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vdp property Price Index

Q4. 2018

Strong growth persists in the market at year-end

Compared with the corresponding quarter the previous year:

Overall market: **+ 7,6 %**

Housing market: **+ 8,0 %**

Owner-occupied residential housing: + 7,7 %

Multi-family houses: + 8,4 %

TOP-7 Housing market: **+7,2 %**

TOP-7 Owner-occupied residential housing: + 5,5 %

TOP-7 Multi-family houses: + 7,6 %

Commercial property market: **+ 6,0 %**

Office properties: + 9,7 %

Retail properties: -1,2 %



Strong growth persists in the market at year-end

Market as a whole

The fourth quarter of 2018 saw yet another rise in prices for German real estate: the vdp property price index climbed by 7.6% compared with the corresponding quarter one year earlier. The gripping question is how long this upward trajectory in prices, which has been ongoing for nine years now, will endure, and whether it will come to an abrupt end or gradually peter out. Judging by price movements observed in the last few quarters, the latter seems somewhat more likely at present.

The subindices for housing and commercial properties, which are combined in this overall index, also continued their upward trend, although displaying different individual growth rates. This was attributable to the upswing that the German economy has enjoyed for the last six years, but which has lost some of its momentum of late. On the one hand, this is partly because the global economic climate is becoming rougher, leading to a decline in demand for exports. On the other hand, the persistently strong demand for labor has pushed wages up, boosting household income. Given these factors, combined with a still-favorable interest rate environment and – consequently – low lending rates, demand for real estate has stayed consistently buoyant.

Housing market

Demand for housing remained high in many parts of Germany, causing residential properties to rise in price by 8% compared with the corresponding figure in 2017. This was true of multi-family houses in particular. In this market segment, investors were still confident that demand for housing in urban concentrations and university towns would remain brisk and so invested heavily in this asset class. Prices grew by 8.4% as a result.

The cap rate index dropped by 2.2% compared with the final quarter of the previous year. At the same time, new lease rentals went up by 6%. That was the strongest increase since price measurements began in 2003, and is indicative of the continuing housing supply shortage, above all in densely populated towns and cities.

Owner-occupied housing likewise recorded a surge in prices (+7.7%). Prices for single-family houses increased at a particularly strong rate compared with the fourth quarter of 2017, growing by 8.2%, while prices for condominiums rose to a lesser extent (+5.6%). A persisting, stable demand contrasted with a shortage in supply in this market segment, too. A lack of building plots and rising building costs pushed up new construction costs; this, in turn, resulted in higher prices in the market for existing properties.

Top 7 housing market

Prices for residential properties in Germany's top 7 markets jumped by 7.2% compared with the fourth quarter of 2017. Although prices are still rising at a relatively strong rate, growth appears to be decelerating in the top 7 markets. This suggests that the level of prices and rents now reached is making further increases in this segment more difficult: instead, households are increasingly turning to the more affordable surrounding area.

This is also indicated by the smaller increase in prices for owner-occupied dwellings in the top 7 cities compared with the overall housing market. Amounting to 5.6% for single-family houses and 5.5% for condominiums, price hikes were less pronounced than for the German market as a whole.

The prices for multi-family houses in the top 7 cities also advanced

somewhat less strongly, namely by 7.6%, than they did in Germany as a whole. This result was partly attributable to new lease rentals, which rose by 4.7%. At the same time, a 2.7% decline in the cap rate index for multi-family houses was recorded.

Commercial property market

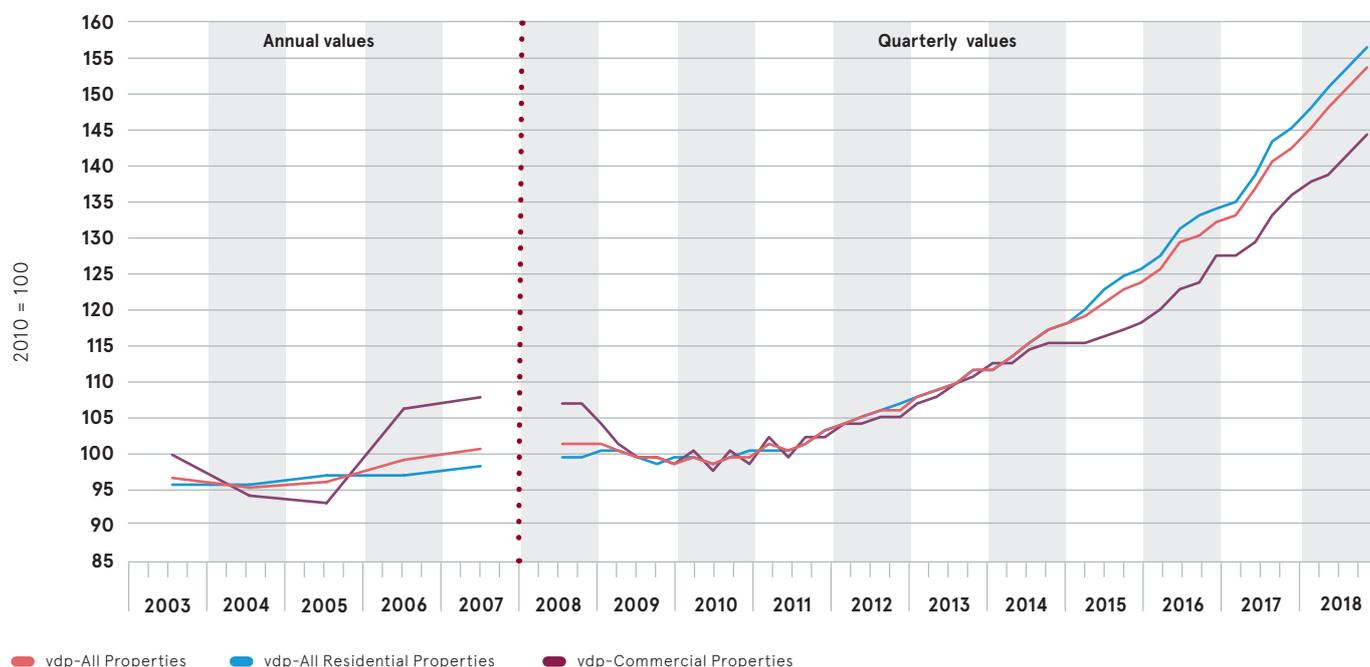
The price index for commercial properties went up by 6% compared with the fourth quarter of 2017. However, the picture for this market segment was mixed. Prices for office premises again saw a sharp increase (+9.7%) year-on-year, whereas retail property prices fell by 1.2% over the same period.

The slightly contracting, yet still positive economic activity in Germany spurred employment growth and the ongoing, brisk demand for office premises. In contrast to this, however, the supply of office space again fell short of demand. As a result, rents were 6.4% higher than in the fourth quarter of 2017. In parallel to this, domestic and foreign investors continued to focus on office properties in the fourth quarter of last year, leading to further yield compression. The cap rate index here fell by 3%.

The market for retail properties presented a different picture. As online retailers go from strength to strength, the pressure on "brick and mortar" businesses is growing. Demand for retail sales premises was down once again; this weighed on new lease rentals for the second quarter in succession. Investor interest was limited to a small number of retail property types, causing the cap rate index to rise again slightly for the first time, by 0.4%.

Real estate market as a whole

Prices still climbing

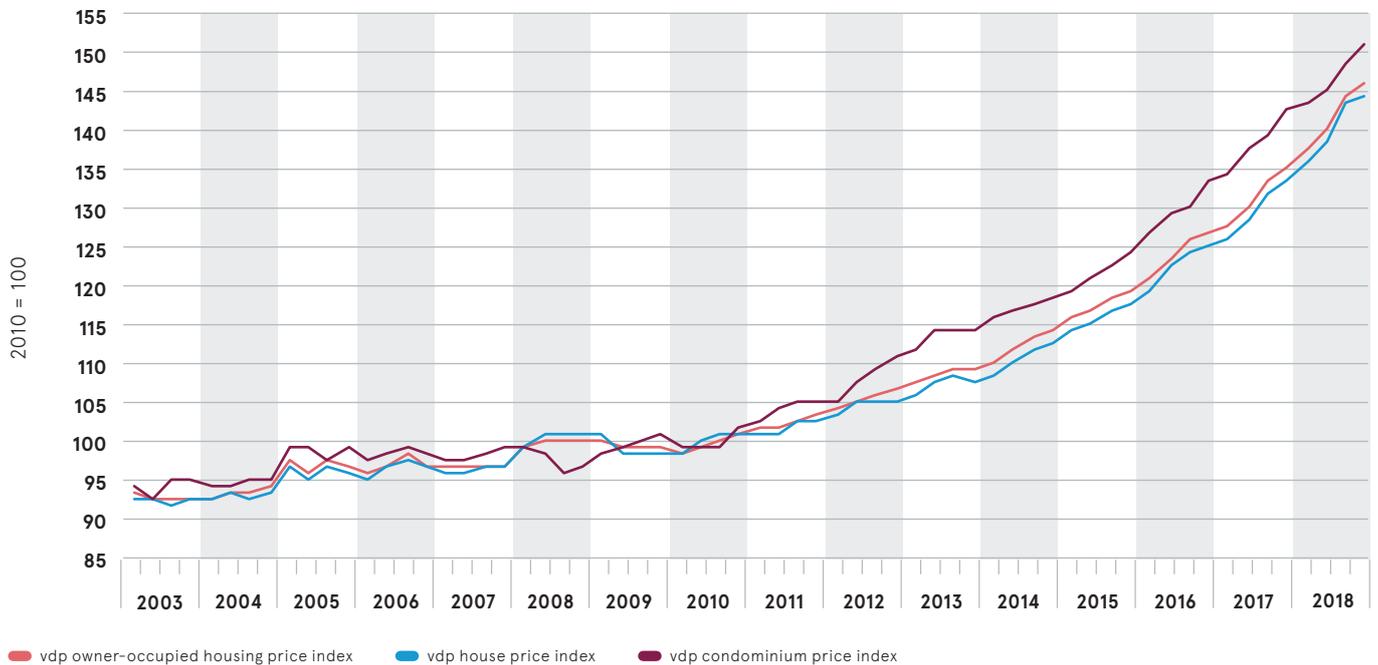


Year	All properties		All residential properties		All commercial properties	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	101.4	1.1	100.2	2	105.2	-1.2
2009	99.5	-1.9	99.4	-0.8	99.7	-5.3
2010	100.0	0.5	100.0	0.6	100.0	0.4
2011	102.7	2.6	102.7	2.7	102.4	2.4
2012	106.4	3.7	106.7	3.8	105.5	3.0
2013	110.7	4.1	110.9	3.9	110.4	4.6
2014	115.9	4.7	116.4	5.0	114.6	3.8
2015	121.7	5.0	123.3	5.9	117.0	2.1
2016	129.5	6.4	131.4	6.5	123.7	5.8
2017	138.3	6.8	140.5	6.9	131.8	6.5
2018	149.4	8.0	152.2	8.3	140.7	6.8

Quarter	All properties		All residential properties		All commercial properties	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	133.6	5.9	135.4	5.8	128.0	6.5
Q2 2017	136.5	5.8	138.7	5.9	129.7	5.4
Q3 2017	140.6	7.5	143.1	7.7	132.9	7.0
Q4 2017	142.7	8.0	144.8	8.3	136.3	7.0
Q1 2018	145.3	8.8	147.8	9.2	137.5	7.4
Q2 2018	147.9	8.3	150.8	8.7	139.0	7.1
Q3 2018	150.8	7.3	153.7	7.4	142.0	6.8
Q4 2018	153.5	7.6	156.4	8.0	144.5	6.0

Owner-occupied housing

Low interest rates fuel persistently high demand

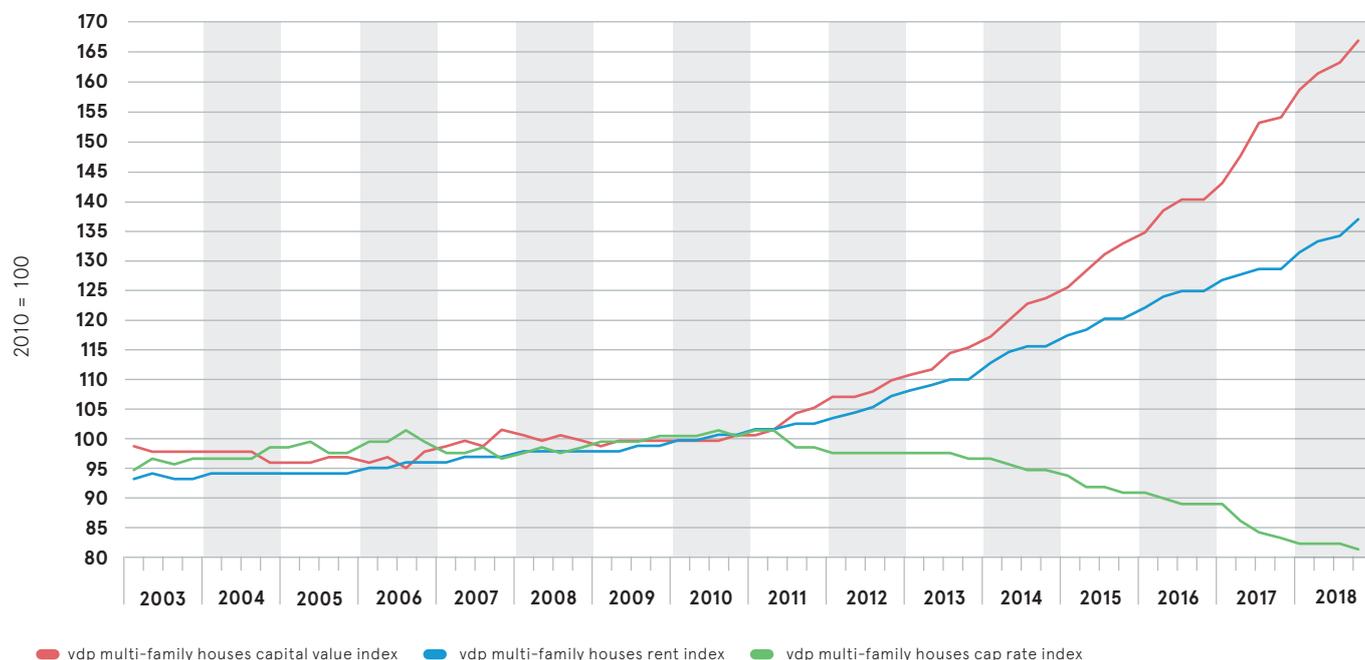


Year	Owner occupied housing		Single family houses		Condominiums	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	100.0	3.3	100.6	4.3	97.9	-0.6
2009	99.4	-0.6	99.3	-1.3	99.8	2.0
2010	100.0	0.6	100.0	0.7	100.0	0.2
2011	102.4	2.4	101.9	1.9	104.3	4.3
2012	105.5	3.0	104.7	2.7	108.3	3.9
2013	108.7	3.1	107.5	2.6	113.6	4.9
2014	112.1	3.1	110.8	3.1	117.0	3.0
2015	117.2	4.6	116.0	4.7	121.7	4.0
2016	124.2	6.0	122.8	5.8	129.6	6.5
2017	131.4	5.8	129.6	5.5	138.5	6.8
2018	141.5	7.7	140.2	8.2	146.6	5.8

Quarter	Owner occupied housing		Single family houses		Condominiums	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	127.6	5.5	125.9	5.3	134.4	6.5
Q2 2017	129.9	5.1	128.0	4.8	137.6	6.4
Q3 2017	133.0	6.0	131.4	5.6	139.3	7.4
Q4 2017	134.9	6.6	133.0	6.4	142.6	7.0
Q1 2018	137.1	7.4	135.7	7.8	142.9	6.3
Q2 2018	139.7	7.5	138.4	8.1	145.0	5.3
Q3 2018	143.8	8.1	142.8	8.7	147.8	6.1
Q4 2018	145.3	7.7	143.9	8.2	150.6	5.6

Multi-family houses

Strong demand among renters and investors pushes up capital values



Index: 2010 = 100

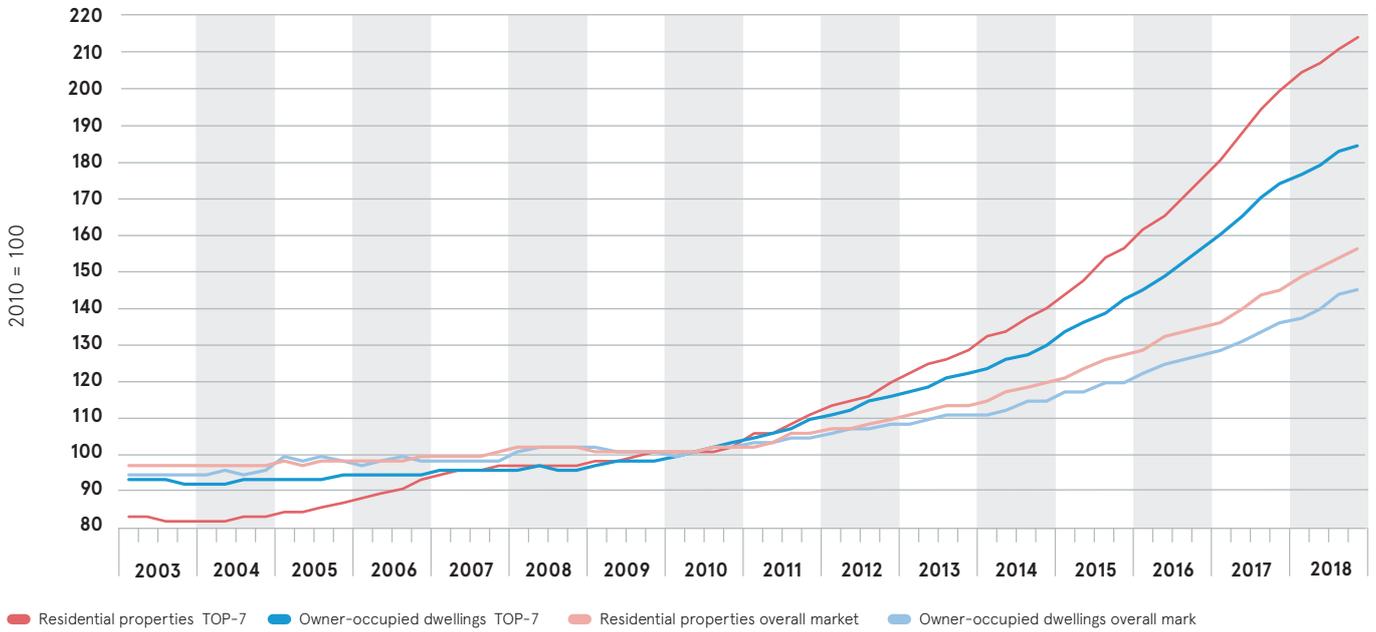
Year	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	100.4	0.7	97.7	0.8	97.4	0.1
2009	99.5	-0.9	98.5	0.8	99.1	1.7
2010	100.0	0.6	100.0	1.5	100.0	0.9
2011	103.0	3.0	102.1	2.1	99.1	-0.9
2012	107.9	4.8	104.8	2.7	97.1	-1.9
2013	113.1	4.8	109.3	4.2	96.6	-0.5
2014	120.8	6.8	114.5	4.8	94.8	-1.9
2015	129.5	7.3	118.9	3.9	91.8	-3.2
2016	138.7	7.1	123.7	4.0	89.1	-2.9
2017	149.7	7.9	127.7	3.2	85.3	-4.3
2017	163.2	9.0	133.6	4.6	81.9	-4.0

Index: 2010 = 100

Quarter	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	143.3	6.0	126.5	3.8	88.3	-2.0
Q2 2017	147.8	6.6	127.2	2.9	86.1	-3.5
Q3 2017	153.4	9.3	128.2	2.9	83.6	-5.8
Q4 2017	154.9	9.9	128.8	3.3	83.2	-6.0
Q1 2018	158.9	10.9	130.9	3.5	82.4	-6.6
Q2 2018	162.1	9.7	133.1	4.6	82.1	-4.7
Q3 2018	163.8	6.8	133.8	4.4	81.7	-2.3
Q4 2018	167.8	8.4	136.6	6.0	81.4	-2.2

Owner-occupied housing Top 7*

Price increase slowing down



For all the individual figures of the TOP-7 cities, go to www.vdpresearch.de

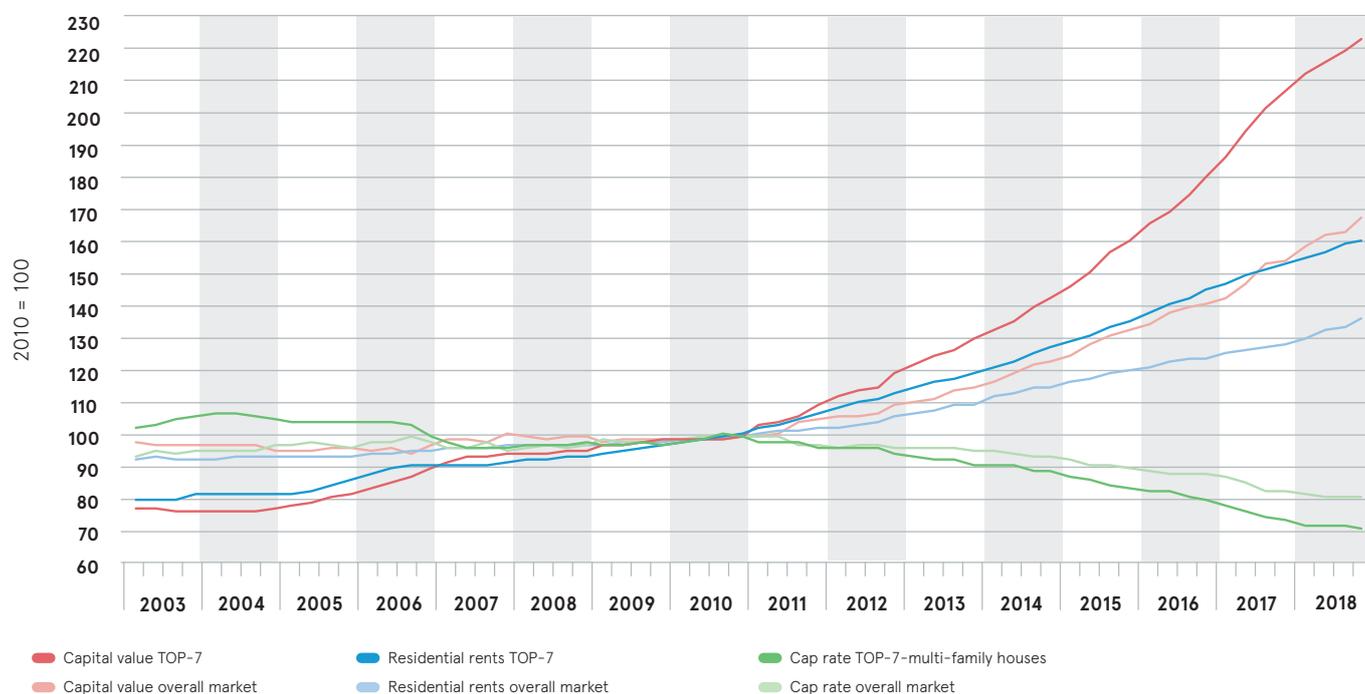
Year	Residential properties TOP-7		Owner occupied housing TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %
2008	95.4	1.6	94.5	0.7
2009	97.9	2.5	96.1	1.6
2010	100.0	2.2	100.0	4.1
2011	106.3	6.3	105.4	5.4
2012	114.9	8.1	112.0	6.3
2013	124.4	8.3	118.4	5.8
2014	135.3	8.7	125.9	6.3
2015	150.0	10.9	136.7	8.6
2016	167.6	11.7	150.0	9.7
2017	190.5	13.7	167.3	11.5
2018	209.3	9.9	180.7	8.0

Quarter	Residential properties TOP-7		Owner occupied housing TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	180.7	12.0	160.1	10.7
Q2 2017	187.7	14.0	164.8	11.0
Q3 2017	194.1	14.5	169.8	12.0
Q4 2017	199.6	14.1	174.4	12.3
Q1 2018	204.3	13.1	176.8	10.4
Q2 2018	207.8	10.7	179.5	9.0
Q3 2018	211.2	8.8	182.5	7.5
Q4 2018	214.0	7.2	184.1	5.5

*Berlin, Cologne, Dusseldorf, Frankfurt am Main, Hamburg, Munich, Stuttgart

Multi-family houses Top 7*

Demand pressures persist, driving prices up further.



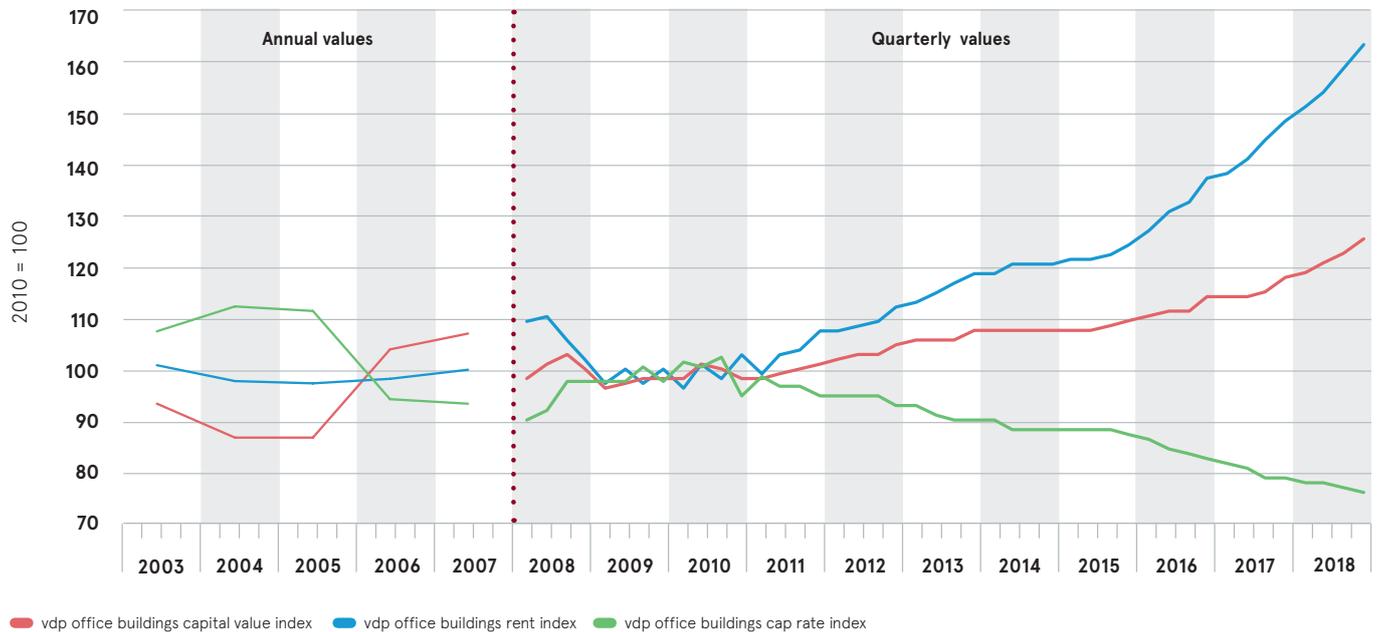
Year	Capital value TOP-7		Residential rents TOP-7		Cap rate TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	95.7	1.8	93.7	2.4	97.9	0.5
2009	98.4	2.8	96.4	2.9	98.0	0.1
2010	100.0	1.6	100.0	3.7	100.0	2.0
2011	106.6	6.6	104.9	4.9	98.4	-1.6
2012	115.8	8.6	111.4	6.2	96.2	-2.2
2013	126.2	9.0	117.6	5.6	93.2	-3.1
2014	138.0	9.4	125.0	6.2	90.5	-2.9
2015	153.8	11.4	132.8	6.3	86.4	-4.6
2016	172.6	12.3	142.0	6.9	82.3	-4.8
2017	197.1	14.2	150.7	6.1	76.5	-7.1
2018	217.6	10.4	158.4	5.1	72.8	-4.8

Quarter	Capital value TOP-7		Residential rents TOP-7		Cap rate TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	186.6	12.3	147.1	6.1	78.8	-5.5
Q2 2017	194.3	14.7	149.7	6.3	77.0	-7.4
Q3 2017	201.2	15.2	152.2	6.2	75.6	-7.8
Q4 2017	206.9	14.6	153.9	5.8	74.4	-7.6
Q1 2018	212.3	13.7	155.6	5.8	73.3	-7.0
Q2 2018	216.0	11.2	157.5	5.2	72.9	-5.3
Q3 2018	219.5	9.1	159.5	4.8	72.6	-3.9
Q4 2018	222.7	7.6	161.2	4.7	72.4	-2.7

*Berlin, Cologne, Dusseldorf, Frankfurt am Main, Hamburg, Munich, Stuttgart

Office and administration buildings

Still a highly sought-after asset class amid rising prices

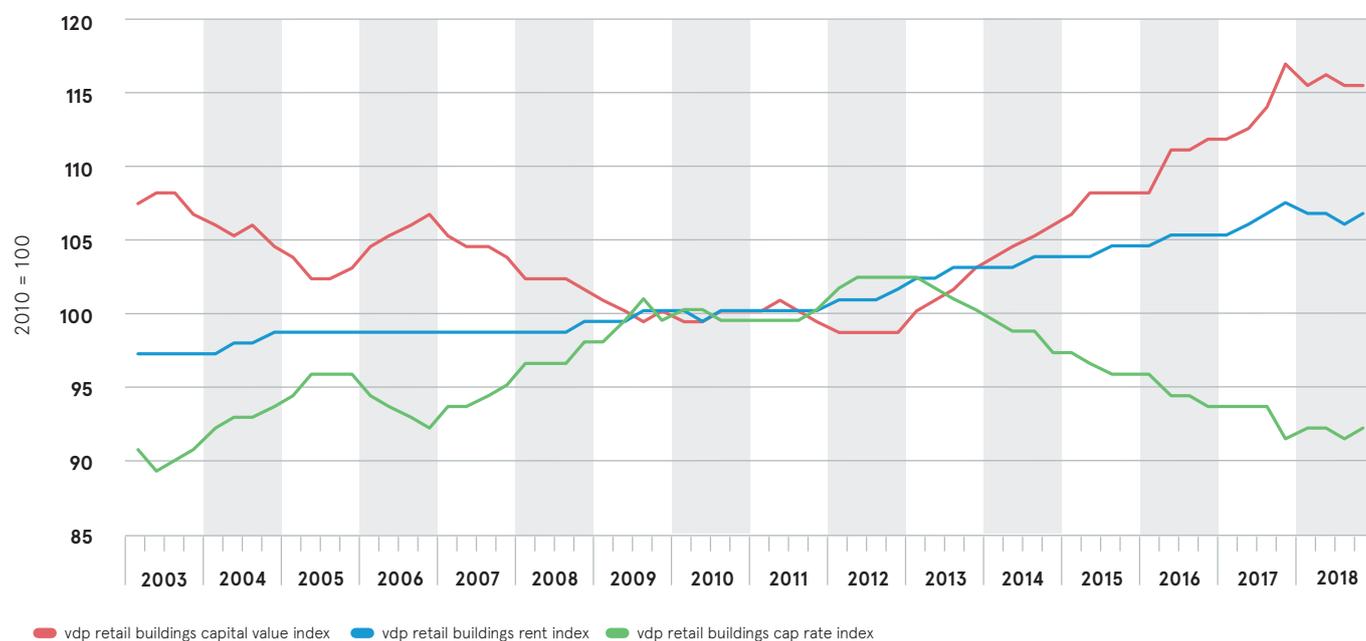


Year	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	107,2	-0,7	101,3	0,6	94,5	1,3
2009	99,3	-7,3	98,1	-3,1	98,8	4,5
2010	100,0	0,7	100,0	1,9	100,0	1,2
2011	103,6	3,6	100,2	0,2	96,7	-3,3
2012	109,9	6,0	103,6	3,4	94,3	-2,5
2013	116,4	5,9	106,4	2,7	91,5	-3,0
2014	120,9	3,9	108,0	1,5	89,3	-2,3
2015	122,9	1,7	108,7	0,6	88,4	-1,1
2016	132,4	7,7	112,1	3,2	84,7	-4,2
2017	143,6	8,4	115,7	3,2	80,6	-4,9
2018	157,4	9,6	122,1	5,5	77,6	-3,7

Quarter	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	138,6	8,4	114,4	3,4	82,5	-4,6
Q2 2017	141,2	7,5	114,7	3,0	81,2	-4,2
Q3 2017	145,6	9,5	115,7	3,2	79,5	-5,8
Q4 2017	149,3	8,3	117,9	3,1	79,0	-4,8
Q1 2018	152,1	9,7	119,1	4,1	78,3	-5,1
Q2 2018	154,2	9,2	121,1	5,6	78,5	-3,3
Q3 2018	159,5	9,6	122,8	6,1	77,0	-3,1
Q4 2018	163,7	9,7	125,4	6,4	77,6	-3,0

Retail buildings

Capital values fall due to competition from online retailers



Year	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2008	102.2	-2.5	99.1	0.4	97.1	2.9
2009	100.1	-2.0	99.9	0.7	99.7	2.7
2010	100.0	-0.1	100.0	0.1	100.0	0.3
2011	100.6	0.6	100.5	0.5	100.0	0.0
2012	99.0	-1.5	101.2	0.7	102.2	2.3
2013	101.3	2.3	102.8	1.6	101.4	-0.8
2014	105.2	3.8	103.7	0.9	98.6	-2.8
2015	108.0	2.7	104.3	0.5	96.6	-2.1
2016	110.6	2.5	105.0	0.7	94.9	-1.7
2017	113.9	2.9	106.4	1.3	93.4	-1.6
2018	115.8	1.7	106.7	0.3	92.1	-1.3

Quarter	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
Q1 2017	112.0	3.2	105.4	0.8	94.1	-2.3
Q2 2017	112.5	1.5	105.7	0.6	94.0	-1.0
Q3 2017	114.0	2.5	106.7	1.6	93.6	-0.9
Q4 2017	117.0	4.5	107.6	2.1	92.0	-2.3
Q1 2018	115.8	3.4	106.8	1.4	92.3	-1.9
Q2 2018	116.1	3.1	106.8	1.0	92.0	-2.1
Q3 2018	115.6	1.4	106.3	-0.4	91.9	-1.8
Q4 2018	115.6	-1.2	106.7	-0.8	92.3	-0.4

Methodology

Data basis

German financial institutions participating in the transaction database provide transaction details from their real estate financing business for input into the database. The database has been maintained since 2004 and provides statistically evaluable information on actual real estate transactions. Data are captured by the participating institutions in the form of appraisals of market and mortgage lending values that are prepared in the course of their mortgage lending activities. Property valuations are determined within each financial institution by certified property valuers or specially trained bank personnel. In addition to purchase price and date of purchase, the appraisal includes information about the property's macro and micro location, its age, layout and other price-influencing variables. In the case of certain types of property, information is also collected with regard to rental agreements and the date they were concluded. Information used to derive market and mortgage lending values is ascertained partly from submitted documentation and partly by valuers working in accordance with codified procedures. Table 1 provides an overview of the variables most frequently applied in the specification of individual indices for various market segments.

Substantive definitions of individual variables are coordinated with financial institutions via the contractual relationship between them and the vdp. In addition, property valuation in Germany is subject to strict regulations, which ensure that the valuation processes of individual institutions are harmonised to the greatest extent

Table 1: Variables from the vdp's transaction database

Variable	Scaling	Characteristics
Makrolage	Nominal	Landkreis oder kreisfreie Stadt in Deutschland
Micro location	Ordinal	Very good - good - average - moderate - poor - catastrophic
Living /usable space	Metric	Living or usable space m ²
Plot size	Metric	Plot size of property in m ²
Year built	Metric	Year property built
Layout	Ordinal	Very good - good - average - moderate - poor - catastrophic
Condition	Ordinal	Very good - good - average - moderate - poor - catastrophic
Saleability	Ordinal	Very good - good - average - moderate - poor - catastrophic
Sub-property type	Nominal	Division of market segment into sub-segments
Purchase price	Metric	Purchase price of property in Euros
Rent	Metric	Contractual rent of property in Euros per m ²

possible, especially as a result of the Verordnung über die Grundsätze für die Ermittlung der Verkehrswerte von Grundstücken (Regulation on the Principles for Determining the Market Value of Property – abbreviated to ImmoWertV) and the Beleihungswertermittlungsverordnung (Regulation on the Determination of the Mortgage Lending Value – abbreviated to BelWertV). Because the purchase prices and significant price-influencing characteristics of individual properties are determined in a uniform manner and because they are input into a uniform database structure, it is possible to analyse the data with the help of complex statistical procedures.

Calculation

As a result of the distinct heterogeneity of real estate properties and in order to be able to measure pure price changes, it is necessary to take account of the varying quality of the

properties concerned when measuring prices. Various procedures exist which take explicit account of the differences in the quality of individual properties in order to be able to measure pure price changes.

All vdp real estate indices are calculated by making use of so-called hedonic models. The hedonic model is based on the idea that heterogeneous commodities can be described by reference to their characteristics. In other words, a commodity can be represented as the sum of its characteristics. With regard to real estate, this means that this set of attributes might include, for example, details of physical characteristics such as plot size, living area, year built and details as to the property's location. Each of these named attributes has a specific influence on the price of the property, but there is no market for the attributes themselves; they cannot be sold separately and therefore cannot be viewed

in isolation. It is possible, nonetheless, implicitly to determine the proportion of the overall price of the property which each individual attribute makes up by examining real estate supply and demand. Multivariate regression models are used for this purpose, helping to provide a statistical estimate of the marginal contribution of each attribute. It is assumed that the model incorporates all relevant attributes and that deviations occur simply by coincidence and are not indicative of any systematic structures.

Weighting

The overall index is the weighted arithmetical average of the various price indices for residential and commercial real estate. The weightings used correspond to the share of monetary turnover in the German real estate market constituted respectively by residential and commercial real estate. Based on details provided by valuer committees (Gutachterausschüsse), these averaged 75.6% and 24.4%, respectively, between 2007 and 2012.

The weights used correspond with the percentage share of households in Germany living in their own home. For the year 2011 this share stood at 50.7%. Accordingly, 49.3% lived in a rented dwelling. The weights were derived on the basis of the building and housing census conducted by the Federal Statistical Office in 2011. The price index for owner-occupied housing is calculated as a weighted arithmetic mean of the percentage of households living in their own single-family house or condominium. In 2011 these shares amounted to 79.7% for single-family houses and 20.3% for condominiums.

For the commercial property price index, the weightings attributable to the office property capital value index and the retail property capital value index

correspond to the proportion of loans in the accounts of Pfandbrief Banks that were granted to these two categories. The figures for office property and retail property amount to 60% and 40%, respectively.

Top 7 residential properties

The top 7 residential property indices are calculated analogously to the calculation for the vdp's nationwide property price indices. The indices are estimated separately for each of the cities on the basis of the transaction database. Then, the seven individual indices of the relevant market segment are aggregated according to the respective shares to form a top 7 index. For more information, please visit the website of vdpResearch.

Base year

Starting from this edition, the base year for the indices is 2010.

Publication

All vdp real estate price indices are published on a quarterly basis. Each year's first quarter index figures are published on 10 May of the same year (six weeks after the end of the quarter under review). Other publication dates are as follows:

- 10 August, 2nd quarter
- 10. November, 3. Quartal
- 10 February of the following year, 4th quarter (including figures for the year as a whole)

The index figures are released at 2:00 p.m. on the respective publication dates. Where the publication date falls on a Saturday, Sunday or public holiday, the index figures are published on the next working day at 2:00 p.m.

The accompanying press releases are published in German and English on

the websites of the Verband deutscher Pfandbriefbanken e.V. (vdp) www.pfandbrief.de and vdpResearch GmbH www.vdpresearch.de. They are also published via press agencies.

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The member institutions of the **Association of German Pfandbrief Banks** (Verband deutscher Pfandbriefbanken, vdp) have been the market leaders in commercial real estate finance in Germany and hold sizeable market shares in residential real estate finance as well. As the representative of its member banks, the vdp performs this function vis-à-vis all executive bodies of politics on both the national and the European stage and a wider public.

The vdp's know-how is tailored towards the specific interests of the Pfandbrief issuers, namely, the Pfandbrief business and the underlying business fields property finance, public-sector lending, ship and aircraft finance. The vdp assists its member banks also in regulatory matters and represents them vis-à-vis national regulatory authorities. By means of group governance, member institutions exchange information and experiences in vdp committees, which are then summarized and developed into market standards. The vdp also assists its member banks in the efficient structuring of their specialized loan or issuance businesses.

Scientific editing:

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vdpResearch GmbH, a subsidiary of the Association of German Pfandbrief Banks (vdp), works intensively on compiling, analyzing and forecasting property prices in the context of real estate finance. Its remit includes measuring and forecasting trends in rents and prices in the residential and commercial property sectors at the regional and national level.

To measure the movements of rents and prices, vdpResearch makes use of a unique transaction database that is also used to provide property-related comparative prices, comparative rents and other valuation parameters. These parameters are central to specially developed software solutions for valuing standard and individual properties and are fully compliant with regulations governing market and property valuation.

Today, the products and services of vdpResearch are a key component for many credit institutions in the evaluation and assessment of property and market price risks. The nationwide property price indices that vdpResearch prepares for the Association of German Pfandbrief Banks are geared to an interested public and offer an overview of general price trends in Germany's real estate markets.

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