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vdp property Price Index

Q2. 2018

Real estate market unmoved by general political climate

Compared with the corresponding quarter the previous year:

Overall market: **+ 8.3 %**

Housing market: **+ 8.7 %**

Owner-occupied residential housing: + 7.5 %

Multi-family houses: + 9.7 %

TOP-7 Housing market: **+ 10.7 %**

TOP-7 Owner-occupied residential housing: + 9.0 %

TOP-7 Multi-family houses: + 11.2 %

Commercial property market: **+ 7.1 %**

Office properties: + 9.2 %

Retail properties: + 3.1 %



Real estate market unmoved by general political climate

Market as a whole

Prices on the German property market rose yet again in the second quarter of 2018. The vdp property price index increased by 8.3% in the second quarter of 2018 year on year. All the sub-indices on which the overall index is based contributed to this result, albeit to a different extent in each case. The macroeconomic conditions for the German economy remain very favorable, although Brexit and the trade conflict between the USA, China and the EU are two issues which certainly do entail risks for Germany's export-dependent economy. Notwithstanding these dark clouds, households have seen a further increase in employment and incomes. Moreover, interest rates remain at very low levels, as a consequence of which demand for residential and commercial properties was as buoyant as ever.

Housing market

Once again, residential properties were very high in demand: prices in Germany as a whole increased by 8.7% compared with the second quarter of 2017. This rise is made up of a price increase of 9.7% for multi-family houses and of 7.5% for owner-occupied dwellings.

The price growth seen for multi-family houses is accounted for – on the one hand – by the persistently high demand for living space. As a result, new lease rentals were up by 4.7% compared with the second quarter of 2017. On the other hand, multi-family houses are still in demand among domestic and foreign investors alike. This sent the cap rate index downward by 4.7% over the same period.

Excess demand also characterized the market for owner-occupied housing. Prices for single- and two-family houses climbed by 8.1% on the year and condominium prices went up by 5.3%.

Top 7 housing market

As expected, prices in the top 7 markets saw more dynamic growth than the market as a whole. Top 7 residential property prices surged by 10.7% compared with the second quarter of 2017. The discrepancy between supply and demand is therefore even more pronounced in the urban concentrations. Owner-occupied housing saw prices rise by 9.0%. The situation in the market for rental housing likewise remains tense: new lease rentals rose again, this time by 5.2%. Over the same period, the cap rate index con-

tracted by 5.3%. This is a reflection of the strong investor demand, particularly in the top 7 markets, where prices for multi-family houses jumped by 11.2% overall.

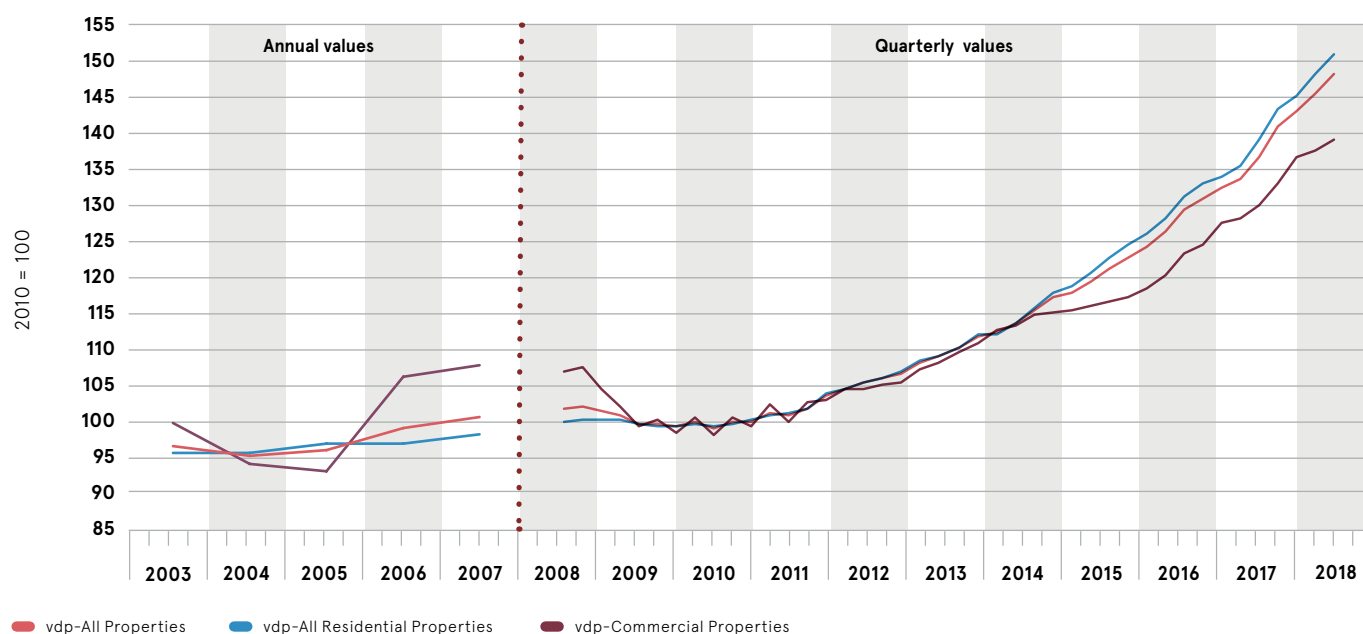
Commercial property market

In the second quarter of 2018, prices for commercial real estate were 7.1% higher than in the corresponding quarter one year earlier. This price development was driven primarily by office properties, the price index for which went up by 9.2%. New lease rentals saw a pick-up of 5.6% year on year, reflecting low vacancy rates and consistently high user demand. Concurrently, the "office" asset class continues to attract investors, while supply levels are low. As a result, returns in this market segment also dropped further (-3.3%).

Developments in the retail property market were more subdued, with prices rising by 3.1%. The willingness to pay ever-higher rents in prime locations waned once again. Consequently, new lease rentals edged up only slightly (+1%) compared with the second quarter of 2017. Investors are increasingly focusing on just a few property types, and the cap rate index decreased only slightly as a result (-2.1%).

Real estate market as a whole

Unflagging price momentum

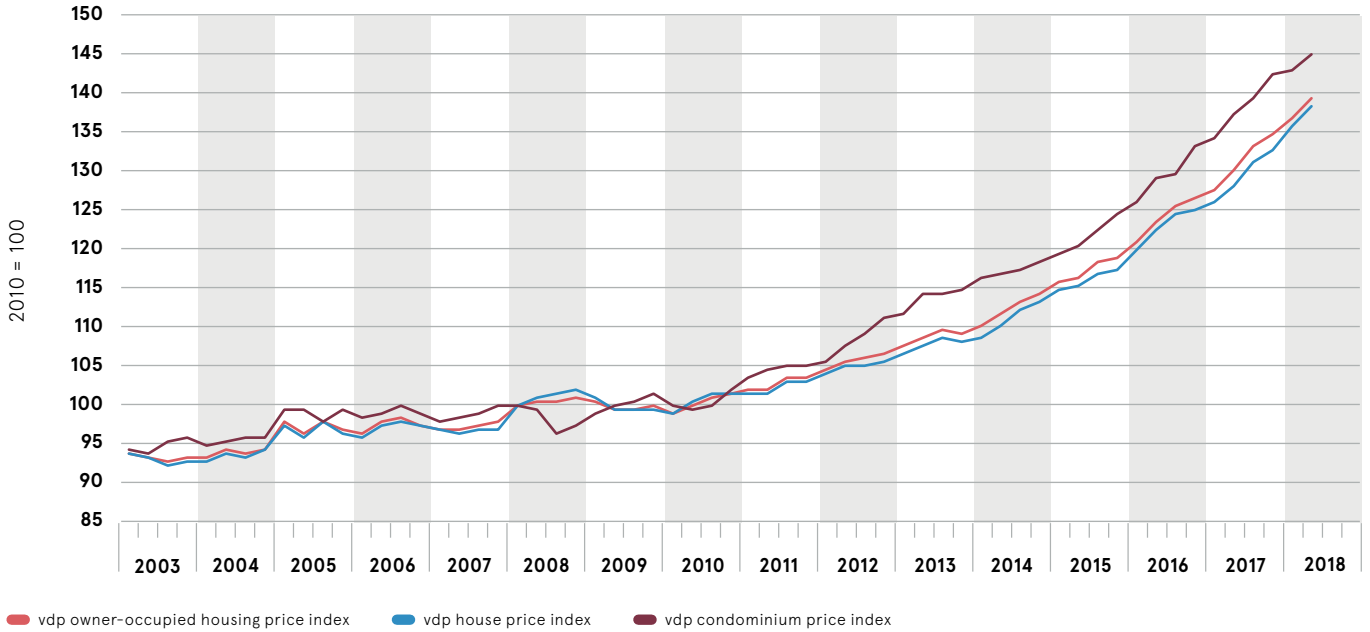


Year	All properties		All residential properties		All commercial properties	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2007	100.4	1.6	98.2	1.5	106.5	1.5
2008	101.4	1.1	100.2	2.0	105.2	-1.2
2009	99.5	-1.9	99.4	-0.8	99.7	-5.3
2010	100.0	0.5	100.0	0.6	100.0	0.4
2011	102.7	2.6	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

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 %
Q3 2016	130.8	6.6	132.8	6.8	124.3	6.2
Q4 2016	132.1	6.5	133.7	6.2	127.4	7.5
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

Owner-occupied housing

Single- and two-family houses see greatest price hike

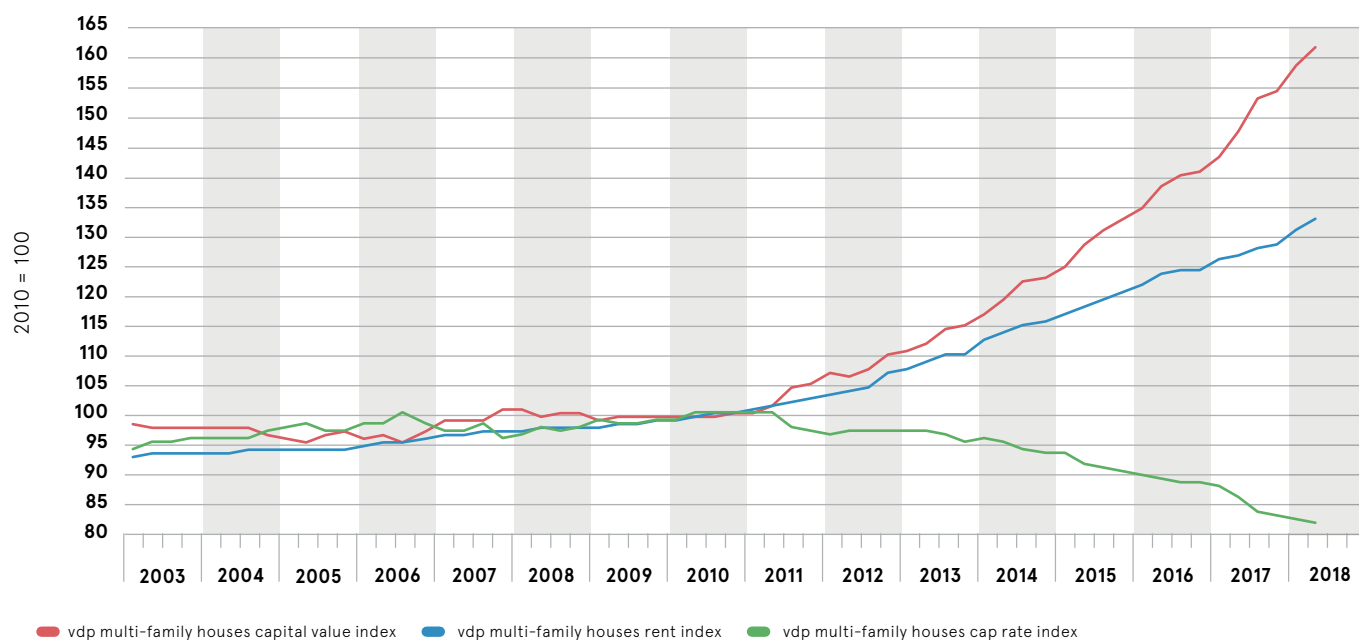


Year	Owner occupied housing		Single family houses		Condominiums	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2007	96.9	-0.2	96.5	-0.2	98.4	-0.2
2008	100.0	3.3	100.6	4.3	97.9	-0.6
2009	99.4	-0.6	99.3	-1.3	99.8	2.0
2010	100.0	0.6	100.0	0.7	100.0	0.2
2011	102.4	2.4	101.9	1.9	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

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 %
Q3 2016	125.5	6.4	124.5	6.5	129.7	6.0
Q4 2016	126.6	6.6	124.9	6.5	133.3	7.1
Q1 2017	127.6	5.5	125.9	5.3	134.4	6.5
Q2 2017	129.9	5.1	128	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	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

Multi-family houses

Price increase in user and investment market continues

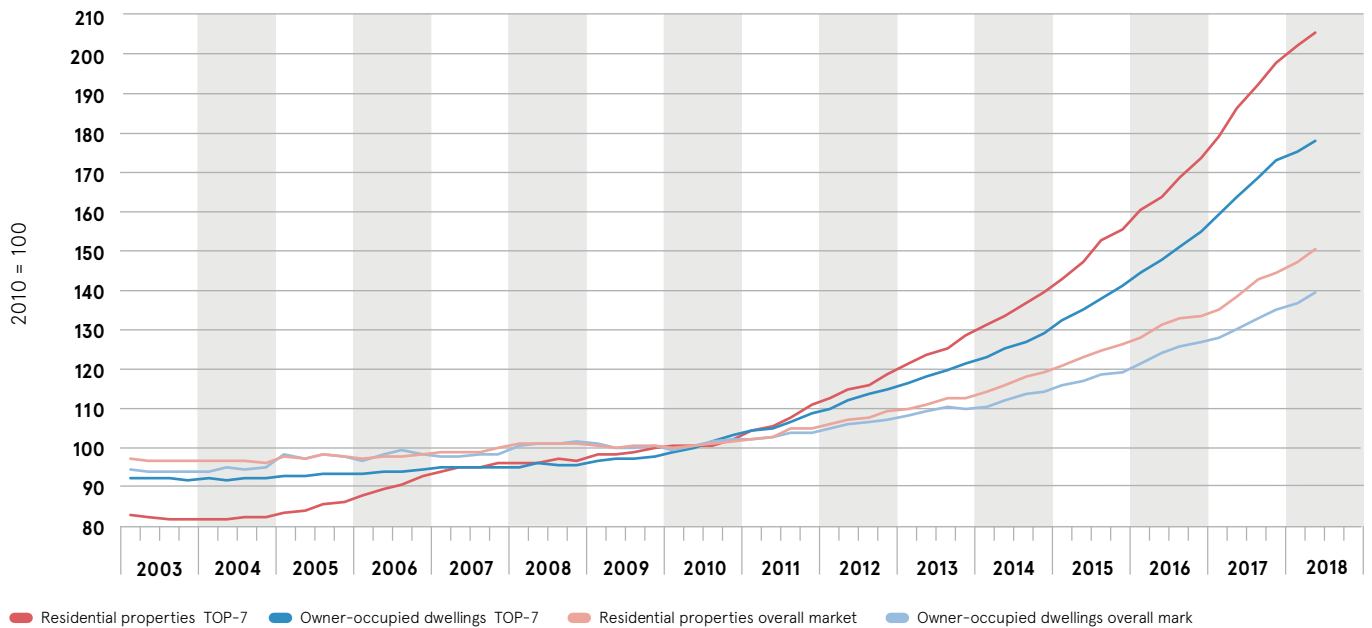


Year	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2007	99.6	3.4	96.9	1.6	97.3	-1.7
2008	100.4	0.7	97.7	0.8	97.4	0.1
2009	99.5	-0.9	98.5	0.8	99.1	1.7
2010	100.0	0.6	100.0	1.5	100.0	0.9
2011	103.0	3.0	102.1	2.1	99.1	-0.9
2012	107.9	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

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 %
Q3 2016	140.4	7.1	124.5	4.0	88.7	-2.9
Q4 2016	140.9	5.8	124.7	3.5	88.5	-2.2
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

Owner-occupied housing Top 7*

Still no end in sight for rising prices



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

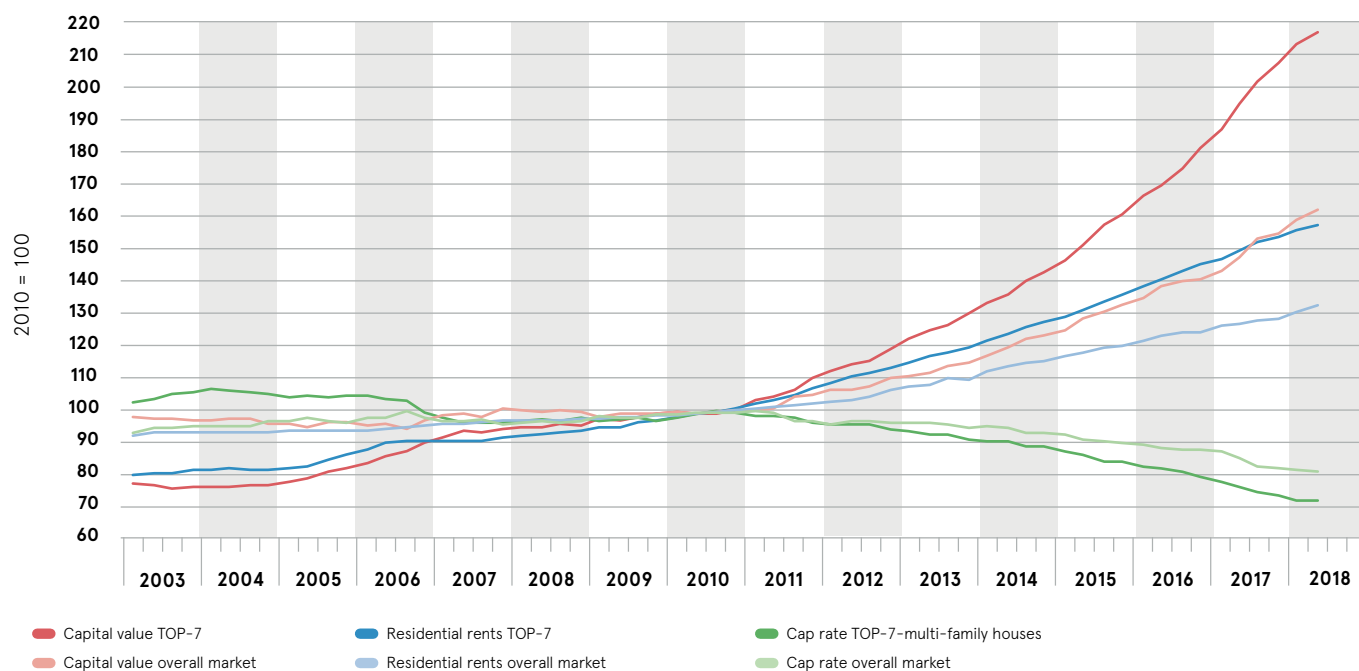
Year	Residential properties TOP-7		Owner occupied housing TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %
2007	94.0	5.9	93.9	1.2
2008	95.4	1.6	94.5	0.7
2009	97.9	2.5	96.1	1.6
2010	100.0	2.2	100.0	4.1
2011	106.3	6.3	105.4	5.4
2012	114.9	8.1	112.0	6.3
2013	124.4	8.3	118.4	5.8
2014	135.3	8.7	125.9	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

Quarter	Residential properties TOP-7		Owner occupied housing TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %
Q3 2016	169.5	10.7	151.7	10.0
Q4 2016	174.9	11.9	155.4	9.9
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

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

Multi-family houses Top 7*

Users and investors stay mainly focused on top 7 cities



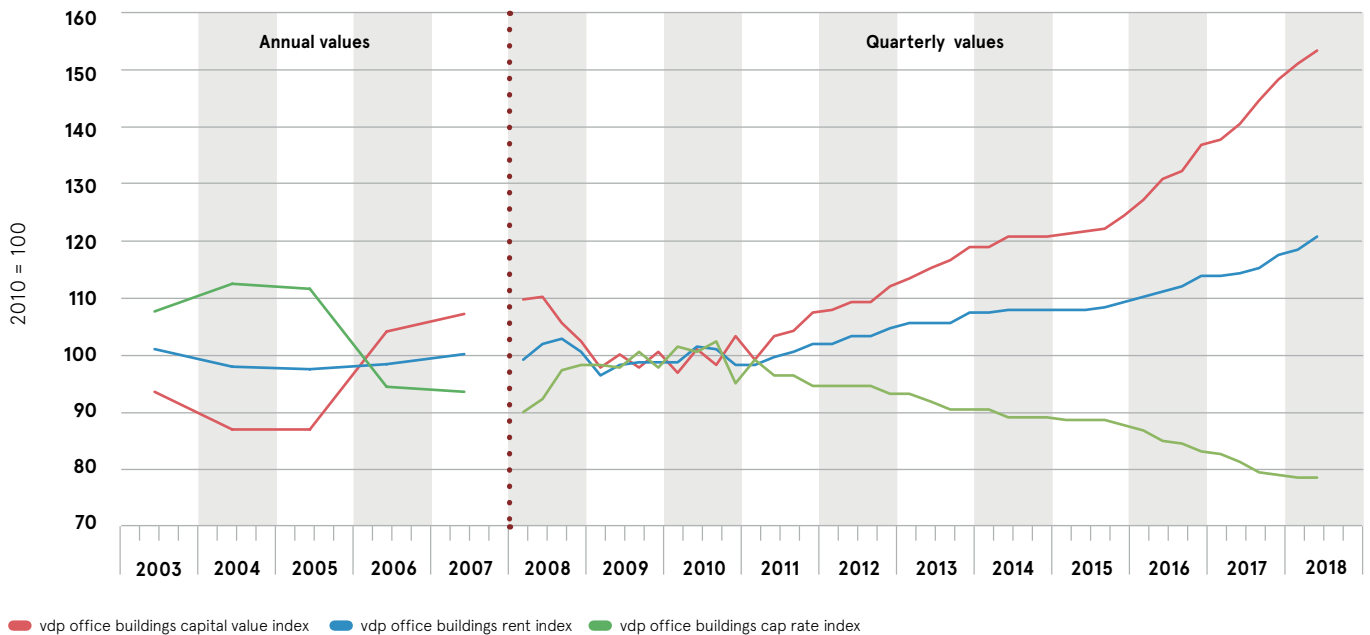
Year	Capital value TOP-7		Residential rents TOP-7		Cap rate TOP-7	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2007	94.0	7.4	91.5	1.1	97.4	-5.8
2008	95.7	1.8	93.7	2.4	97.9	0.5
2009	98.4	2.8	96.4	2.9	98.0	0.1
2010	100.0	1.6	100.0	3.7	100.0	2.0
2011	106.6	6.6	104.9	4.9	98.4	-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

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 %
Q3 2016	174.7	10.9	143.3	6.8	82.0	-3.7
Q4 2016	180.5	12.4	145.4	6.7	80.5	-5.1
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

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

Office and administration buildings

Rents and prices rise further amid scarcity of office space and properties

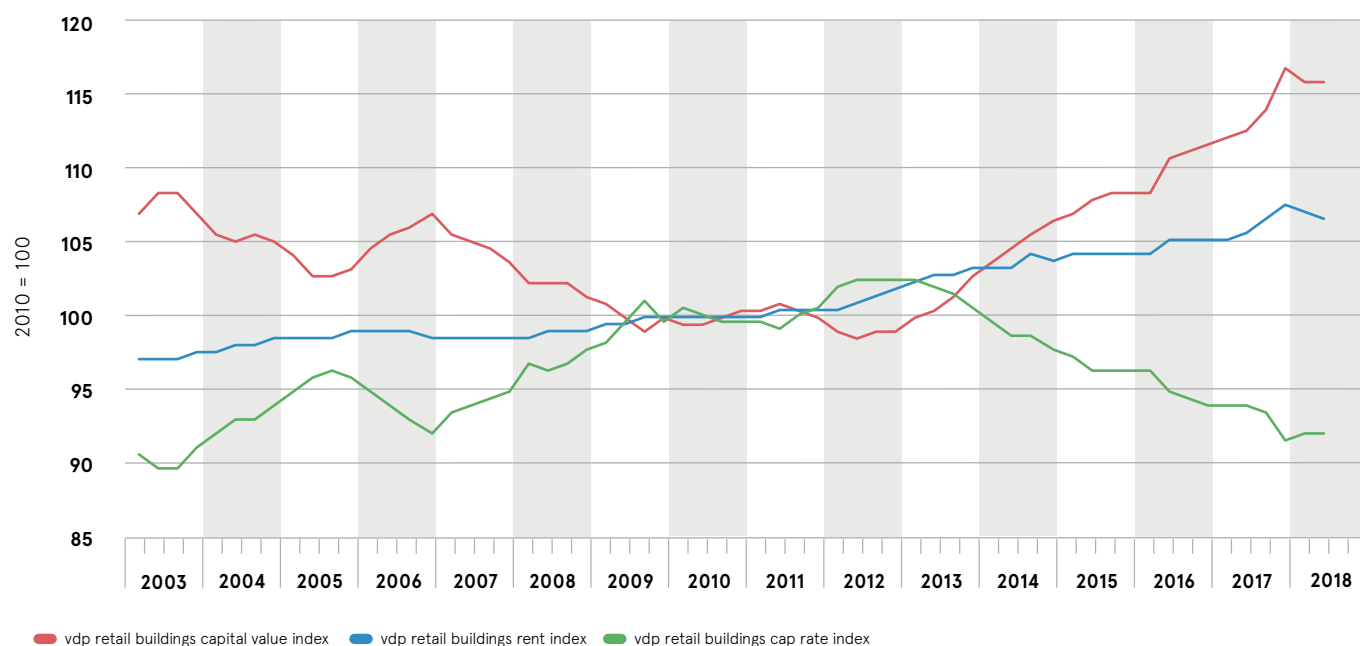


Year	Capital value		Residential rents		Cap rate	
	Index	y-o-y change in %	Index	y-o-y change in %	Index	y-o-y change in %
2007	107.9	2.9	100.7	1.8	93.3	-1.0
2008	107.2	-0.7	101.3	0.6	94.5	1.3
2009	99.3	-7.3	98.1	-3.1	98.8	4.5
2010	100.0	0.7	100.0	1.9	100.0	1.2
2011	103.6	3.6	100.2	0.2	96.7	-3.3
2012	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

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 %
Q3 2016	132.9	8.3	112.2	3.3	84.4	-4.7
Q4 2016	137.8	10.1	114.3	4.3	83	-5.3
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	-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

Retail buildings

Continued deceleration of price increase



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 %
2007	104.8	-1.1	98.8	-0.3	94.3	0.7
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

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 %
Q3 2016	111.3	2.7	105.1	0.7	94.4	-2.0
Q4 2016	111.9	3.1	105.4	0.8	94.1	-2.2
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	-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	-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

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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