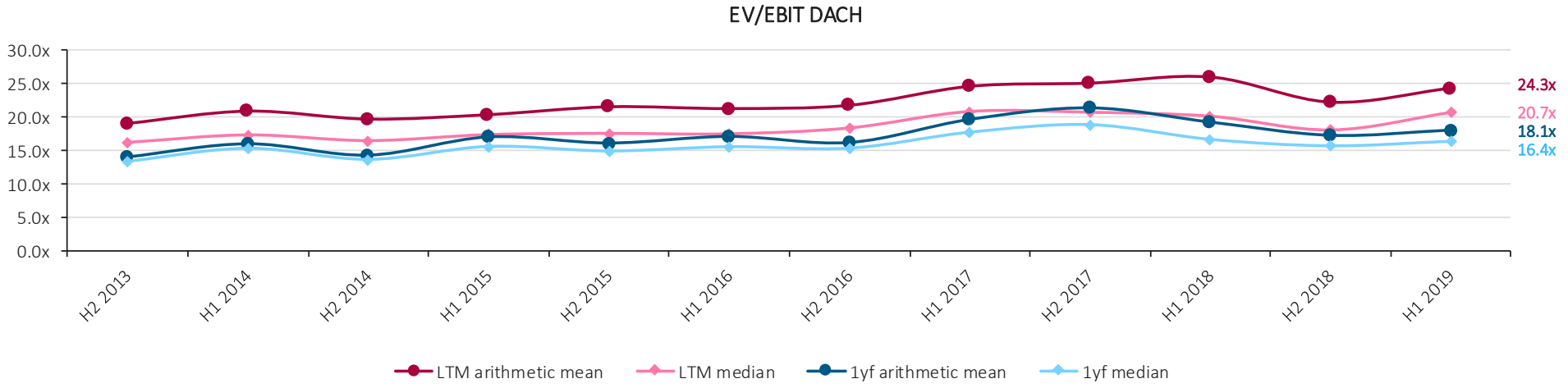
Appendix

Historical development of trading multiples since 2013

Trading Multiples

DACH (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

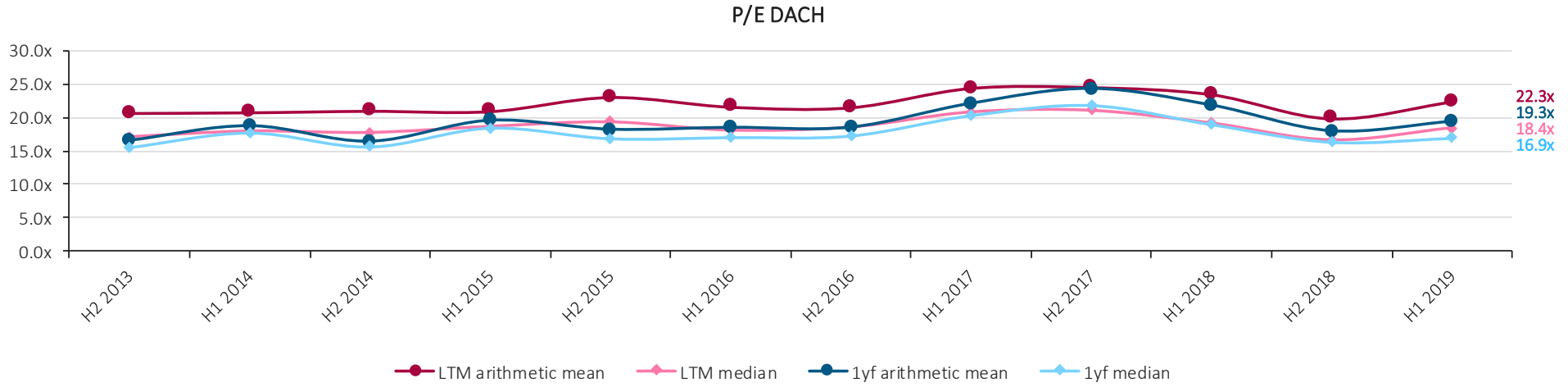


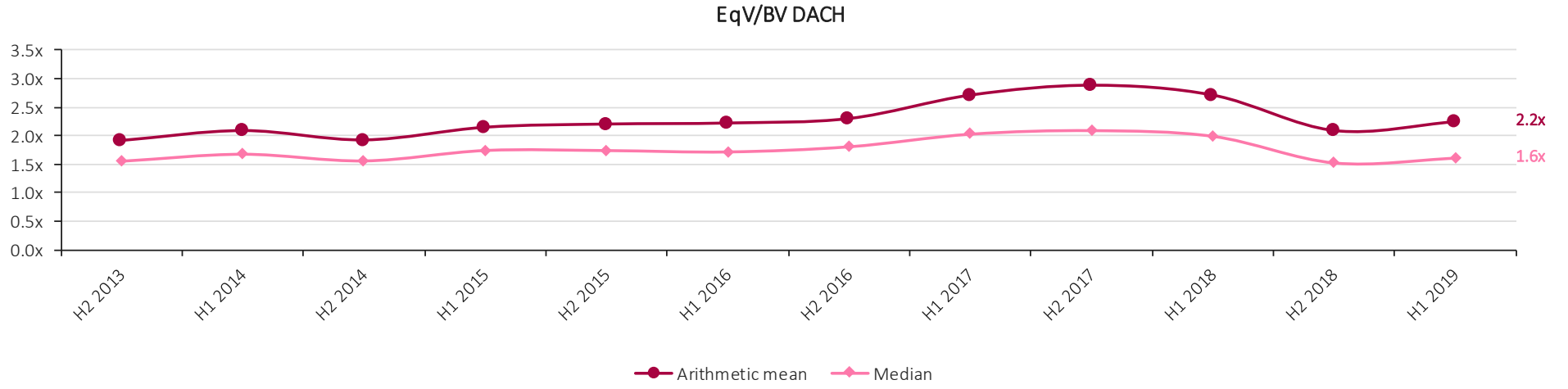


Note: As of the reference date, the "FIRE" sector used in previous studies was divided into the sectors Banking, Financial Services, Insurance and Real Estate. The historical development of the DACH multiples is based on the sector classification used in previous studies. Opposed to that, the DACH multiples as of the reference date June 30, 2019 correspond to the newly introduced sector classification (cf. 33).

Trading Multiples

DACH (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

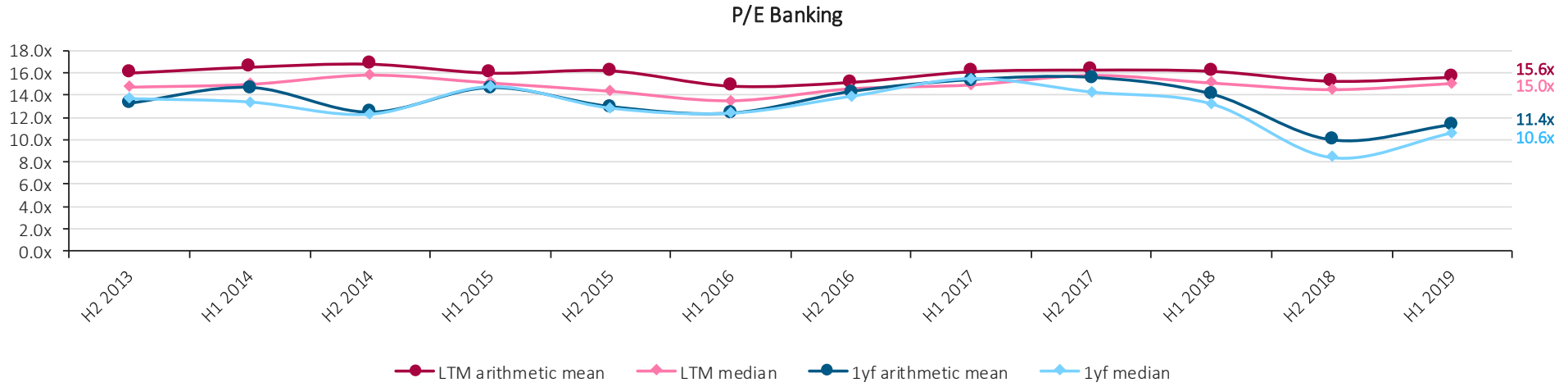


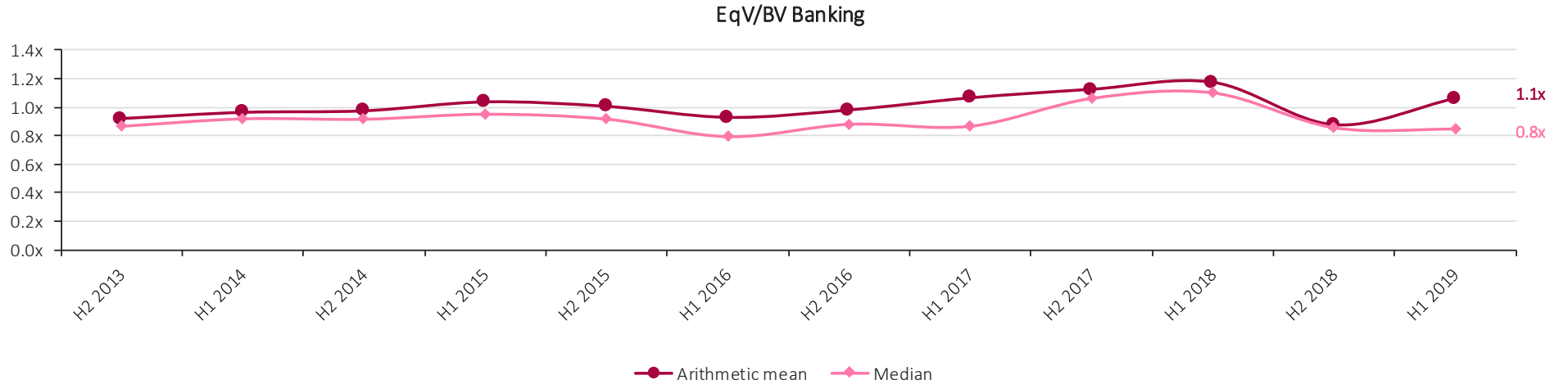


Note: As of the reference date, the "FIRE" sector used in previous studies was divided into the sectors Banking, Financial Services, Insurance and Real Estate. The historical development of the DACH multiples is based on the sector classification used in previous studies. Opposed to that, the DACH multiples as of the reference date June 30, 2019 correspond to the newly introduced sector classification (cf. 33).

Trading Multiples

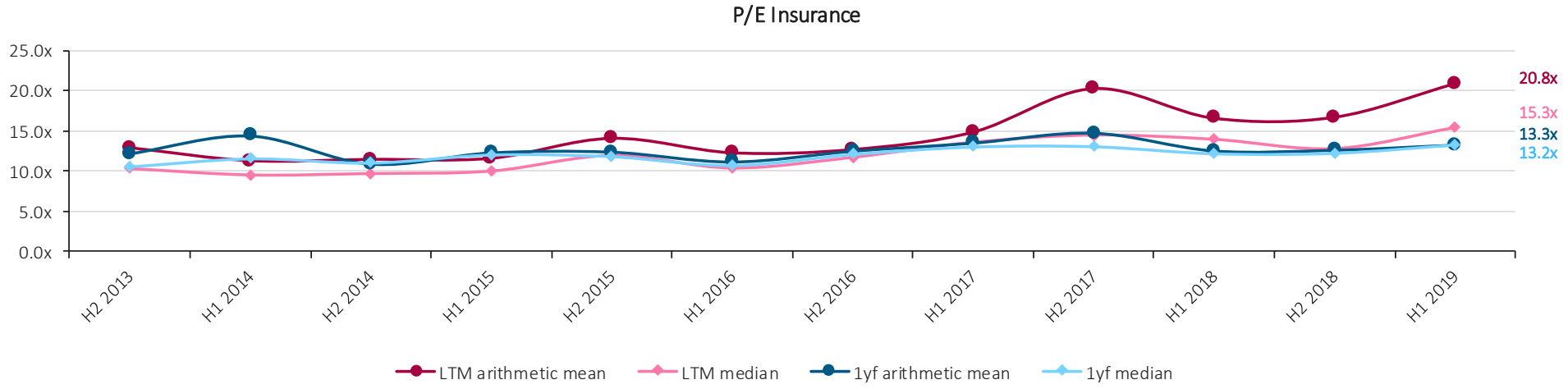
Banking (1/1) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

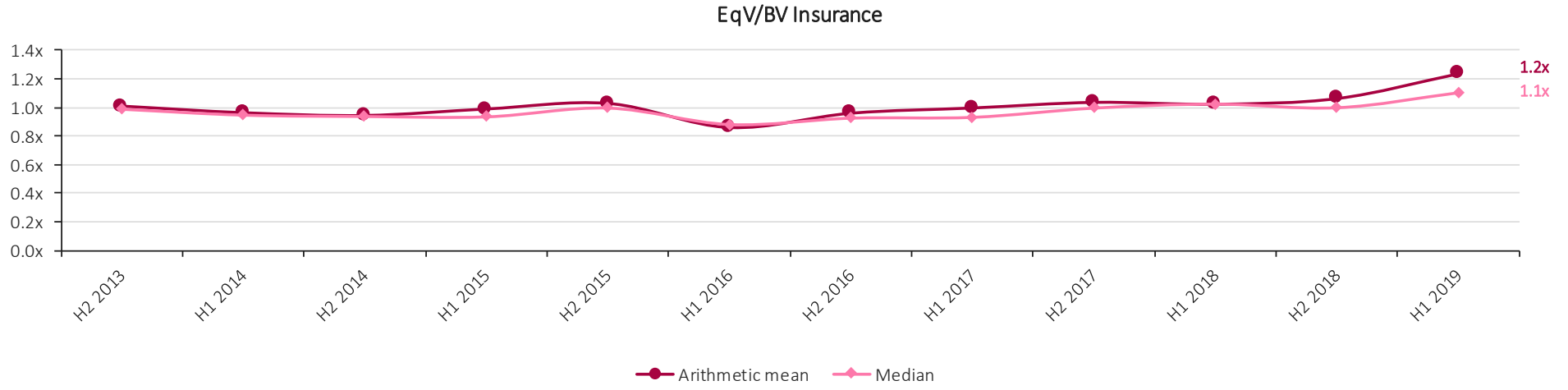




Trading Multiples

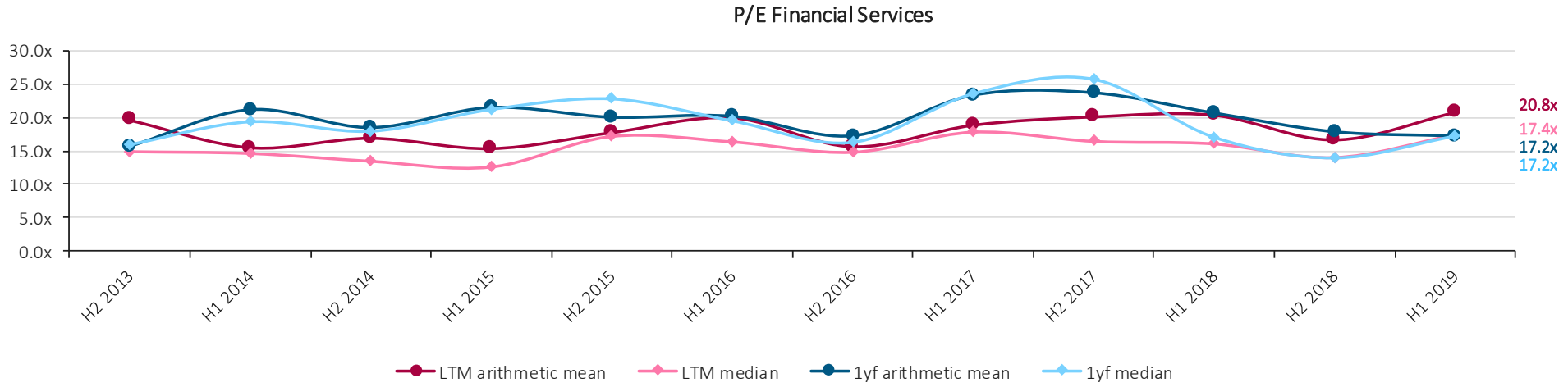
Insurance (1/1) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

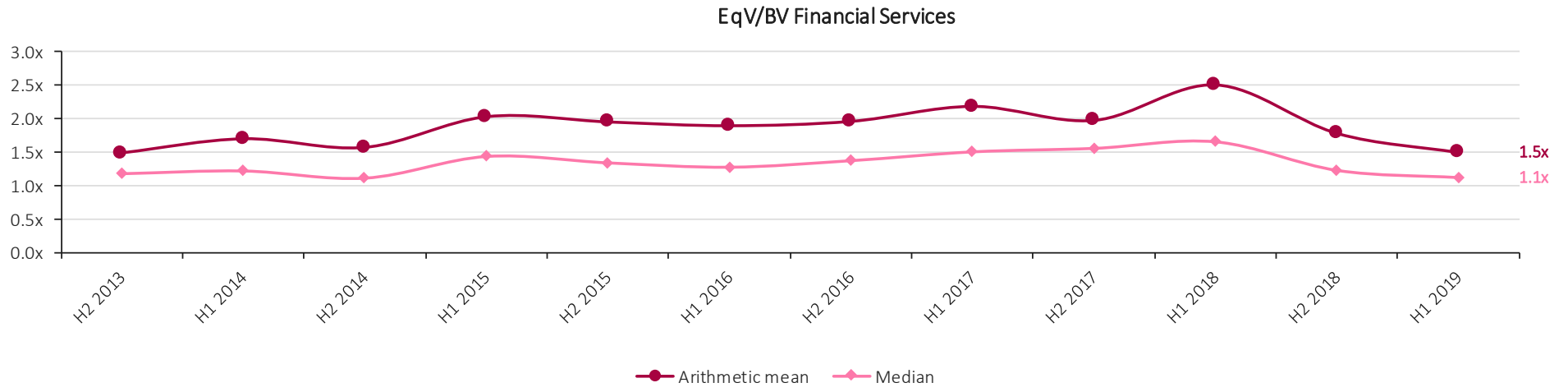




Trading Multiples

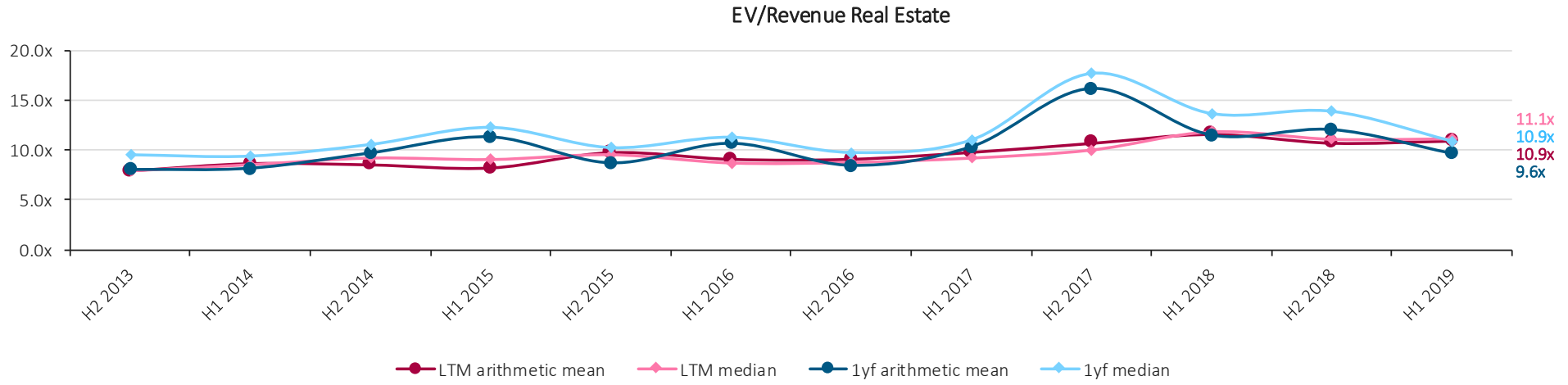
Financial Services (1/1) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

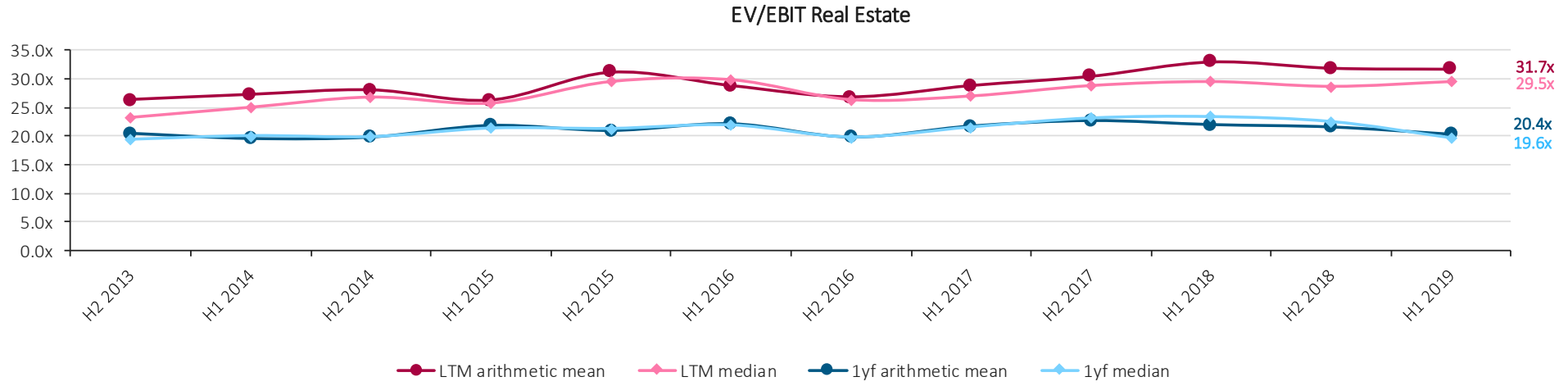




Trading Multiples

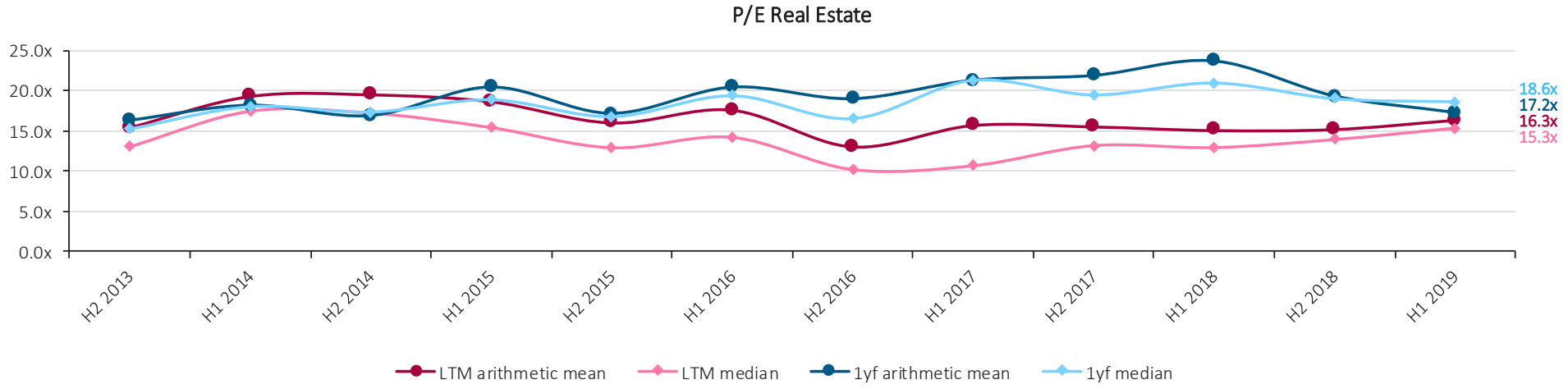
Real Estate (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

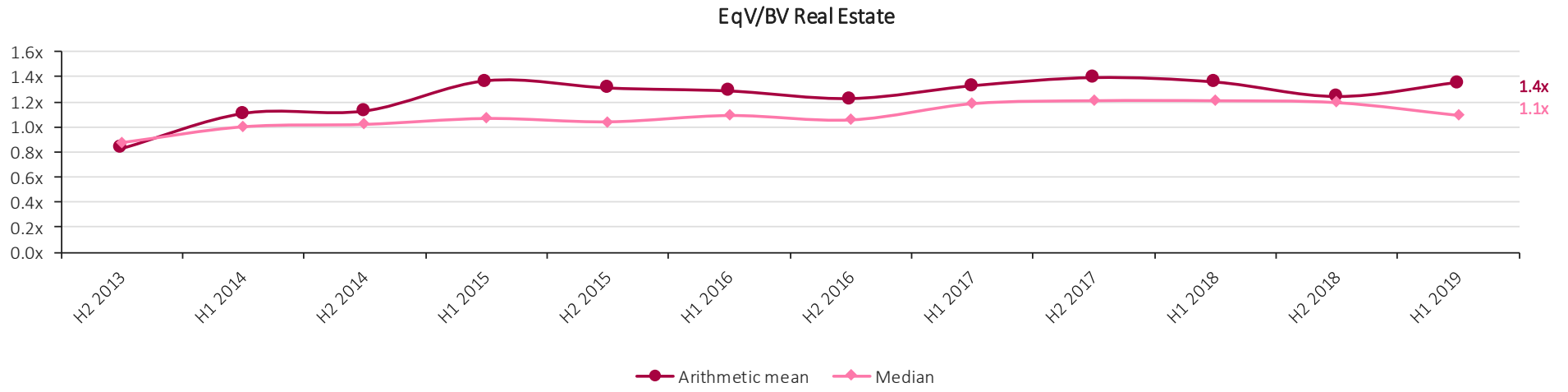




Trading Multiples

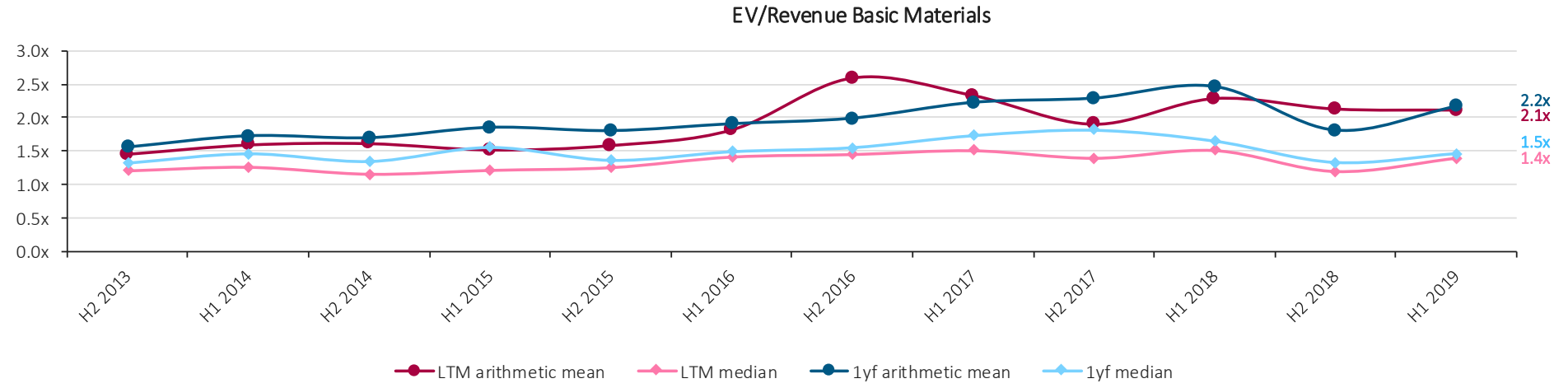
Real Estate (2/2) – P/E-Multiples and EqV/BV-Multiples
LTM and 1yf since 2013

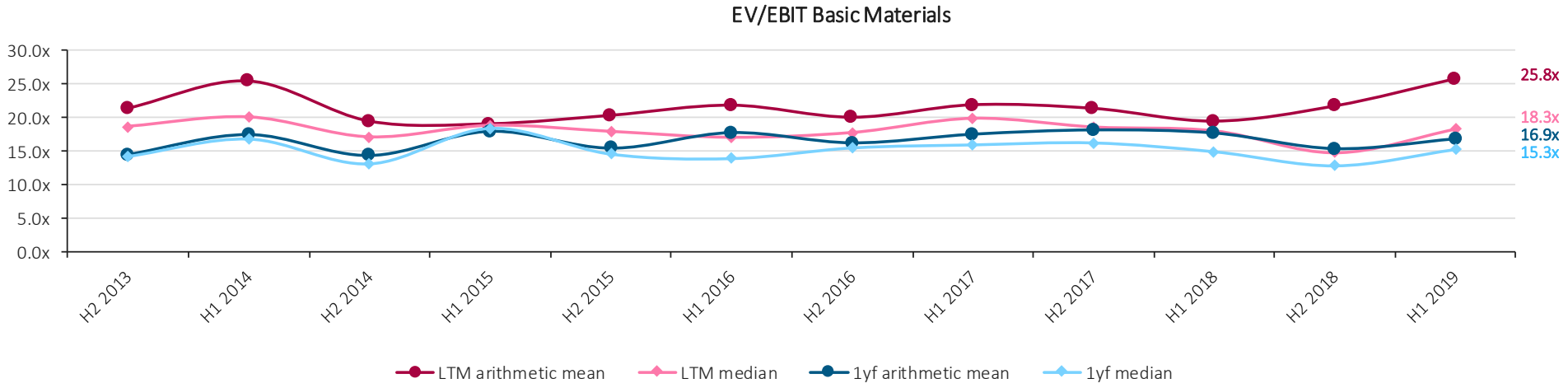




Trading Multiples

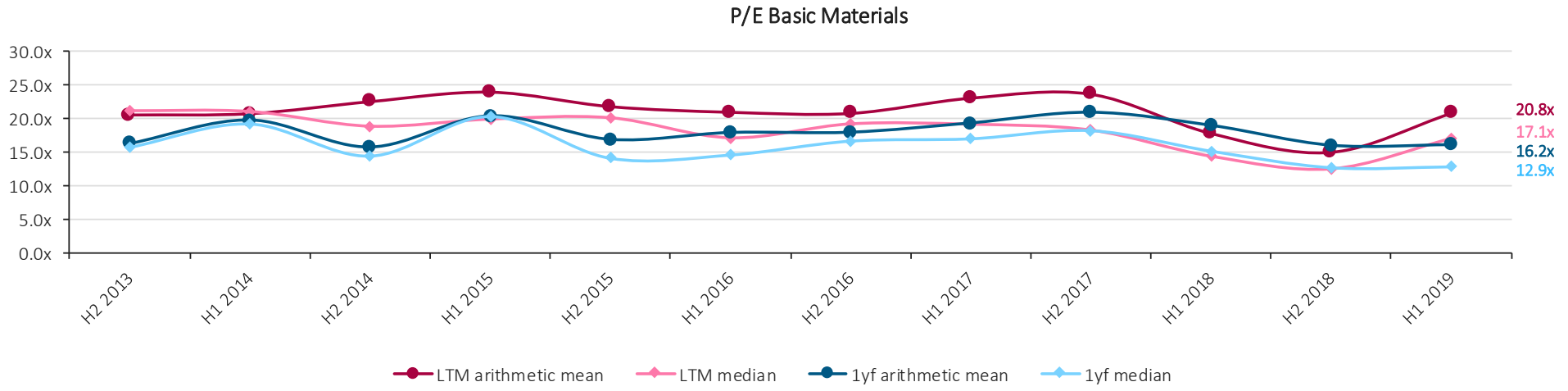
Basic Materials (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

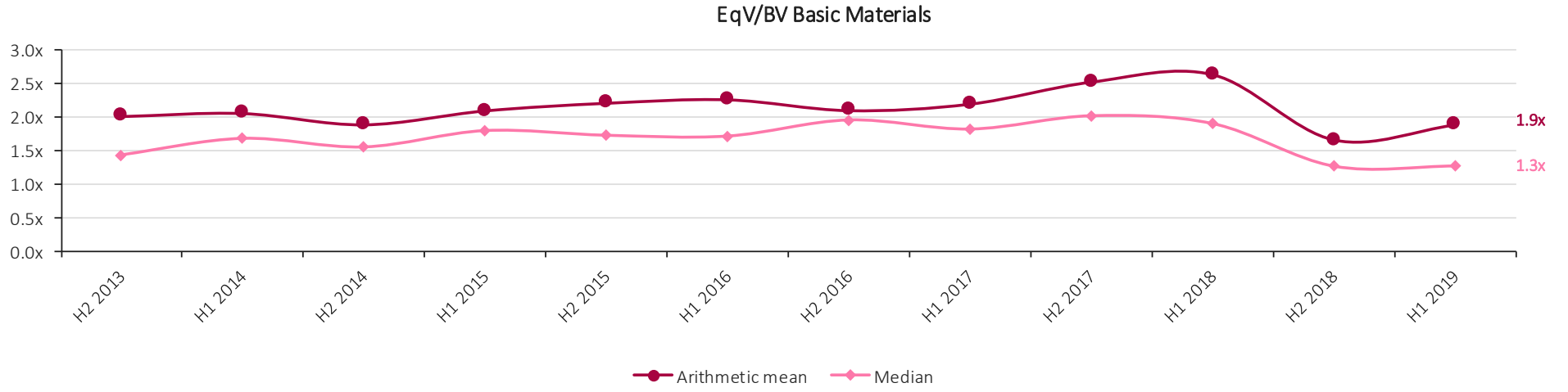




Trading Multiples

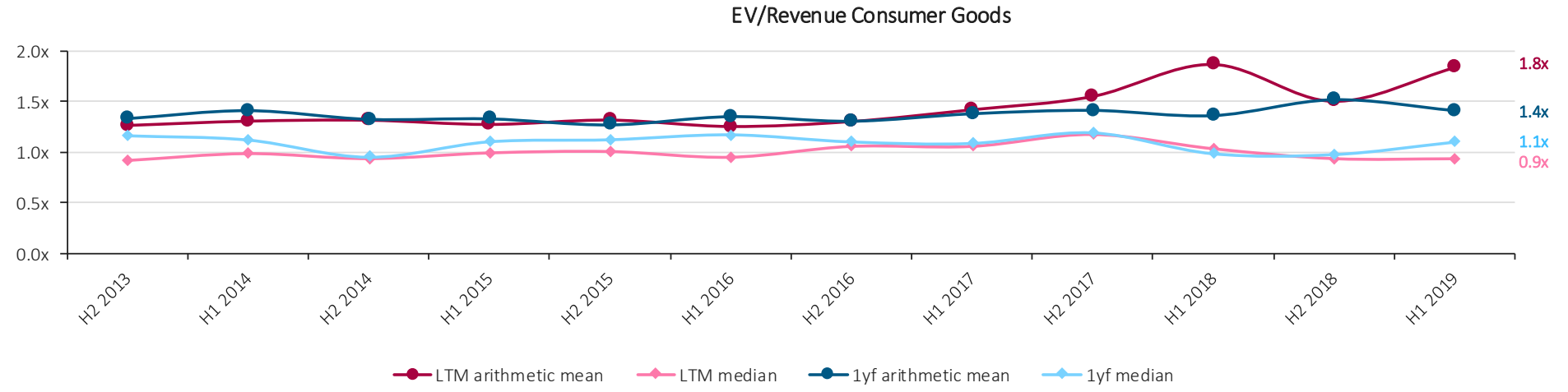
Basic Materials (2/2) – P/E-Multiples and EqV/BV-Multiples
LTM and 1yf since 2013

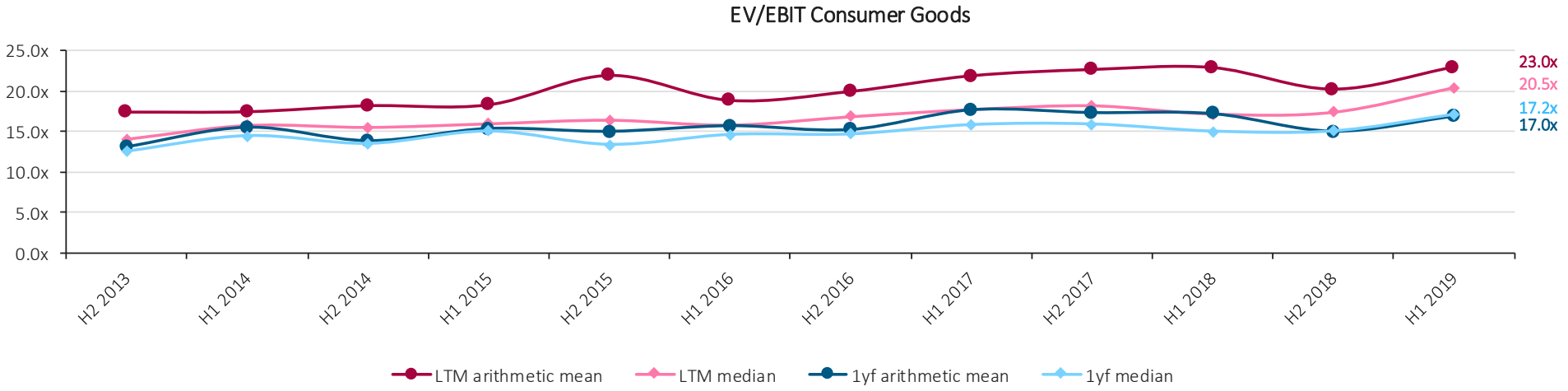




Trading Multiples

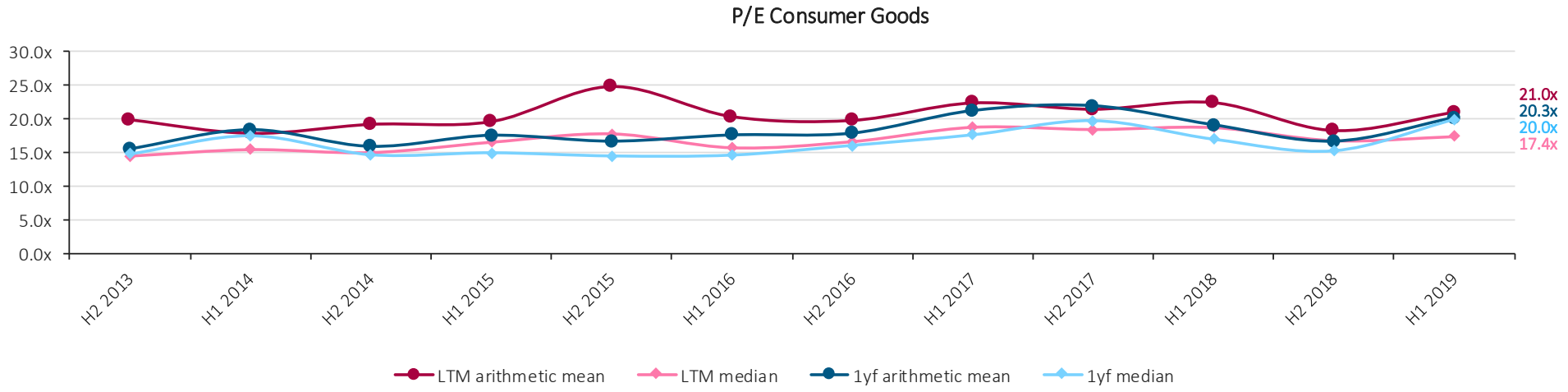
Consumer Goods (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

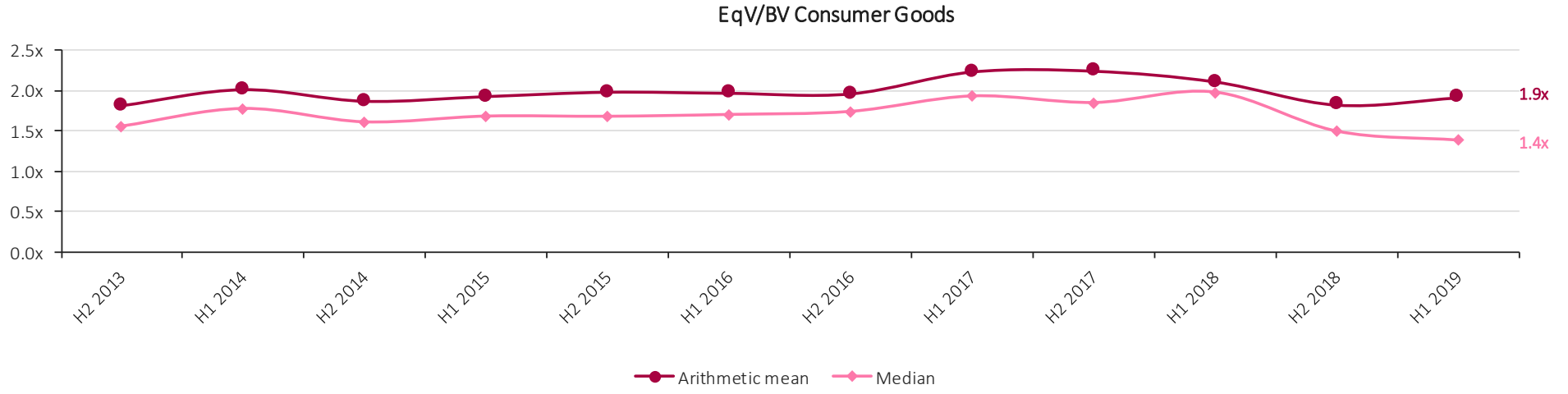




Trading Multiples

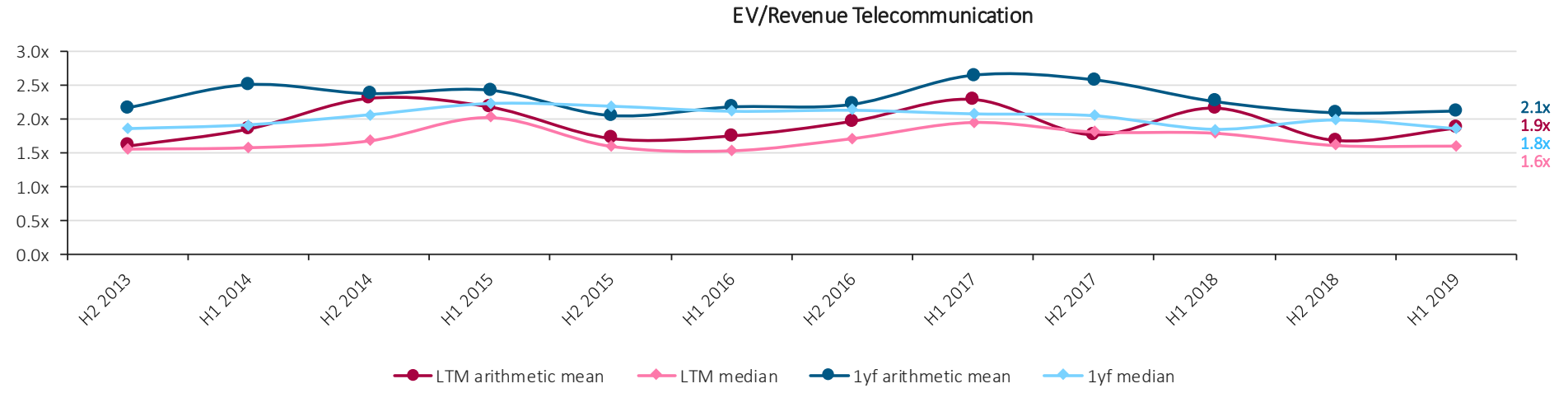
Consumer Goods (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

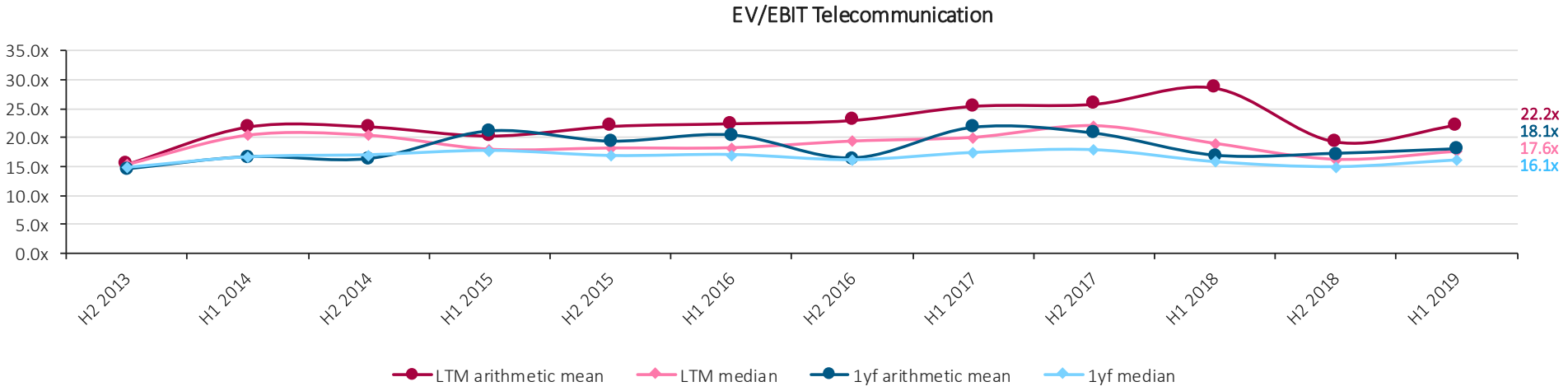




Trading Multiples

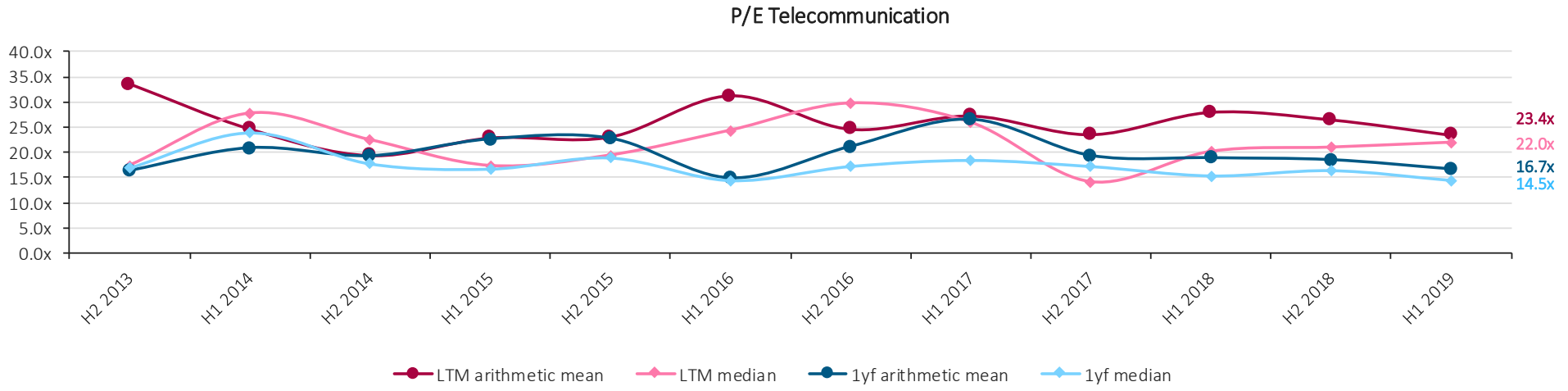
Telecommunication (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

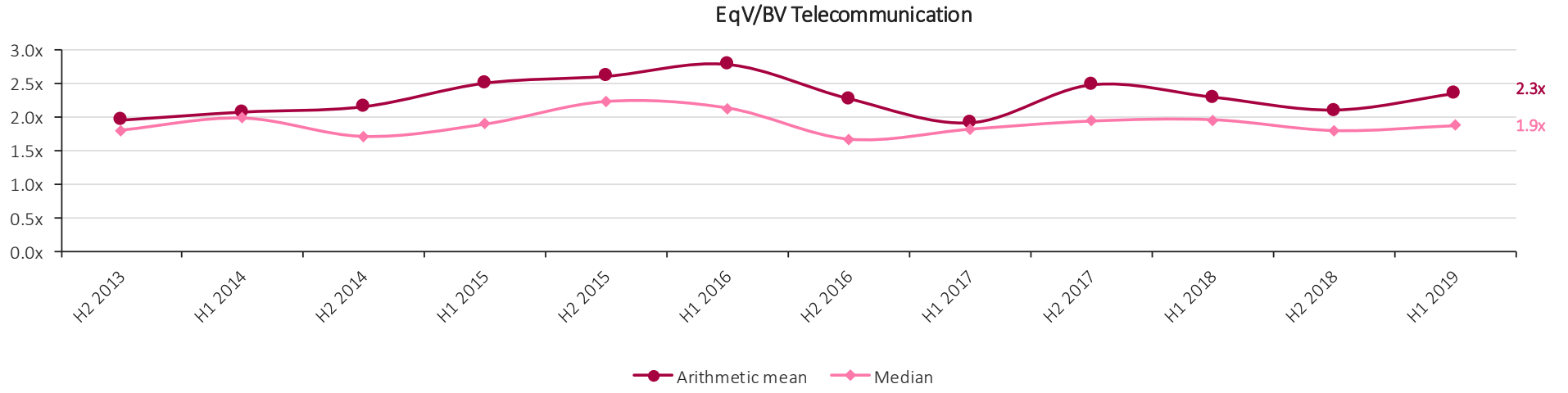




Trading Multiples

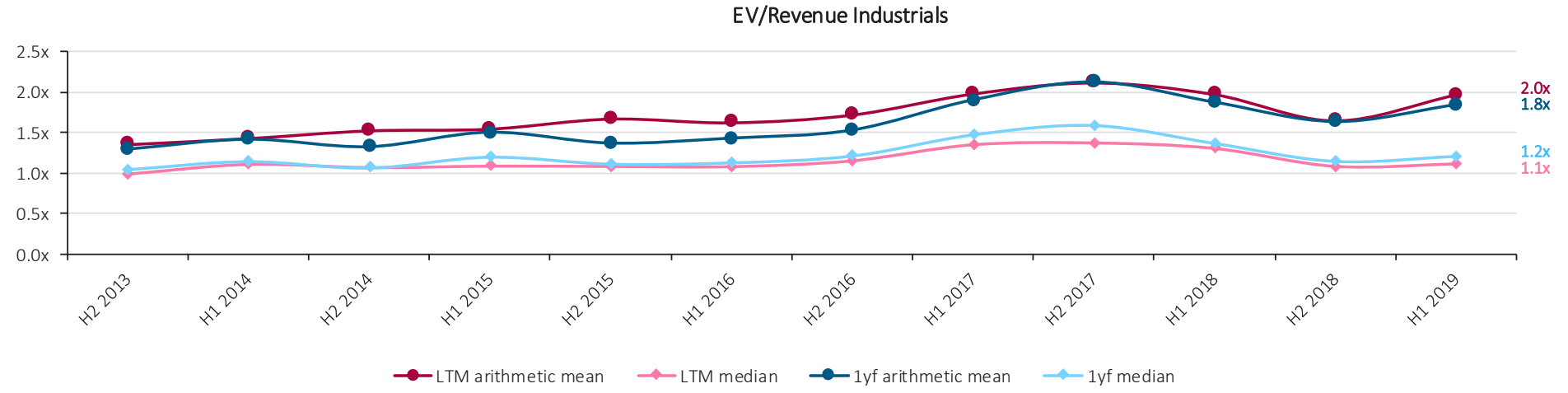
Telecommunication (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

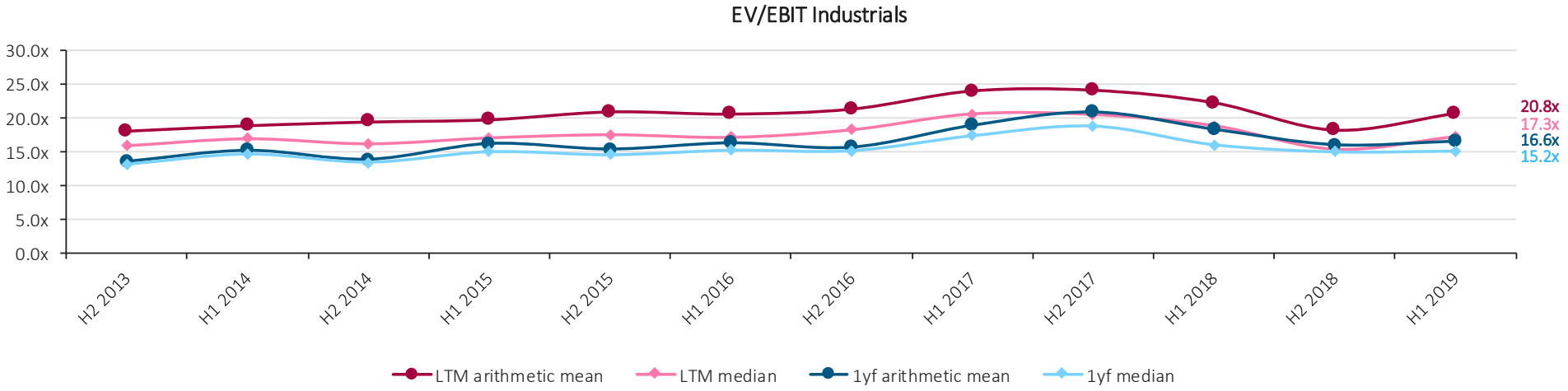




Trading Multiples

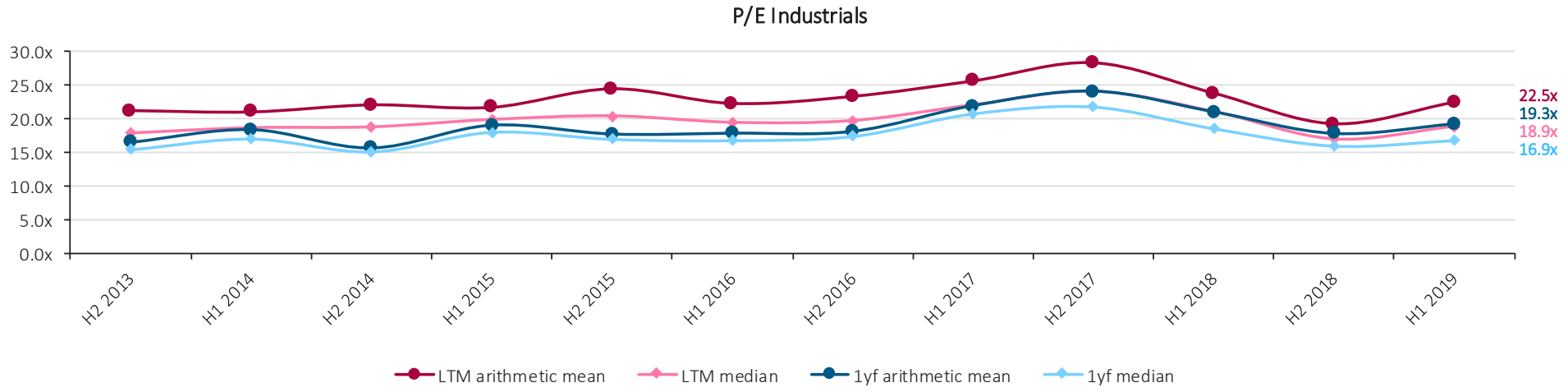
Industrials (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

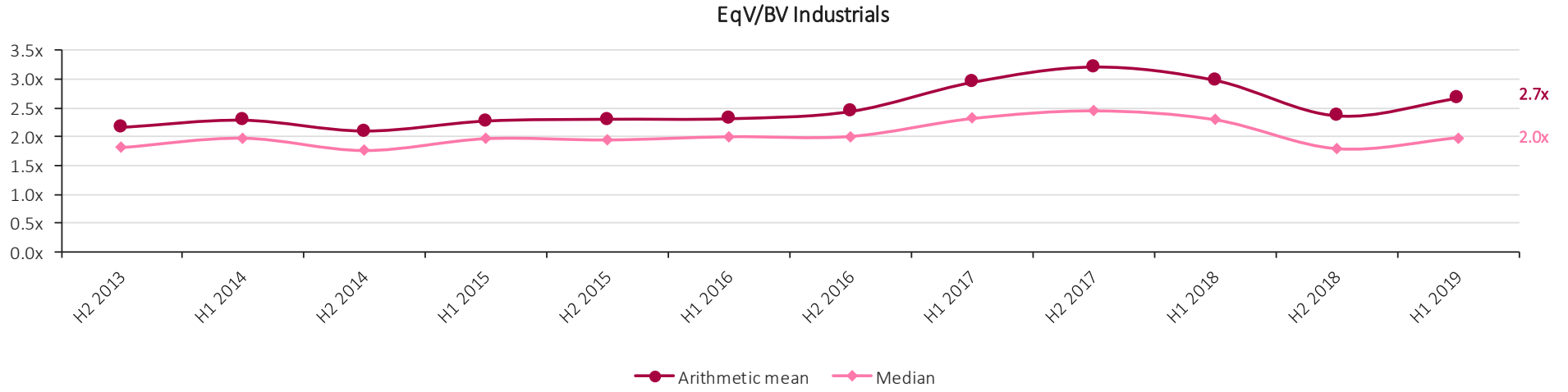




Trading Multiples

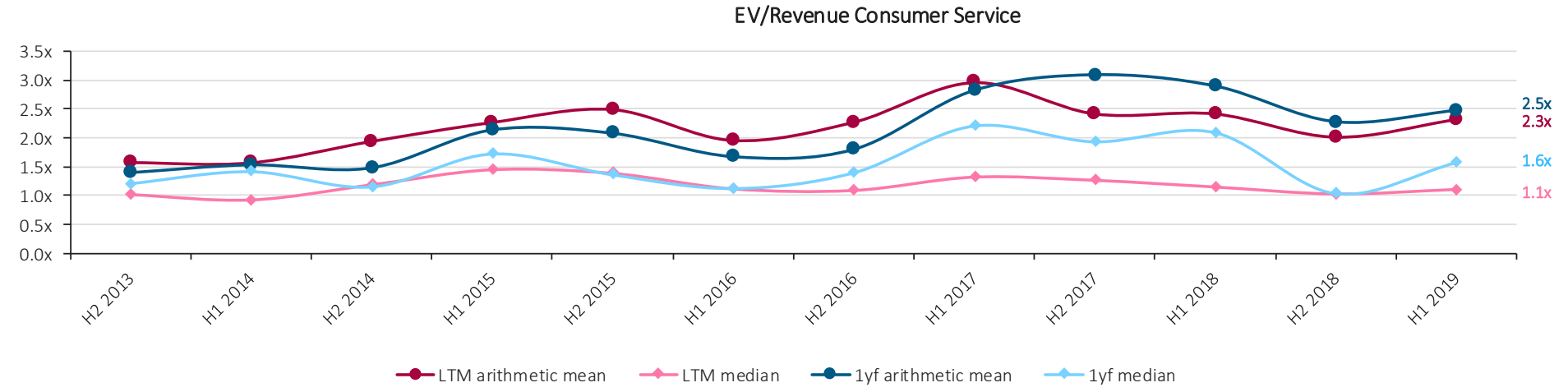
Industrials (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

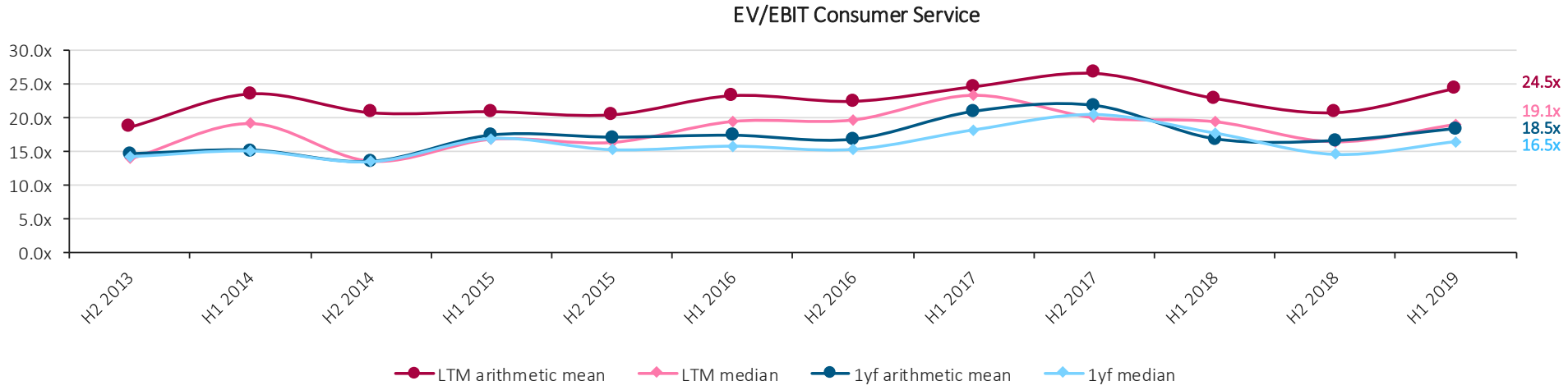




Trading Multiples

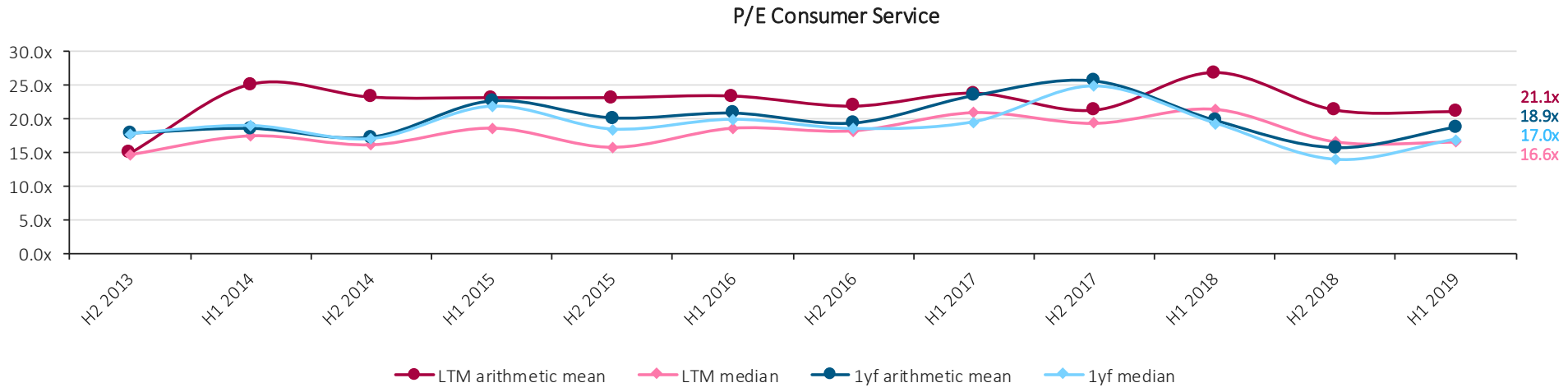
Consumer Service (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

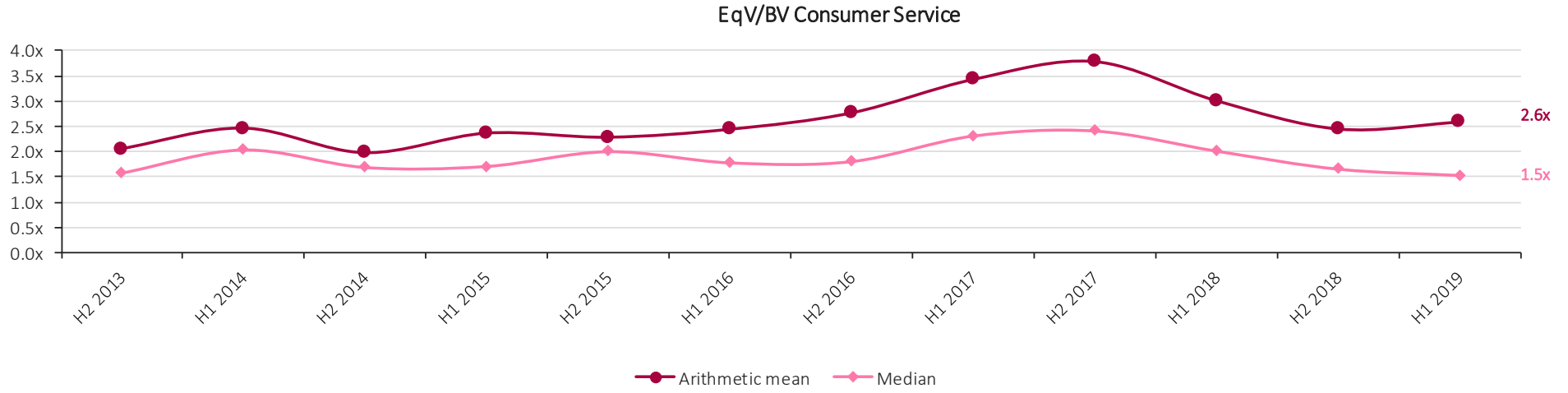




Trading Multiples

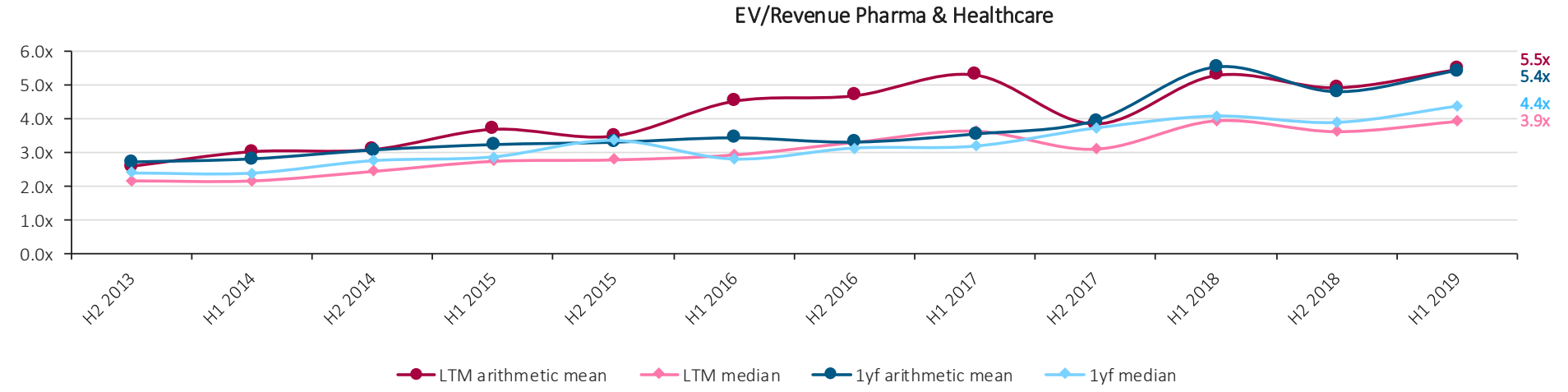
Consumer Service (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

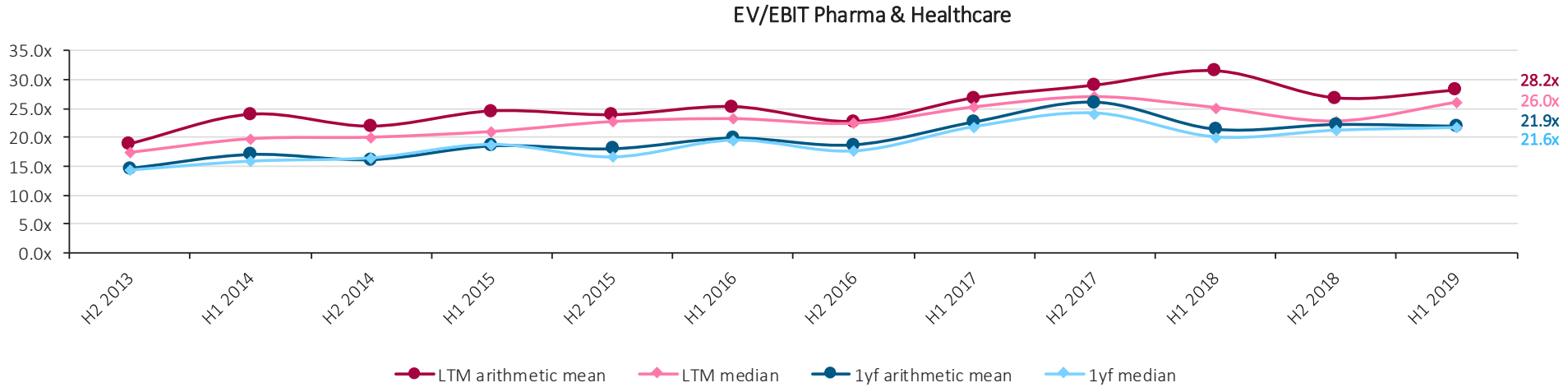




Trading Multiples

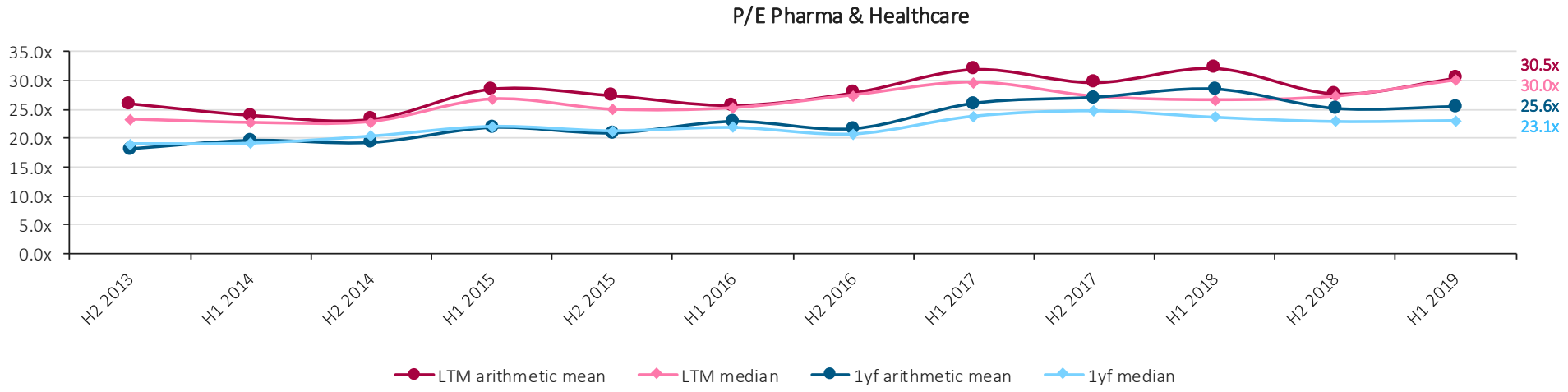
Pharma & Healthcare (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

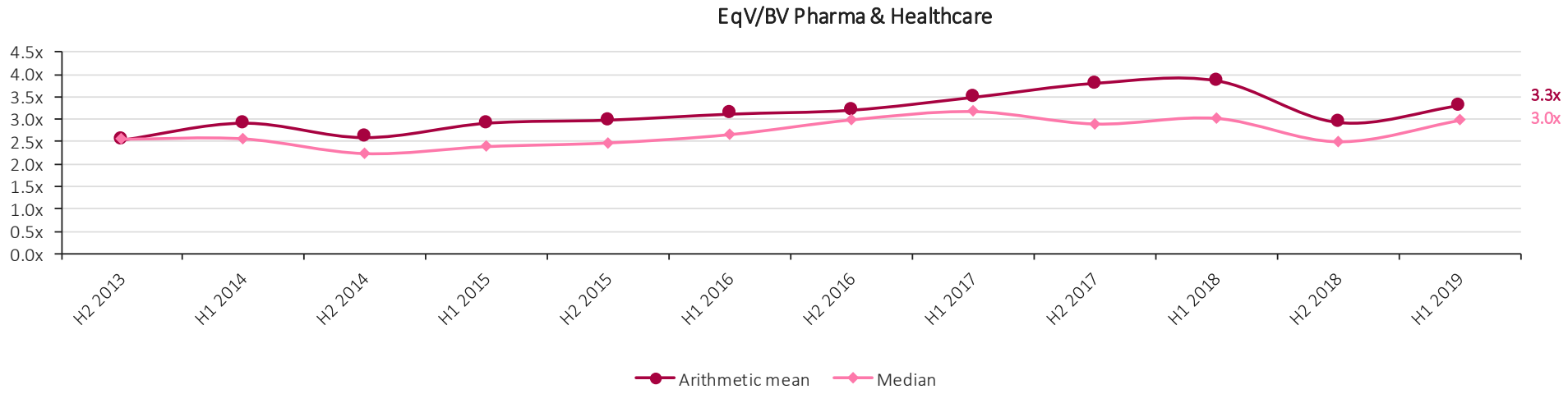




Trading Multiples

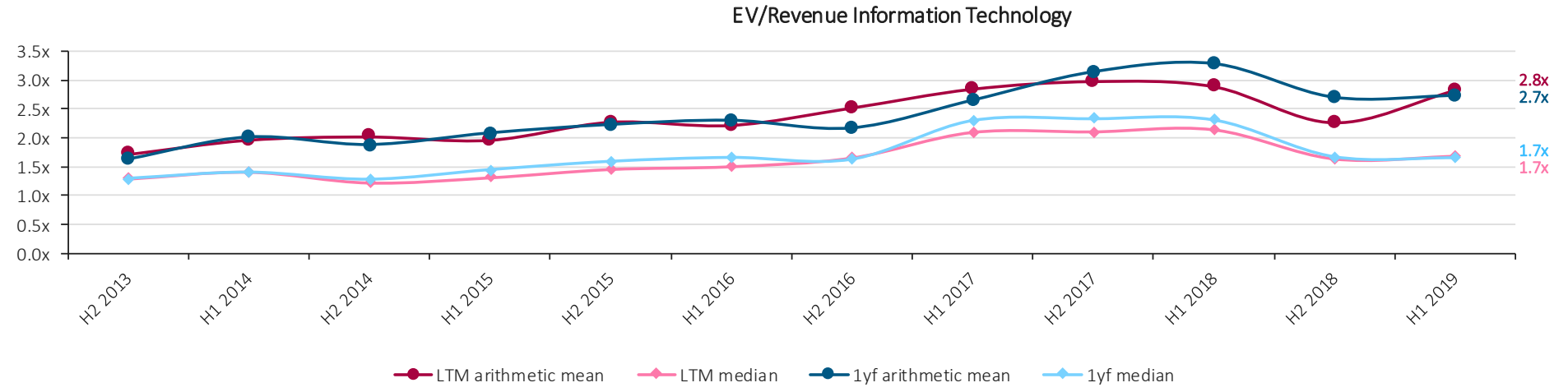
Pharma & Healthcare (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

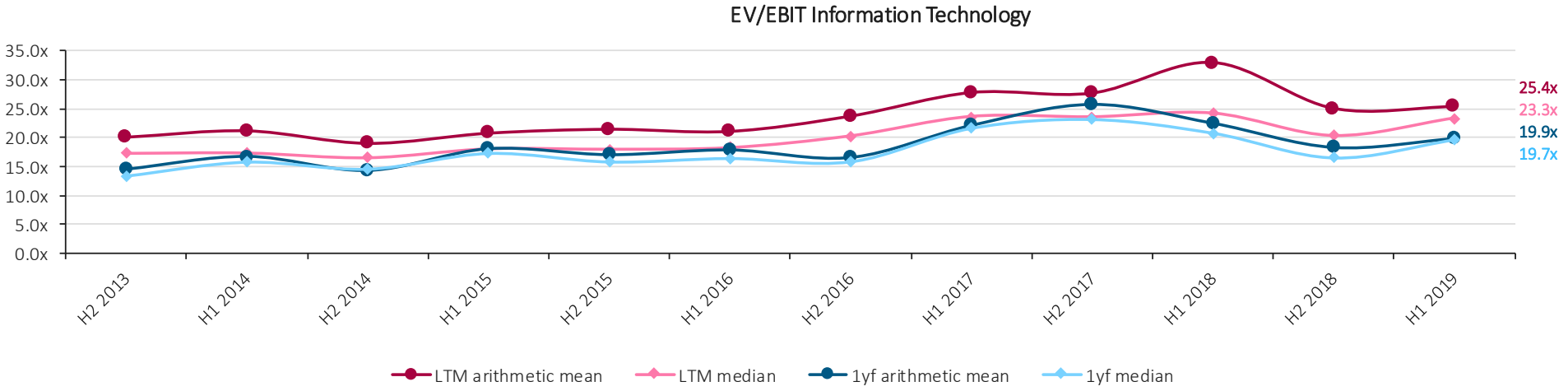




Trading Multiples

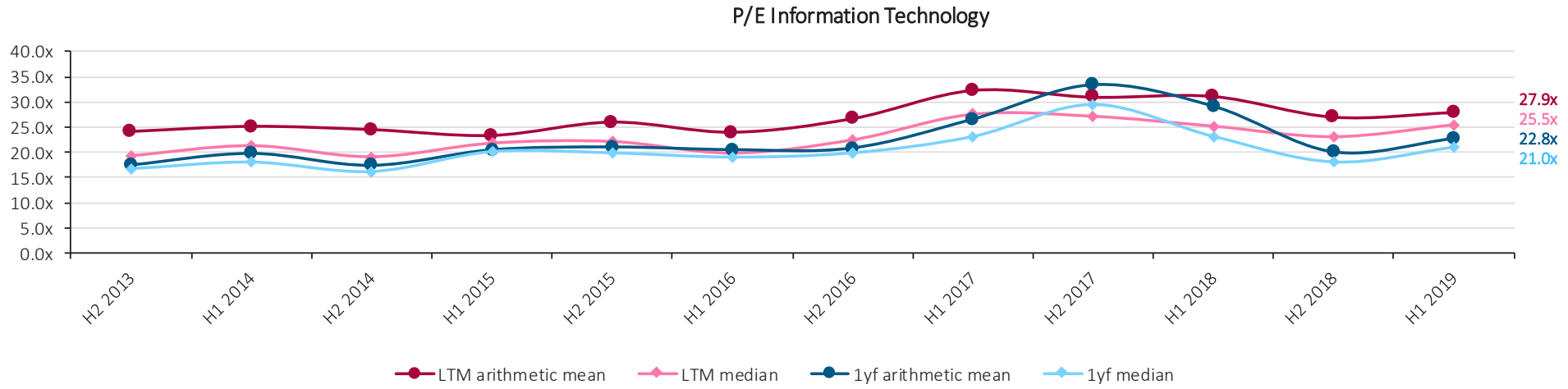
Information Technology (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

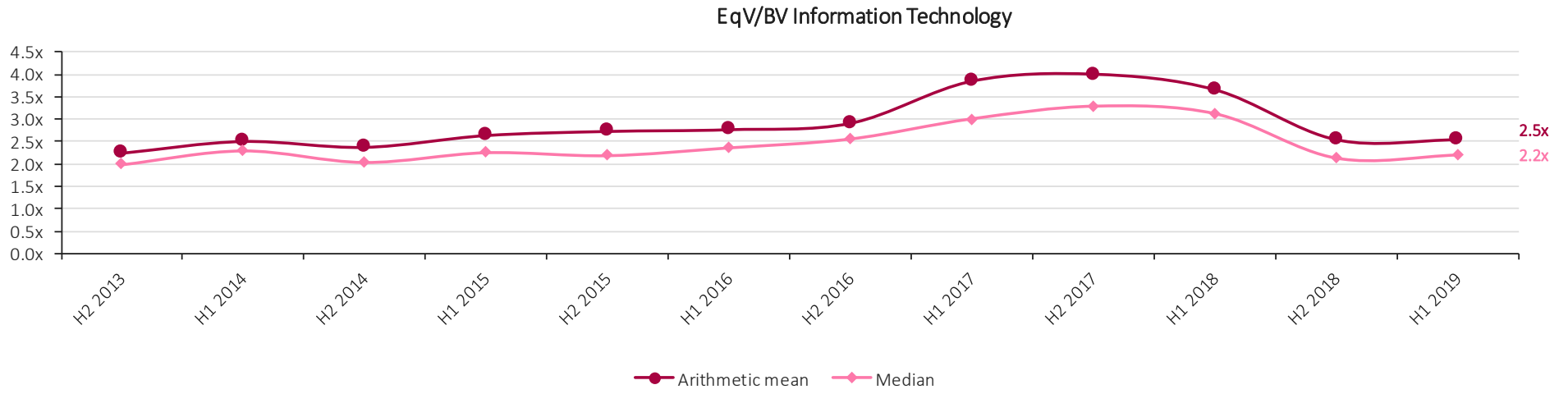




Trading Multiples

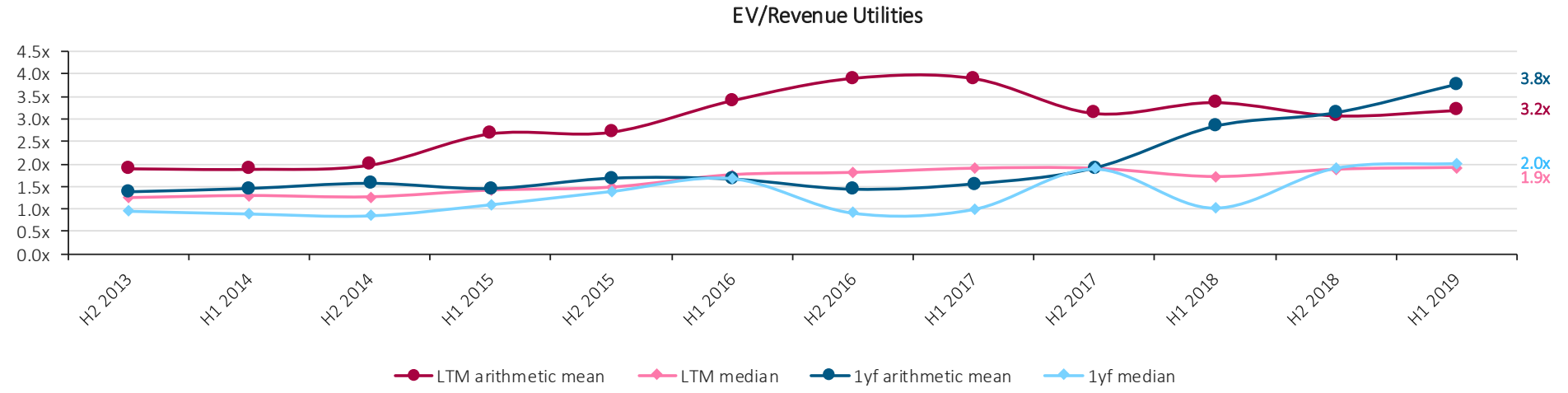
Information Technology (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013

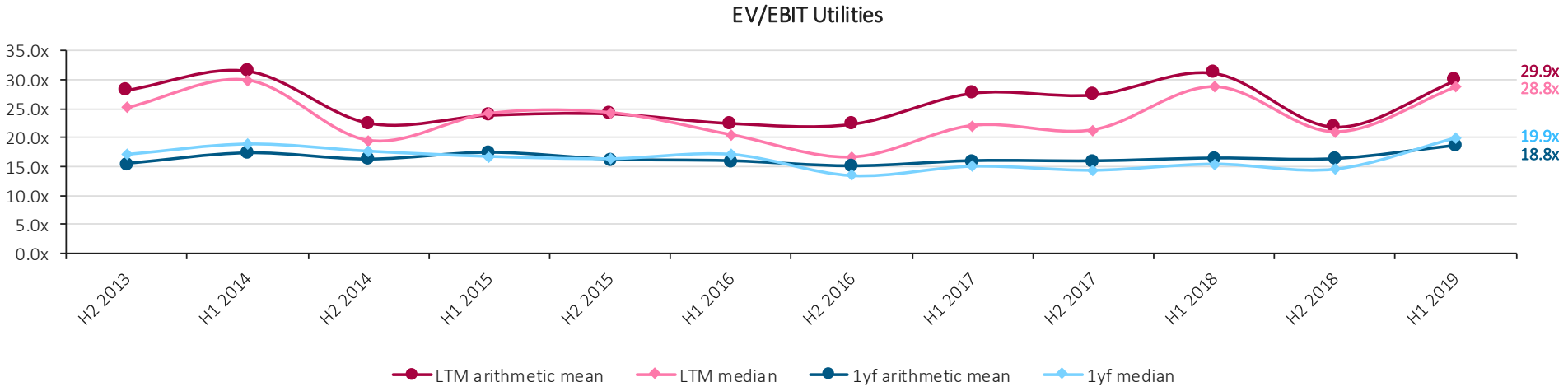




Trading Multiples

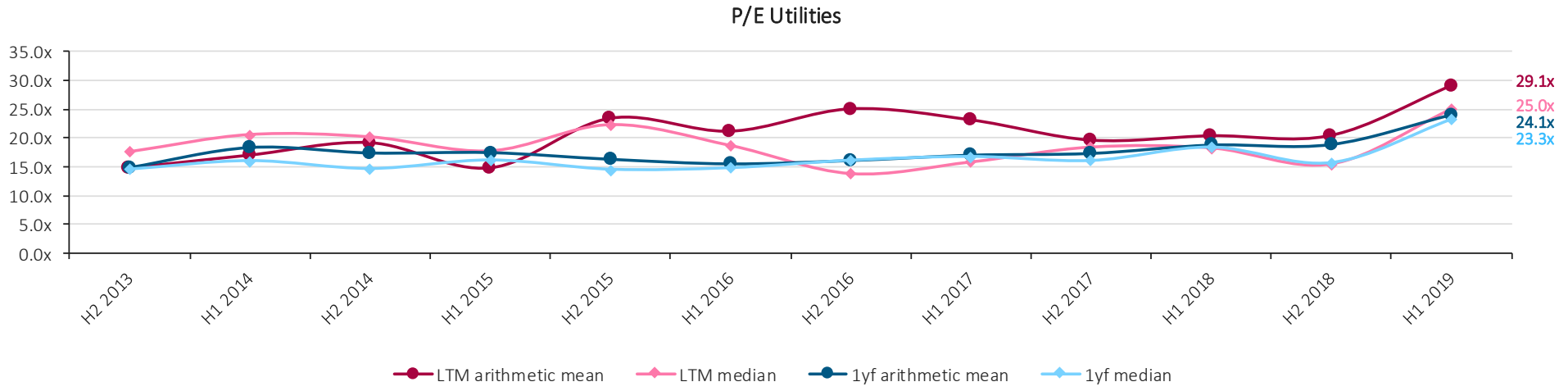
Utilities (1/2) – Revenue- and EBIT-Multiples
LTM and 1yf since 2013

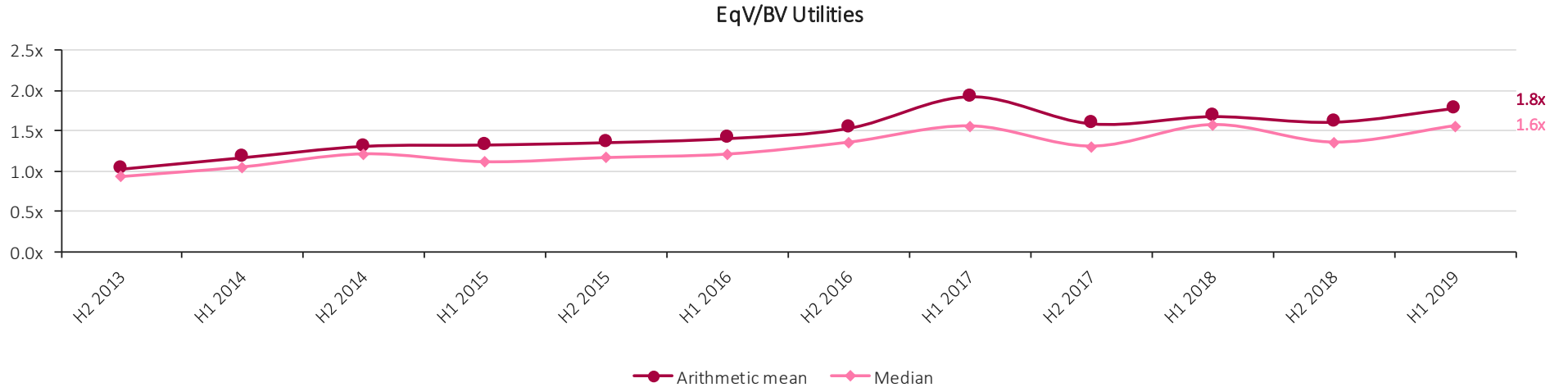




Trading Multiples

Utilities (2/2) – P/E- and EqV/BV-Multiples
LTM and 1yf since 2013





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