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WHERE ARE RESIDENTIAL REAL ESTATE INVESTMENTS PARTICULARLY SUSTAINABLE?

CLEAR DIFFERENCES BETWEEN LOCATIONS IN TERMS OF DYNAMISM, STABILITY AND RISK

RESEARCH REPORT
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Where are residential real estate investments particularly sustainable?

Clear differences between locations in terms of dynamism, stability and risk

For many years now private and institutional investors have focused on rented residential real estate. In this respect there is considerable interest in a stable, sustainable capital investment that can be planned easily. For more than ten years now rents for apartments have been rising steadily in virtually every location. Real estate values and purchase prices have followed the development of rents, and have often even surpassed these in terms of the percentage increase. Real estate market-related prices have thus increased in almost every segment in recent years; in terms of units and space, vacancies were previously reduced to a large extent, and especially in larger cities. In the meantime a shortage in terms of areas can be ascertained.

Questions relating to adequate availability and a further increase in the cost of housing are being discussed from a regional economic and socio-political stance. Intervention at housing policy level and the decline in dynamism in the current economic cycle is leading to greater risk with relatively low yields for interventions and banks. A focus on loctions with sustainable socio-economic structures, stable prices and thus a lower degree of risk is gaining importance. The decisive factors are location-related parameters affecting demand and price development such as dynamics, stability and structural factors. To this end this study analyses various primary, secondary and tertiary locations for investments on the German residential market.

Content

1. Outstanding performance of residential real estate markets in the past ten years

For many years now the focus of private and institutional investors from Germany and abroad has been on rented residential real estate. In this respect there is considerable interest in stable, sustainable capital investments that can be planned easily. Markets with rising rents and stable long-term leases are being sought. The German housing market is thus an attractive one. For more than ten years now residential rents have been increasing continually at virtually all locations. This is true not only for new housing, but also for existing properties. The price development in both segments in recent years has been much higher than the general rate of inflation (CPI). In this respect rents for new apartments have been rising slightly stronger than those for existing housing, but still much less substantially than expected (Fig. 1). Real estate values and purchase prices have followed the development of rents, and have often surpassed these in terms of their percentage increase. The reason for this is an ongoing "yield compression", which is typical for euphoria- and shortage-driven market phases. The underlying valuation yields have been driven to a large extent by the general capital market. Declining interest rates and the associated decline in yields have played a role with almost all investments. Capital from the national and international environments has increasingly found its way on to the German real estate market in the search for stable investment opportunities, and in particular on to the residential market. As a consequence of the strong demand (capital) and, at the same time, a limited supply (real estate stock, new construction), prices have already increased in the wake of the shortage. It has been possible to observe this in recent years across a number of segments of the real estate market. While enlargement of the market (expansion of volumes and areas) is desirable from a housing policy stance, it is difficult to implement in factual terms. Not only does the time factor play a role here, but areas suitable for construction are severely limited, as are the necessary construction capacities.

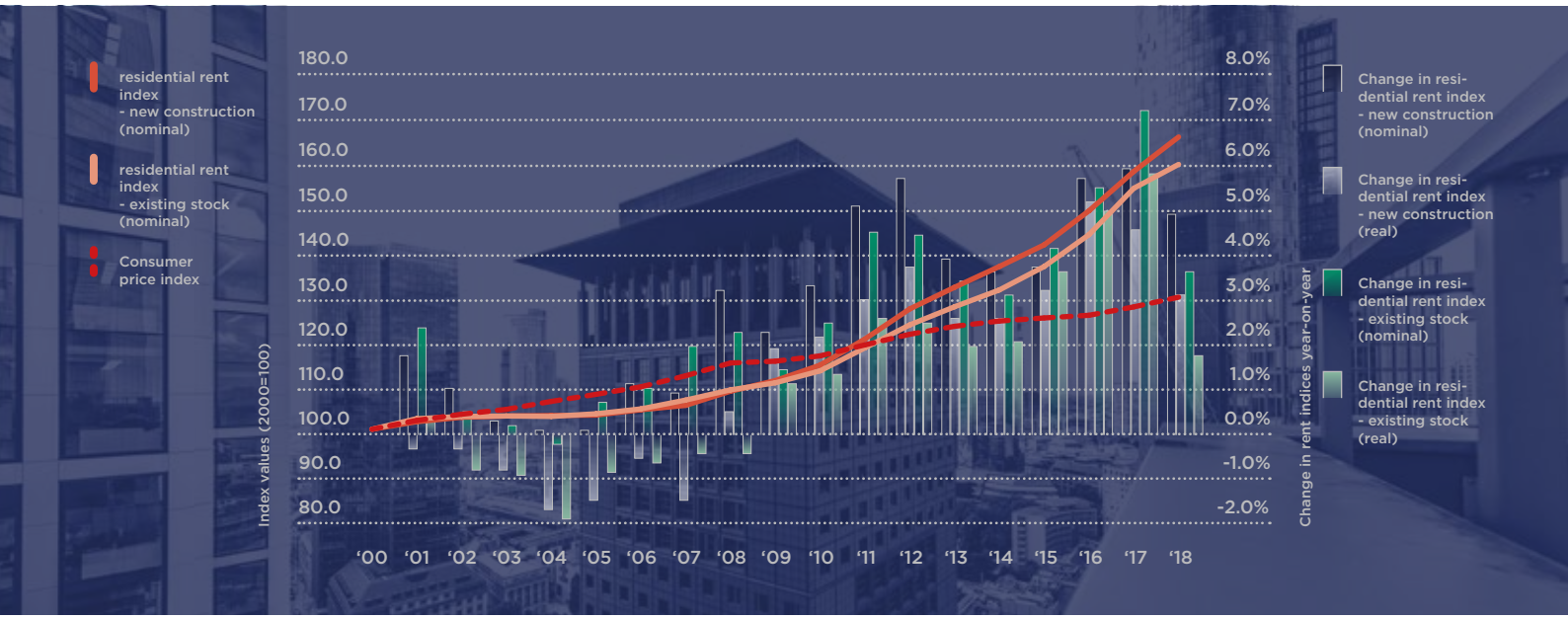

Fig. 1: Development of indices residential rents and consumer prices – base year 2000, Germany
Sources: bulwiengesa AG, Federal Statistical Office; own calculation and illustration

The general debate mainly focuses on rents. For investors and tenants the rate of change (dynamism) is just as interesting as the amount of the rents. Both components provide the calculation basis in order to forecast the respective payments and revenues. Alongside this liquidity and revenue consideration, rents are a key element when calculating market values and purchase prices, value effects therefore.

Residential rents are not an autonomous phenomenon, but are also driven by preceding socio-economic demand factors such as population, purchasing power, employment levels etc. In particular when it comes to new rentals they are in part dependent on general economic developments and can be subject to cyclical fluctuations. Depending on the economic development, rents can also stagnate or develop negatively. In the development since 2000 it is notable that the rent increases in the individual years have varied widely. In particular in strong economic phases – since 2009 for instance – the growth rates have often been considerably higher than the general increase in prices (CPI). If the inflation-adjusted real values are calculated, however, then in some periods, for example the years from the beginning to the middle of the decade starting in the year 2000, there were also phases with negative results.

Following the above-average increase in rents in the current market phase, which has now been in progress for ten years, investors are becoming more cautious. The question is in which markets the level attained is sustainable and where there is a possible risk of a downturn in the rents attained to date and those calculated for future projects. Not least of all the background to this is the fact that the increase in rents has differed greatly from region to region (e.g. over five years: +35.41% in Augsburg compared to a mere +0.22% in Jena), and in part has also encompassed markets which did not use to be primarily in the focus of investors (often smaller towns and cities, i.e. the so-called B/C/D locations). As the yields there have also declined, the current level often only provides a small buffer to compensate for market-typical risks such as a rent decrease, vacancies or an increase in costs.

It is to be assumed that there is a particular risk of a downturn in markets which have recently seen sharp rises without this being sustained by fundamental factors, such as incomes or demographic factors. Also critical are markets in which specific negative developments with regard to preceding factors (e.g. unemployment, surplus of residential housing) are likely to emerge. Other cities will, on the other hand, benefit from further growth or at least remain stable.

The sustainability of individual clusters and cities, as well as the potential for these and the risks they face, cannot be measured directly. There are, however, indicators in the field real estate market, construction activity, demography and economy which point to positive, neutral or negative outlooks. In this study various parameters are examined for 60 German cities. On the one hand, this is conducted individually at city/town level, and, on the other hand, figures are consolidated for the respective clusters. The clusters used here are based on market size and the corresponding difference in relevance for investors. In this respect the study differentiates between primary investment locations (Top 7 markets), secondary locations (cities with more than 200,000 inhabitants, excl. Top 7) and tertiary locations (smaller cities with less than 200,000 inhabitants).

2. Differentiated development in the individual clusters

Institutional investments classically focus on locations with strong growth and which are liquid. In Germany these are usually the Top 7 cities Berlin, Dusseldorf, Frankfurt a. M., Hamburg, Cologne, Munich and Stuttgart. For commercial real estate, the general availability, lettability and possibility to sell individual properties justify limiting the target markets in such a manner. By contrast, in the case of small-volume residential investments, the fo-

cus is usually on the issue of an increase in demand (population, households) and location-specific fundamental data (purchasing power, employment level, economic growth). In particular, population growth has of late concentrated to a high degree on the above-mentioned major cities.
In recent years investors have increasingly shifted their focus to smaller cities, however, initially in the environs of the Top 7, later also across a wider area. What is interesting is the extent to which these cities' key ratios stand out from those of the Top 7 and from the trend for Germany as a whole. This is examined in more detail below.

Large bandwidth of rents across all locations

Although residential rents have risen throughout Germany across the market as a whole, the percentage increases have differed widely. An overview of the growth rates in the past five years is provided by the graphic below. In this respect the bandwidth ranges from +40.5% in Berlin to the almost unchanged location Jena.

Whether such differences result from the widely differing sizes of the cities would have to be examined. For this reason the respective mean values for the rent increases have been calculated for the three size-based clusters. In this respect it can be seen that the primary investment locations do indeed display the greatest growth, namely +25.1% over five years. The smaller, tertiary locations bring up the rear. With +17.9% these lag slightly behind the secondary locations, which saw a development of +19.4%. The respective rents can be differentiated further with respect to their size and dynamism as follows.

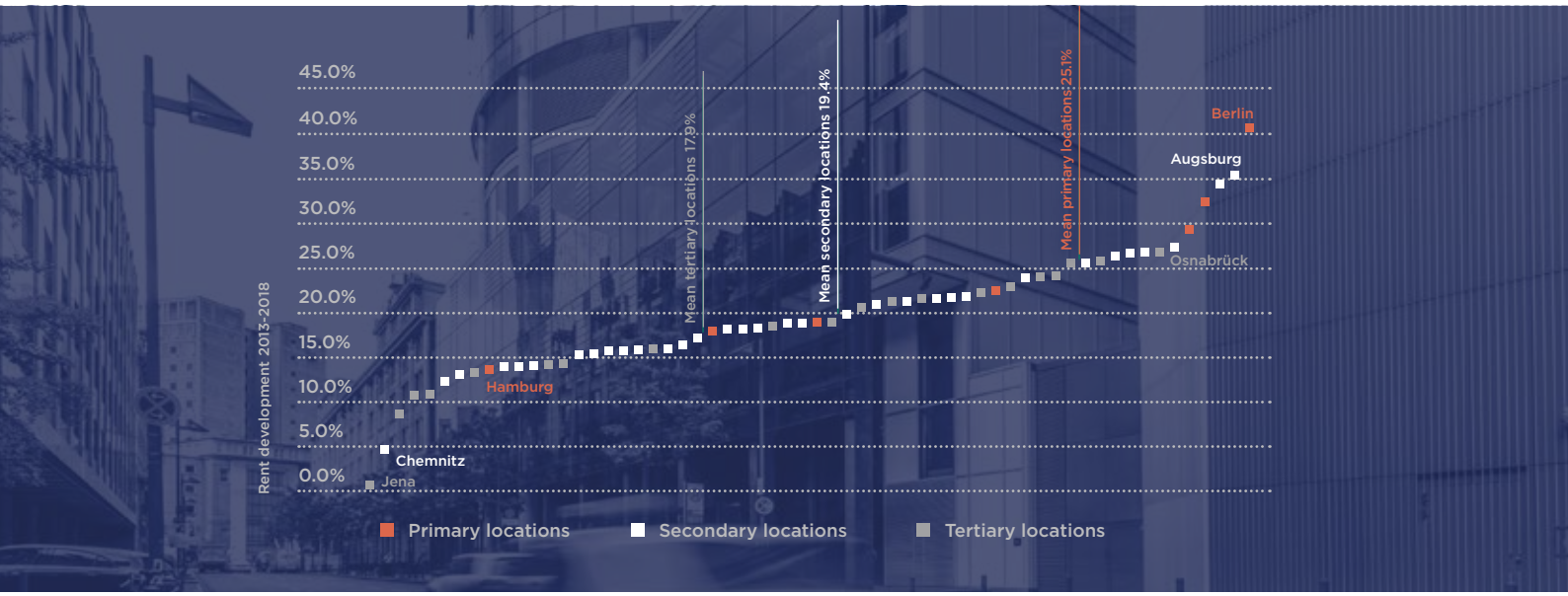

Fig. 2: Rent development from 2013 to 2018 (rate of change) – 60 German cities, clustered by primary, secondary, tertiary investment locations
Source: F+B GmbH; own calculation and illustration

Primary investment locations (Top 7)

The primary investment locations, here as the Top 7, lead the way in terms of both the average size of rents as well as their dynamism. At present the apartment rent based on the average value for all seven cities is a little over 12.00 EUR/m².

On average the residential rents have increased by nearly 4.3% from 2017 to 2018 alone. In the medium term since 2013 the average growth has been more than 25%, which corresponds to an annual increase (geometric mean) of 4.5%. Continuous growth can also be observed here even in the longer term. Since 2008 the rents have increased by more than 50% in total, by 4.1% p.a. therefore.
At the same time there are considerable differences between the individual cities in the cluster. The band-width of rents between the most expensive city (Munich) and the cheapest city (Dusseldorf) is currently at 6.97 EUR/m². The rates of increase also differ. In Hamburg the rents rose by nearly 14% (2.6% p.a.) from 2013 to 2018, while in Berlin the figure was 40.5% (7.0% p.a.). The capital of Germany also posted the highest percentage increase in each of the periods considered. In the longer-term comparison since 2008 the gap in terms of rent growth to the bottom of the table in this period (Cologne) is nearly 50 percentage points – rents in Berlin grew twice as fast each year from 2008 to 2018 as they did in the metropolis on the Rhine. In contrast, Munich heads the ranking for rents unchallenged the whole time, with rents increasing by 4.17 EUR/m² since 2013 alone.

PRIMARY (Top7)	RENT				RENT GROWTH		
	2008	2013	2017	2018	2008-2018	2013-2018	2017-2018
Mean	8.10 €/m²	9.67 €/m²	11.60 €/m²	12.09 €/m²	total +50.33 % (+3.98 €/m²) p.a. +4.11 % (+0.40 €/m²)	total +25.13 % (+2.42 €/m²) p.a. +4.55 % (+0.48 €/m²)	p.a. +4.28 % (+0.49 €/m²)
Max.	Munich 10.93 €/m²	Munich 12.90 €/m²	Munich 16.37 €/m²	Munich 17.07 €/m²	Berlin total +85.42 % (+4.71 €/m²) p.a. +6.37 % (+0.47 €/m²)	Berlin total +40.47 % (+2.95 €/m²) p.a. +7.03 % (+0.59 €/m²)	Berlin p.a. +8.40 % (+0.79 €/m²)
Min.	Berlin 5.52 €/m²	Berlin 7.28 €/m²	Berlin 9.44 €/m²	Dusseld. 10.10 €/m²	Cologne total +36.17 % (+2.83 €/m²) p.a. +3.14 % (+0.28 €/m²)	Hamburg total +13.89 % (+1.35 €/m²) p.a. +2.64 % (+0.27 €/m²)	Dusseldorf p.a. -2.34 % (-0.24 €/m²)
Max.-Min.	5.41 €/m²	5.62 €/m²	6.93 €/m²	6.97 €/m²	49.25 pp p.a. 3.23 pp	26.57 pp p.a. 4.40 pp	p.a. 10.74 pp

Fig. 3: Development residential rents – primary investment locations (Top 7), various periods
Source: F+B GmbH; own calculation

Secondary investment locations
(>= 200,000 inhabitants, excl. Top 7)

The secondary investment locations differ considerably from the Top 7. The average rent is currently 4.37 EUR/m² lower, at 7.72 EUR/m². In Chemnitz, the cheapest city in the cluster, the rent is just under 30% compared to the level in Munich.
In a growth comparison it is necessary to differentiate between the periods considered. In the longer-term mean from 2008 to 2018 the secondary locations lag a long way behind the Top 7, by approx. 19 percentage points. In the short-term comparison, in contrast, there is scarcely any difference (4.3% in the primary cluster, 3.9% in the secondary cluster). The slight difference of just 0.4 percentage points means a largely similar dynamism.
The secondary cluster is extremely heterogeneous, with the cities displaying some major differences. The gap between the most expensive location, Freiburg i. B., which surpasses some of the Top 7 cities with a rent of 11.64 EUR/m², and the cheapest, Chemnitz, is 6.69 EUR/m². The growth differences are also

greater than in the Top 7. In the ten- and five-year periods Augsburg is at the top and Chemnitz at the bottom of the cluster in both cases. The resulting growth bandwidths are 51 (10 years) and 31 (5 years) percentage points, respectively, and somewhat larger than in the primary cluster. All in all the 33 cities that have been examined in the secondary cluster are not particularly homogeneous. Some cities with a clear increase in rents contrast with other cities that have more restrained growth almost bordering on stagnation. Augsburg, Hanover, Braunschweig and Kassel stand out positively. Here the rents have increased by more than 50% since 2008. In contrast, alongside bottom-of-the-table Chemnitz, western German cities such as Monchengladbach, Oberhausen and Wuppertal have growth rates of a mere 15% and less. Differing fundamental data undoubtedly play a role; this will be examined later in the study.

SECONDARY (>=200k inhab., excl. Top 7)	RENT				RENT GROWTH		
	2008	2013	2017	2018	2008-2018	2013-2018	2017-2018
Mean	5.84 €/m²	6.45 €/m²	7.42 €/m²	7.72 €/m²	total +31.55 % (+1.88 €/m²) p.a. +2.74 % (+0.19 €/m²)	total +19.43 % (+1.26 €/m²) p.a. +3.59 % (+0.25 €/m²)	p.a. +3.90 % (+0.29 €/m²)
Max.	Mainz 8.16 €/m²	Freib. i.B. 9.96 €/m²	Freib. i.B. 11.49 €/m²	Freib. i.B. 11.64 €/m²	Augsburg total+57.52 % (+3.68 €/m²) p.a. +4.65 % (+0.37 €/m²)	Augsburg total+35.41 % (+2.63 €/m²) p.a. +6.25 % (+0.53 €/m²)	Hanover p.a. +8.78 % (+0.72 €/m²)
Min.	Chemnitz 4.65 €/m²	Chemnitz 4.75 €/m²	Chemnitz 4.93 €/m²	Chemnitz 4.95 €/m²	Chemnitz total +6.43 % (+0.30 €/m²) p.a. +0.63 % (+0.03 €/m²)	Chemnitz total +4.21 % (+0.20 €/m²) p.a. +0.83 % (+0.04 €/m²)	Chemnitz p.a. +0.35 % (+0.02 €/m²)
Max.-Min.	3.51 €/m²	5.21 €/m²	6.56 €/m²	6.69 €/m²	51.09 pp p.a. 4.02 pp	31.19 pp p.a. 5.42 pp	p.a. 8.43 pp

Fig. 4: Development residential rents – secondary investment locations (cities with more than 200,000 inhabitants, excl. Top 7), various periods
Source: F+B GmbH; own calculation

Tertiary investment locations
(< 200,000 inhabitants)

While not always focused on by investors, the tertiary locations are nevertheless of interest. In this study this group encompasses 20 cities each with fewer than 200,000 inhabitants.
Relatively high rents are to be seen in Heidelberg (highest rent), Ingolstadt, Ulm, Darmstadt, Regensburg, Offenbach a. M., Erlangen and Wurzburg. Rents above the ten-euro level are realistic here.
The leading cities for rent growth vary depending on the time horizon. Over ten years Wolfsburg leads the way with +60.8% (+4.9% p.a.). Over five years Osnabrück posted the strongest growth, +26.6% (+4.8% p.a.). Over the past year the leader is Heidelberg. A rent increase of 1.22 EUR/m² corresponds to a growth rate of 12% and is thus higher than for the frontrunners in the two other clusters, Berlin and Hanover. Alongside Heidelberg it was above all Osnabrück and Ulm, each with growth rates of more than 8% in the past year, which posted an extraordinary development in terms of rents. Saarbrücken is the only location in the cluster for which a downturn in rents can be seen in a year-on-year comparison. In addition to Saarbrücken and Jena, which showed the weakest dynamism in the two other periods, Cottbus, Leverkusen and Schwerin were, for example, locations with

moderate growth in rents over the periods observed. In Jena, where rents have more or less stagnated since 2013, there has at least been more dynamism in the past year (+4.3%).
On average across all the locations in the cluster the dynamism has been somewhat greater over ten years and somewhat lower over five years in comparison with the secondary locations. In the short term the average growth in the tertiary cluster was higher than in the two other clusters, however. On the whole the development of the tertiary cluster has been more homogeneous than that of the secondary cluster. Here too, it is interesting to see which potential parameters drive the development of rents.

TERTIARY (<200k inhab.)	RENT				RENT GROWTH		
	2008	2013	2017	2018	2008-2018	2013-2018	2017-2018
Mean	6.48 €/m²	7.40 €/m²	8.35 €/m²	8.74 €/m²	total +34.84 % (+2.26 €/m²) p.a. +3.00 % (+0.23 €/m²)	total +17.90 % (+1.34 €/m²) p.a. +3.59 % (+0.25 €/m²)	p.a. +4.43 % (+0.39 €/m²)
Max.	Heidelb. 8.91 €/m²	Heidelb. 9.38 €/m²	Ingolst. 10.79 €/m²	Heidelb. 11.29 €/m²	Wolfsburg total+60.81 % (+3.23 €/m²) p.a. +4.87 % (+0.32 €/m²)	Osnabrück total+26.65 % (+1.63 €/m²) p.a. +4.84 % (+0.33 €/m²)	Heidelberg p.a. +12.07 % (+1.22 €/m²)
Min.	Cottbus 4.74 €/m²	Cottbus 5.00 €/m²	Cottbus 5.66 €/m²	Cottbus 5.73 €/m²	Jena total +18.77 % (+1.28 €/m²) p.a. +1.74 % (+0.13 €/m²)	Jena total +0.22 % (+0.02 €/m²) p.a. +0.04 % (+0.00 €/m²)	Saarbrücken p.a. -0.60 % (-0.04 €/m²)
Max.-Min.	4.17 €/m²	4.38 €/m²	5.13 €/m²	5.56 €/m²	42.04 pp p.a. 3.13 pp	26.43 pp p.a. 4.79 pp	p.a. 12.67 pp

Fig. 5: Development residential rents – tertiary investment locations (selected cities with less than 200,000 inhabitants), various periods
Source: F+B GmbH; own calculation

3. Dynamism of the market-related environment vs. development of rents

Questions relating to adequate availability and a further increase in the cost of housing are being discussed by a wide audience with regard from a regional economic and a socio-political stance, and in part are the subject of some controversy. Yet investors and lenders likewise do not view the increases as merely being positive. Intervention at housing policy level – with various restrictions on prices, fit-out, contractual parameters etc. – is increasingly being felt, the possible downturn of the current economic cycle is leading to greater risks with a simultaneous stagnation in yields. A focus on locations which are sustainable from a socio-economic stance and which display stable prices – and are thus associated with less risk – is gaining in importance. The decisive factors are location-related demand and supply parameters, from which statements on the stability of the local housing market are to be derived.
Residential rents do not come about by chance, and the corresponding rental markets are also not self-contained. Rather prices (rents, purchase prices) and amounts (areas, apartments) are dependent on supply and demand. Both parameters are in turn dependent on preceding factors. Socio-economic parameters for population and income development and for the general economic situaton (e.g. labour market, industry structure) are of particular importance here. It is interesting to

see whether parameters display a constant development or develop differently in the course of time and in the clusters (dynamism, homogeneity), within the parameters change parallel to rents (rates of change, time lags), and whether relationships are clear or only identifiable to a lesser degree (correlation).

Is there a correlation between the development of rents and the number of inhabitants?

The development of the number of inhabitants is – in conjunction with other demand-related factors such as household size and purchasing power – the essential driver for the housing markets. Even with low incomes (e.g. students, unemployed persons) population growth regularly leads to an increase in the total available budget for rent payments at a location. This can be explained not least of all by state support for target groups with low incomes (e.g. housing benefit) and private transfer payments (e.g. family). Thus any increase in the number of inhabitants ultimately leads to a change in demand for housing – also in terms of area and volumes, as well as the willingness and ability to pay for such housing.
In terms of volumes and areas the vacancies have been more or less eradicated, and especially in the larger cities, where there is very little in the way of leasing reserves. If one looks at the aggregate figures for Germany as a whole the general tendency is towards shortages. Although in the longer term there has been a natural decline in the population for some time now (more deaths than births), in the years since 2011 this has been more than compensated for by the high level of migration from abroad. The current level of housing construction, which is by all means leading to an annual increase in housing stock, can scarcely make up for the excess demand. This is due not least of all to the regional distribution of construction activity and the ongoing trend towards smaller households.

Fig. 6: Development indices for residential rents (change year-on-year, base year in each case 2000) and housing stock (growth year-on-year), annual migration balance and natural population change (balance for 2018 provisional result) – Germany
Sources: bulwiengesa AG, Federal Statistical Office; own calculation and illustration

Based on the value for Germany as a whole (Fig. 6) the specific selection of 60 German cities is considered below. At cluster and city level the analysis shows that population growth is not fundamentally restricted to the Top 7. Although Frankfurt a. M. displays considerable dynamism (+7.4% in five years), growth has been even greater in secondary and tertiary cities such as Leipzig (+10.6%) and Potsdam (+10.3%). On the other hand, while there has been no population shrinkage among the cities considered here, a number of secondary and tertiary locations have displayed a significantly lower population increase than the Top 7 location with the weakest growth in the past five years, Dusseldorf. Cities such as Braunschweig (secondary locations cluster) and Cottbus (tertiary locations cluster) grew by a mere 0.4% and 0.6%, respectively. The respective means for the clusters also differ. The mean is highest – as is probably to be expected – for the primary investment locations. Assuming an ongoing trend with population development and limited new construction options, the risk of vacant housing would probably be lowest here. The mean population growth of 4.8% for the tertiary investment cluster is only half a percentage point lower than that for the Top 7, and at the same time exceeds the mean for the larger secondary investment markets by 1.5 percentage points (Fig. 7).

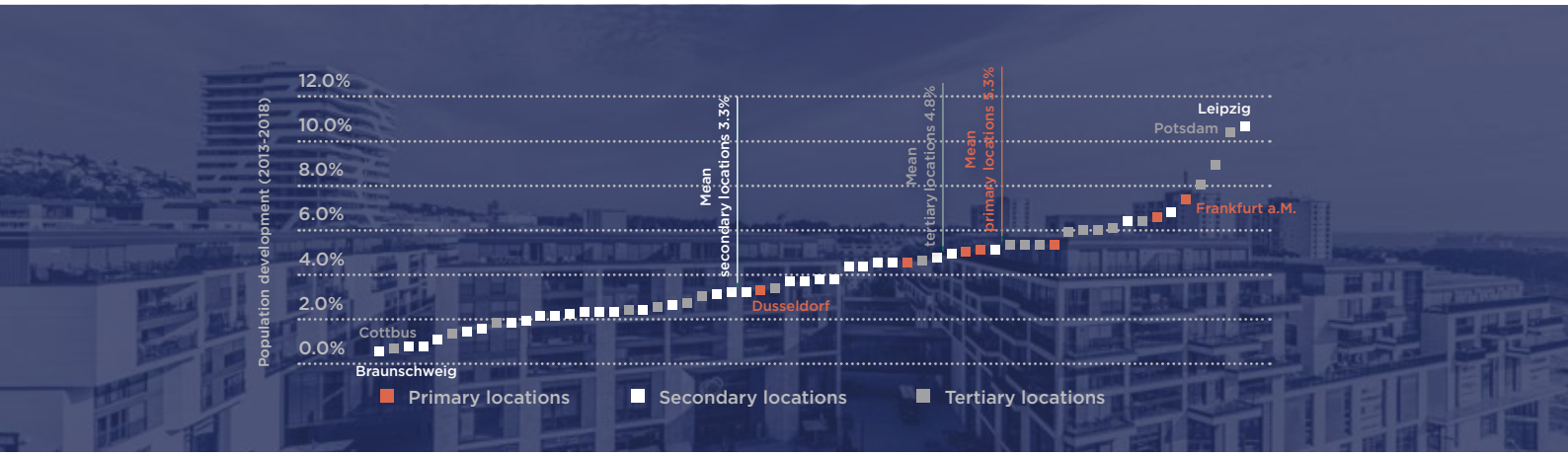

Fig. 7: Population development from 2013 to 2018 (rate of change) – 60 German cities, clustering by primary, secondary, tertiary investment locations
Sources: City of Saarbrücken, Federal Statistical Office and State Statistical Offices; own calculation and illustration

The comparison of population growth and the increase in rents in the individual clusters is interesting (Fig. 8). The longer-term time series from 2005 onwards shows a population increase in all three clusters. The highest increase not only in absolute terms but also in percentage terms is observed in the primary locations. Growth is also to be seen in the secondary and tertiary clusters, however.
A parallel consideration of rents reveals that their rate of increase is considerably higher than for the population figures. Thus from 2005 to 2018 the population in the primary locations increased by 10.1% on average, with rents rising by ca. 54% in the same period. Even when considered in real terms (adjusted for inflation) there is an increase of ca. 34%. The situation is similar in the other clusters, albeit at somewhat lower levels. Thus the number of inhabitants in the secondary locations increased by 3.4% on average, while rents rose by 33.3% (in real terms nearly 13%). In the

tertiary locations the ratios were an average population increase of 6.1% with a mean rise in rents of 39.9% (in real terms nearly 20%).
If one takes the two growth rates and forms the ratio "rate of change rent to rate of change population", this index also increases considerably in all the clusters. Rising index values here represent a development which in percentage terms is higher for rents than for the number of inhabitants. This index is virtually always largest for the primary locations, something which points to an increasing shortage of housing with the corresponding price increases. The background to this can be the ongoing trend towards metropolitan forms of housing, with shortages and rising prices seen above all in the cluster with the largest locations, therefore.

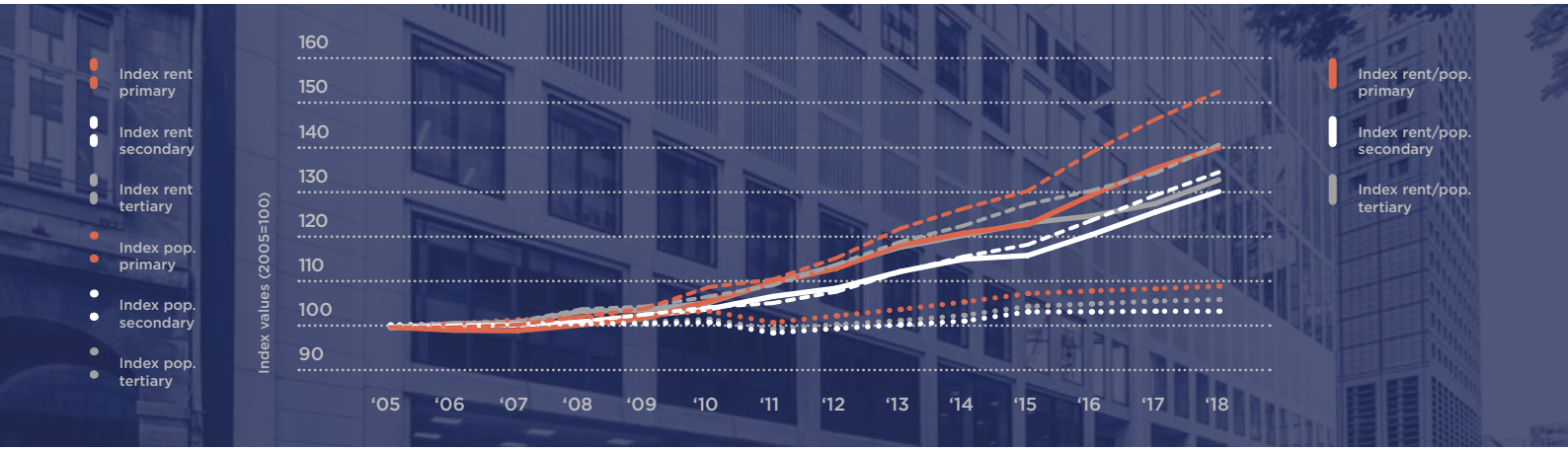

Fig. 8: Overview development of population and rents – indices (2005=100), clustering by primary, secondary, tertiary investment locations
Sources: F+B GmbH, City of Saarbrücken, Federal Statistical Office and State Statistical Offices; own calculation and illustration

There are also differences within the respective clusters, however. This applies to differing time periods as well as between the individual cities, as shown by Fig. 9.
The population increase becomes clear above all in the largest cities. In the primary segment the average increase in the number of inhabitants for all cities since 2008 has been nearly 8%, whereby the strongest growth here was observed in Frankfurt a. M. with more than 13%. This corresponds to an annual rise of 1.25% (calculated as the geometric mean). On average the population of the Top 7 from 2008 to 2018 increased by 0.76% per annum. The secondary and tertiary clusters differ in this respect. Here the annual population growth since 2008 has been 0.30% and 0.53%, respectively.
What is striking is the increasing dynamism of population development in the past five years above all. Based on the mean for all cities the difference in all segments is considerable (primary locations: 1.04% vs. 0.76%, secondary locations: 0.66% vs. 0.30%, tertiary locations: 0.94% vs. 0.53%; each as the increase p.a. 2013-2018 vs. 2008-2018). In this respect a role is played not only by internal migration, but also above all by migrants from abroad, who typically choose (larger) cities as their new place of residence. In the three segments cities such as Frankfurt a. M., Leipzig and Potsdam are striking with their strong growth in the medium-term consideration. In contrast, in their respective clusters Dusseldorf, Braunschweig, Oberhausen and Cottbus, for example, stand out with their below-average population growth. This does not necessarily reflect negatively on the quality of the city but can also be caused by a high occupancy level, which impedes further population influx (e.g. Dusseldorf).

PRIMARY LOCATIONS	POPULATION DEVELOPMENT		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +7.88 % (+96,462) p.a. +0.76 % (+9,646)	total +5.33 % (+76,549) p.a. +1.04 % (+15,310)	p.a. +0.64 % (+10,421)
City Max.	Frankfurt a. M.: total+13.27 % (+88,218) p.a. +1.25 % (+8,822)	Frankfurt a. M.: total +7.37 % (+51,706) p.a. +1.43 % (+10,341)	Munich: p.a. +1.06 % (+15,469)
City Min.	Hamburg: total +3.90 % (+69,079) p.a. +0.38 % (+6,908)	Dusseldorf: total+3.44 % (+20,608) p.a. +0.68 % (+4,122)	Dusseldorf: p.a. +0.33 % (+2,014)
Max.-Min.	9.37 pp p.a. 0.87 pp	3.93 pp p.a. 0.75 pp	p.a. 0.74 pp
Corr. pop. in t to rent	-0.212	0.173	0.433
Corr. pop. in t-1 to rent	-0.220	0.153	0.141
Corr. pop. in t-2 to rent	-0.227	0.419	0.868*

SECONDARY LOCATIONS	POPULATION DEVELOPMENT		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +3.18 % (+10,572) p.a. +0.30 % (+1,057)	total +3.34 % (+11,299) p.a. +0.66 % (+2,260)	p.a. +0.27 % (+977)
City Max.	Munster: total +14.77 % (+40,444) p.a. 1.39 % (+4,044)	Leipzig: total +10.59 % (+56,295) p.a. 2.03 % (+11,259)	Leipzig: p.a. +1.01 % (+5,877)
City Min.	Aachen: total -4.59 % (-11,889) p.a. -0.47 % (-1,189)	Braunschweig: total +0.43 % (+1,065) p.a. +0.09 % (+213)	Oberhausen: p.a. -0.28 % (-593)
Max.-Min.	total 19.35 pp p.a. 1.86 pp	total 10.16 pp p.a. 1.95 pp	p.a. 1.29 pp
Corr. pop. in t to rent	0.418*	0.121	0.232
Corr. pop. in t-1 to rent	0.357*	0.180	-0.006
Corr. pop. in t-2 to rent	0.375*	0.246	0.156

TERTIARY LOCATIONS	POPULATION DEVELOPMENT		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +5.56 % (+7,437) p.a. +0.53 % (+744)	total +4.82 % (+6,550) p.a. +0.94 % (+1,310)	p.a. +0.54 % (+786)
City Max.	Potsdam: total +16.42 % (+25,123) p.a. +1.53 % (+2,512)	Potsdam: total +10.29 % (+16,621) p.a. +1.98 % (+3,324)	Offenbach a. M.: p.a. +1.65 % (+2,086)
City Min.	Wurzburg: total -4.21 % (-5,621) p.a. -0.43 % (-562)	Cottbus: total +0.63 % (+624) p.a. +0.12 % (+125)	Cottbus: p.a. -0.81 % (-817)
Max.-Min.	total 20.63 pp p.a. 1.96 pp	total 9.67 pp p.a. 1.85 pp	p.a. 2.46 pp
Corr. pop. in t to rent	0.149	0.488*	0.234
Corr. pop. in t-1 to rent	0.119	0.450*	0.296
Corr. pop. in t-2 to rent	0.130	0.523*	0.546*

**statistically significant correlation at 5% level*

Fig. 9: Overview development of population – clustering by primary, secondary, tertiary investment locations, various periods; growth rates p.a. as geometric mean, absolute growth p.a. as arithmetic mean; best/worst city in the cluster on the basis of the percentage growth in the period
Sources: F+B GmbH, City of Saarbrücken, Federal Statistical Office and State Statistical Offices; own calculation

The relationship between population levels and rents, or rather between the corresponding growth rates, is plausible in terms of content. Furthermore, it can also be examined statistically on the basis of correlation. As effects can also first occur with a time delay, it is recommended that a test of the corresponding delays (time lags) is conducted. In addition to synchronous series for population growth and rent increase, the population data can also be analysed with a leading period of several years to the corresponding rent series (here taken into account with leading periods of one and two years). The results across the observed clusters and periods are varied. Higher correlation coefficients and statistically significant results (5% level) can be seen in the synchronous and leading time series for the secondary cluster (period 2008-2018). Here the changes in rents clearly appear to be related to the population development in the past ten years.

The situation is analogous in the five-year observation in the tertiary cluster, where there are also consistently significant and in part high positive correlation coefficients, which may be substantiated theoretically (parallel development of population and rents). However, other time periods and the primary cluster (with the exception of the leading series of two years in the observation 2017-2018) do not show any significant results. In part there are also some surprising negative coefficients, for instance in the ten-year observation of the Top 7, which arise from statistical effects (very high rent growth with comparatively moderate population growth, small number of data pairs). This does not, however, fundamentally rebut the assumed correlation between population growth and the increase in rents.

Ultimately it may be stated that a statistical correlation between population growth and

the increase in rents may be ascertained in part, but that this effect is not always clearly pronounced, however, and ultimately it does not seem to dominate. Alongside the fact that correlations are not to be equated with causalities, it is fundamentally to be assumed that there are other factors with a simultaneous (and possibly stronger) impact. Apart from population figures, it is likely that socio-economic factors such as income and employment levels, and thus the general economic development of a region, play a role.

Is the development of rents reflected in economic strength?

Alongside population development, the economic strength of a region can be a further major factor for the size of rents. The economic dynamism in the clusters and locations may be measured using the goods and services produced in one year (GDP and GDP change), for example. This figure may be estimated more realistically and be more comparable through reference to the number of inhabitants (GDP per capita). An improvement in this figure is probably related to a higher purchasing power and thus to a stronger growth in rent levels (conditional upon other effects such as wage share, taxes, inflation).
Fig. 10 contrasts the course of the development of GDP per capita as well as the rents in the three clusters formed by the primary, secondary and tertiary locations. In the comparison of the cross-cluster development of per capita economic output it becomes clear that this was very homogeneous until 2007. The primary markets were then affected most negatively by the financial and economic crisis which commenced in 2008.
At the end of the data series the index value for the tertiary cluster is more than 20 points higher than in the Top 7 cluster (144.4 vs. 123.5) and nearly 16 points higher than that for the secondary locations. After the economic downturn in 2009 the economic recovery in the tertiary cluster was significantly stronger than in the other two clusters. Thus above all the years 2010 and 2011, as well as 2016, were shaped by strong growth. The rent index developed more strongly than in the secondary cluster, yet remained behind the very high level of growth observed with regards to economic output.
In the secondary cluster the development of both indices through to 2017 is similar. In the Top 7 markets, in contrast, the increase in rents is considerably higher than the rise in GDP per capita. Above all since 2012/2013 growth in rents has outstripped economic growth to a considerable degree. This is an indicator that the specific impact of the economic output alone cannot be used to explain the rise in rents. Rather it is to be assumed that there are other significant factors.

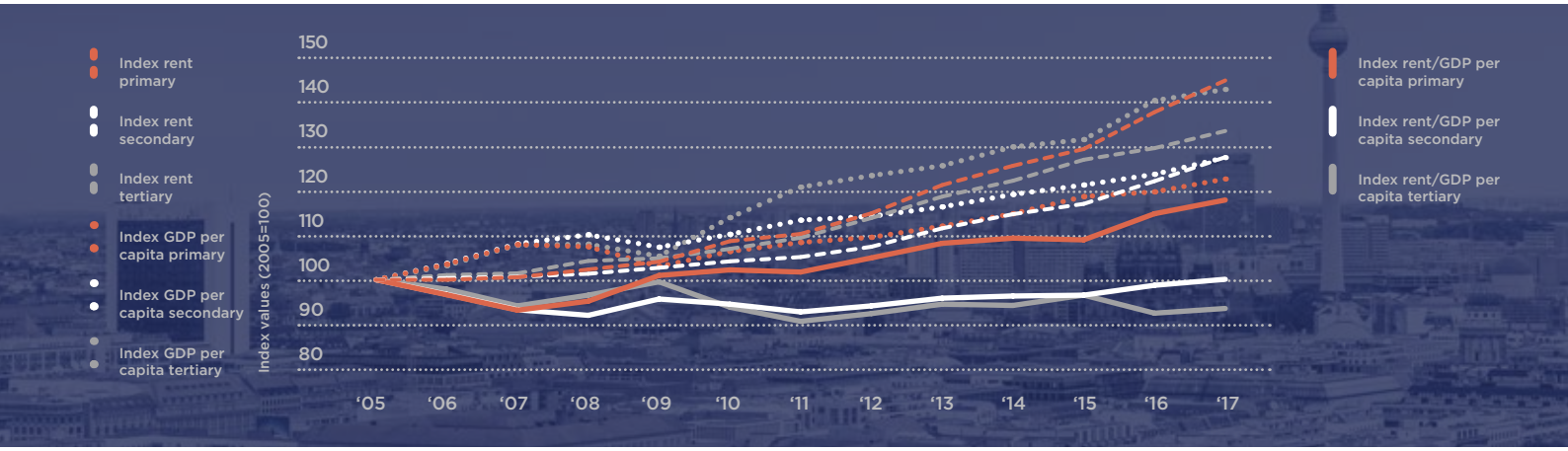

Fig. 10: Overview development of GDP per capita and rents – indices (2005=100); clustering by primary, secondary, tertiary investment locations
Sources: F+B GmbH, Federal Statistical Office and State Statistical Offices (VGRdL); own calculation and illustration

The graphic and tabular illustrations (Fig. 10, Fig. 11) reveal that the economic developments have displayed widely differing dynamics. In the ten-year period GDP per capita in the tertiary cluster increased by 30% – this is more than ten percentage points higher than the mean for the primary and secondary locations. In the five-year observation (from 2012 onwards) the tertiary locations still have the highest growth rates, albeit by a much smaller margin. In the short-term observation all the clusters are at practically the same level.

Broken down by cities it is above all the tertiary cluster which displays heterogeneous developments. The difference between the location with the strongest growth (Wolfsburg) and the weakest location (Offenbach a. M.) amounts to more than 85 percentage points. The city at the bottom of the cluster illustrates the fact that a decline in economic output per capita is still possible even in a good economic phase. In the five-year period the two cities are separated by just less than 36 percentage points. On an annual basis there is a difference of more than six percentage points.

In the cluster of Top 7 cities Frankfurt a. M. brings up the rear in all periods; it has positive rates of change and a high starting level, however. Over ten years Berlin is the location with the strongest growth; viewed over a shorter period Munich is the leader. In the cluster of secondary locations it is above all northern and eastern German cities which stand out positively, whereas locations in North Rhine-Westphalia usually occupy the lower positions.

Statistical analyses of the relationship between rents and GDP do not result in any significant correlations. Although it is above all the Top 7 locations which display high correlation coefficients, these are based on a small number of data pairs and are not to be regarded as significant (at the 5% level). In the two other clusters the coefficients are smaller, in part also negative, and likewise not significant. In the selected test environment the relevance of economic output (as rate of change per capita) for the development of rents cannot be demonstrated in statistical terms, therefore. It has to be assumed, however, that several parameters for economic development have an impact in interaction with one another and are thus a fundamental bundle of parameters for explanations of and prognoses on rents. To be stated in this respect are labour market indicators and other ratios from national accounts, for example.

PRIMARY LOCATIONS	DEVELOPMENT GDP PER CAPITA (NOMINAL, IN EUR)		
	2007-2017	2012-2017	2016-2017
Cluster Mean	total +16.58 % (+8,789) p.a. +1.52 % (+879)	total +13.36 % (+7,801) p.a. +2.53 % (+1,560)	p.a. +2.57 % (+1,737)
City Max.	Berlin: total +33.88 % (+9,834) p.a. +2.96 % (+983)	Munich: total +18.79 % (+12,467) p.a. +3.50 % (+2,493)	Munich: p.a. +5.06 % (+3,793)
City Min.	Frankfurt a. M.: total +3.54 % (+3,178) p.a. +0.35 % (+318)	Frankfurt a. M.: total +5.33 % (+4,706) p.a. +1.04 % (+941)	Frankfurt a. M.: p.a. +0.90 % (827)
Max.-Min.	total 30.34 pp p.a. 2.61 pp	total 13.47 pp p.a. 2.46 pp	p.a. 4.16 pp
Corr. GDP in t to rent	0.726	0.475	0.184
Corr. GDP in t-1 to rent	0.610	0.369	0.569
Corr. GDP in t-2 to rent	0.398	0.384	0.106

SECONDARY LOCATIONS	DEVELOPMENT GDP PER CAPITA (NOMINAL . IN EUR)		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +19.73 % (+7,058) p.a. +1.80 % (+706)	total +12.03 % (+4,809) p.a. +2.28 % (+962)	p.a. +3.04 % (+1,353)
City Max.	Lübeck: total +35.01 % (+10,515) p.a. +3.05 % (+1,052)	Dresden: total +21.46 % (+6,915) p.a. +3.97 % (+1,383)	Rostock: p.a. +7.72 % (+2,679)
City Min.	Munster: total -0.36 % (-203) p.a. -0.04 % (-20)	Gelsenkirchen: total +1.31 % (+328) p.a. +0.26 % (+76)	Oberhausen: p.a. -2.11 % (-575)
Max.-Min.	total 35.37 pp p.a. 3.08 pp	total 20.16 pp p.a. 3.71 pp	p.a. 9.83 pp
Corr. GDP in t to rent	0.019	0.201	0.129
Corr. GDP in t-1 to rent	-0.074	0.229	-0.161
Corr. GDP in t-2 to rent	-0.169	0.138	-0.039

TERTIARY LOCATIONS	DEVELOPMENT GDP PER CAPITA (NOMINAL . IN EUR)		
	2007-2017	2012-2017	2016-2017
Cluster Mean	total +29.63 % (+17,183) p.a. +2.54 % (+1,718)	total +14.88 % (+9,507) p.a. +2.78 % (+1,901)	p.a. +2.75 % (+1,239)
City Max.	Wolfsburg: total +83.17 % (+78,299) p.a. +6.24 % (+7,830)	Wolfsburg: total +34.30 % (+44,039) p.a. +6.08 % (+8,808)	Ingolstadt: p.a. +8.37 % (+7,007)
City Min.	Offenbach a. M.: total -2.58 % (-975) p.a. -0.26 % (-98)	Offenbach a. M.: total -1.57 % (-587) p.a. -0.32 % (-117)	Wolfsburg: p.a. -4.44 % (-8,017)
Max.-Min.	total 85.76 pp p.a. 6.50 pp	total 35.87 pp p.a. 6.39 pp	p.a. 12.81 pp
Corr. GDP in t to rent	0.095	0.298	0.218
Corr. GDP in t-1 to rent	0.197	0.247	-0.018
Corr. GDP in t-2 to rent	0.153	-0.030	-0.007

Fig. 11: Overview development of GDP per capita – clustering by primary, secondary, tertiary investment locations, various periods; growth rates p.a. as geometric mean, absolute growth p.a. as arithmetic mean; best/worst city in the cluster on the basis of the percentage growth in the period; due to lack of data availability without Aachen and Saarbrücken
Sources: F+B GmbH, Federal Statistical Office and State Statistical Offices; own calculation

Do rents increase in line with employment levels?

An important ratio for the assessment of the socio-economic structures of a city is the employment level. As the focus of this study has been placed on an appraisal of the stability of local residential housing markets, the level of employment subject to social security contributions is considered here according to the place of residence principle. The index series with 2006 as their base in Fig. 12 show not only the known growth in rents in the clusters but also considerable growth in employment. The strongest growth in terms of employment rates was seen in the primary cluster, which ultimately has an index value of 139.2. This is followed by the tertiary cluster with 134.4, ahead of the secondary locations with 130.7. In this respect the growth in the tertiary cluster through to 2013 was actually higher than that of the Top 7 locations. Since then the dynamism displayed by the Top 7 has been greater than that of the other cities, however. With an index value of 109.7 the Top 7 also lead the way in the ratio of rent increases to employment level increases. The considerable rise in the number of employment relationships subject to social security contributions was clearly exceeded by the rise in rents. The secondary (101.4) and tertiary locations (102.9), in contrast, display an almost uniform development. Only in the most recent two to three years have the indices for rents exceeded those for employment; prior to this the employment indices had exceeded the rent indices.

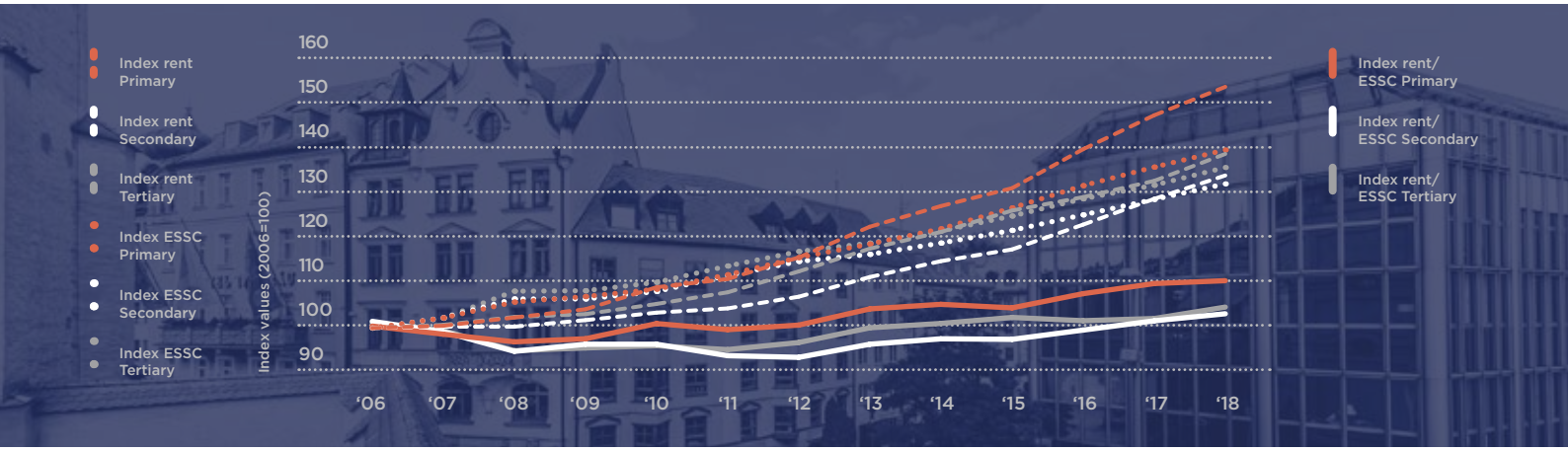

Fig. 12: Overview development of employees subject to social security contributions (ESSC) at the place of residence (as of 30.06. of each year) and rents – indices (2006=100); clustering by primary, secondary, tertiary investment locations
Sources: Federal Employment Agency, F+B GmbH; own calculation and illustration

Further statistical analysis (Fig. 13) reveals that the primary locations dominate the growth rates in all three periods. In the ten- and five-year observations the tertiary cluster is slightly ahead of the secondary cluster. The largest growth in employment in the Top 7 is displayed by Berlin. In this regard the German capital had a relatively constant annual growth rate of between 3.1 and 3.8 % over the periods in consideration. Since 2008 there have been more than 350,000 additional employment relationships subject to social security contributions (considered by place of residence). Dusseldorf and Cologne bring up the rear in this cluster. Nevertheless, the employment levels here also increased by at least 2.18% per annum. In the cluster of secondary locations Leipzig posts the highest upturn in employment levels in the longer-term and medium-term considerations. With growth of more than 73,000 since 2008, Leipzig not only leads its own cluster by a clear margin in this period ahead of Dresden (+48,541) and Nuremberg (+46,723), but is also ahead of the Top 7 cities Dusseldorf and Stuttgart and only just behind Frankfurt a. M. (+76,285). In the short-term observation, however, Aachen displays an even stronger rise in employment – at least in percentage terms – in the secondary cluster. With Oberhausen (10 years), Chemnitz (5 years) and Lübeck (1 year) the bottom of the employment ranking is occupied by a different location in each case. At the same time, employment subject to social security contributions increased by at least 1,028 across all 33 towns and cities in the cluster in the 2017/2018 year-on-year comparison.

In the tertiary cluster Cottbus brings up the rear in all the periods observed. Since 2008 the number of employees subject to social security contributions there has grown by just under 8%. In Regensburg, which heads the cluster in this period, the level of employment rose by more than 41%. On the whole this cluster is the most heterogeneous in terms of employment development. The respective deviation between the highest and lowest increases in employment in each of the three periods is largest here. Above all in the five-year observation since 2013 the tertiary cluster deviates significantly from the two other clusters with a growth difference of 20.97 percentage points between Offenbach a. M. and Cottbus. Alongside Cottbus the growth in employment subject to social security contributions at the place of residence has been extremely slight above all in the two somewhat smaller locations Kaiserslautern and Schwerin.

PRIMARY LOCATIONS	DEVELOPMENT OF EMPLOYEES (SSC) AT PLACE OF RESIDENCE		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +30.36 % (+137,012) p.a. +2.68 % (+13,701)	total +17.13 % (+86,175) p.a. +3.21 % (+17,235)	p.a. +2.91 % (+16,568)
City Max.	Berlin: total +35.76 % (+353,000) p.a. +3.10 % (+35,300)	Berlin: total +20.58 % (+228,690) p.a. +3.81 % (+45,738)	Berlin: p.a. +3.37 % (+43,692)
City Min.	Dusseldorf: total +24.12 % (+47,737) p.a. +2.18 % (+4,774)	Cologne: total +13.95 % (+50,924) p.a. +2.65 % (+10,185)	Dusseldorf: p.a. +2.43 % (5,820)
Max.-Min.	total 11.64 pp p.a. 0.92 pp	total 6.63 pp p.a. 1.17 pp	p.a. 0.94 pp
Corr. ESSC in t to rent	0.742	0.705	0.596
Corr. ESSC in t-1 to rent	0.703	0.584	0.497
Corr. ESSC in t-2 to rent	0.589	0.565	-0.359

SECONDARY LOCATIONS	DEVELOPMENT OF EMPLOYEES (SSC) AT PLACE OF RESIDENCE		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +22.84 % (+23,578) p.a. +2.06 % (+2,358)	total +12.69 % (+14,403) p.a. +2.41 % (+2,881)	p.a. +2.52 % (+3,171)
City Max.	Leipzig: total +45.09 % (+73,163) p.a. 3.79 % (+7,316)	Leipzig: total +21.44 % (+41,565) p.a. 3.96 % (+8,313)	Aachen: p.a. +4.11 % (+3,516)
City Min.	Oberhausen: total +12.21 % (+8,086) p.a. +1.16 % (+809)	Chemnitz: total +8.02 % (+6,861) p.a. +1.55 % (+1,372)	Lübeck: p.a. +1.32 % (+1,028)
Max.-Min.	total 32.88 pp p.a. 2.63 pp	total 13.42 pp p.a. 2.41 pp	p.a. 2.79 pp
Corr. ESSC in t to rent	0.667*	0.556*	-0.179
Corr. ESSC in t-1 to rent	0.702*	0.587*	0.047
Corr. ESSC in t-2 to rent	0.702*	0.682*	0.242

TERTIARY LOCATIONS	DEVELOPMENT OF EMPLOYEES (SSC) AT PLACE OF RESIDENCE		
	2008-2018	2013-2018	2017-2018
Cluster Mean	total +24.10 % (+10,667) p.a. +2.16 % (+1,067)	total +13.41 % (+6,522) p.a. +2.53 % (+1,304)	p.a. +2.45 % (+1,345)
City Max.	Regensburg: total +41.09 % (+18,747) p.a. +3.50 % (+1,875)	Offenbach a. M.: total +26.10 % (+10,956) p.a. +4.75 % (+2,191)	Offenbach a. M.: p.a. +3.64 % (+1,860)
City Min.	Cottbus: total +7.95 % (+2,730) p.a. +0.77 % (+273)	Cottbus: total +5.12 % (+1,805) p.a. +1.00 % (+361)	Cottbus: p.a. 0.74 % (+272)
Max.-Min.	total 33.13 pp p.a. 2.73 pp	total 20.97 pp p.a. 3.74 pp	p.a. 2.90 pp
Corr. ESSC in t to rent	0.512*	0.602*	0.510*
Corr. ESSC in t-1 to rent	0.606*	0.633*	0.524*
Corr. ESSC in t-2 to rent	0.622*	0.609*	0.658*

**statistically significant correlation at 5% level*

Fig. 13: Overview development of employees subject to social security contributions (ESSC) at the place of residence (as of 30.06. of each year) – clustering by primary, secondary, tertiary investment locations, various periods; growth rates p.a. as geometric mean, absolute growth p.a. as arithmetic mean; best/worst city in the cluster on the basis of the percentage growth in the period
Sources: Federal Employment Agency, F+B GmbH; own calculation

With this ratio the correlation analysis reveals a number of significant results. Although the coefficients in the primary cluster are again higher, they are not statistically significant. In the tertiary cluster, however, the correlation between the development of employment levels and rents is confirmed across all time periods and time sequences (synchronous and leading series) to the observed significance level (5%). In addition, the figures for the correlation coefficients here are very high; this would indicate that the development of employment subject to social security contributions at the place of residence undoubtedly has an (parallel) effect on the rents at the location. For the secondary locations cluster there is a similar result in the ten- and five-year periods. It is merely in the short-term consideration that it is not possible to establish a (statistical) correlation. For an appraisal of the further development of rents it can be useful to consider the development of employment levels, therefore. In this respect to some extent there are longer causal chains through wage effects, purchasing power and demand for housing.

Do rents follow the development taken by wages?

Employment levels affect wages and salaries. Ratios from this area can be compared with the development of rents. To this end the latest data from the official statistics on gross wages and salaries per employee were drawn on.
The development of gross wages and salaries since 2005 was relatively uniform across all the clusters. The primary markets merely display an additional spike in 2010, but this later falls in line with the other clusters again. The computed wage indices at the end of 2017 range between 123.3 (secondary locations)

and 125.7 (tertiary locations), and are thus relatively close to one another. There is much greater differentiation in the growth in rents, on the other hand. Thus the resulting ratios computed on the basis of these figures are also offset accordingly. Above all in the Top 7 markets – which reach a level of 118.1 – rents now seem to be developing independently of the growth in wages.

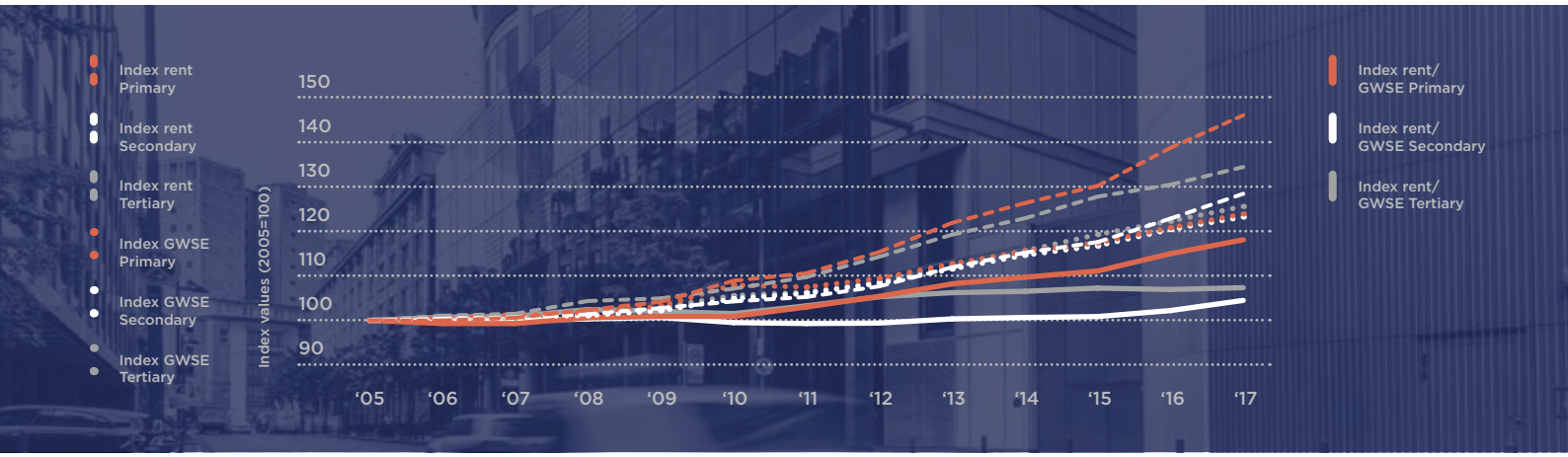

Fig. 14: Overview development of gross wages and salaries per employee (GWSE) and rents – indices (2005=100); clustering by primary, secondary, tertiary investment locations
Sources: F+B GmbH, Federal Statistical Office and State Statistical Offices; own calculation and illustration

The cluster means for the respective computed ratios in the three periods are very similar. Major differences are only seen within the clusters. In the Top 7 Frankfurt a. M. is the frontrunner in the longer-term view, in the medium-term view it brings up the rear, however. The growth in gross wages and salaries of more than 9,600 EUR predominantly came about before 2012. Other cities were more dynamic in the subsequent years. In Stuttgart employees have earnt approx. 2.8% in addition since 2012. In Berlin wages and salaries increased by more than 4.5% in the short-term view.
The highest increase on an annual basis in the secondary cluster was posted by Halle (Saale) with just less than 6.2%; in Bochum, in contrast, there was actually a small decrease. In the other time periods the frontrunners were Chemnitz and Magdeburg, respectively, with Mainz bringing up the rear in both cases.
In the tertiary cluster Wolfsburg posted the highest growth rates in the medium and longer term. In absolute terms, after ten years workers were earning a sum that was at least ten thousand euros higher. A similar trend was displayed by the second automotive city, Ingolstadt (+13,874 EUR from 2007 to 2017, +10,183 EUR from 2012 to 2017). Despite an increase of no less than 4,169 EUR per worker (2007-2017), Wurzburg brings up the rear within the cluster and in a comparison with all the other cities (after Lübeck with +4,592 EUR and Bochum with +4,694 EUR). In the short term Cottbus (though weak in the section on employment levels) displays the clearest wage increase, just over 4.6%, among the tertiary cities; this figure corresponds to ten-fold that posted by the bottom-placed Leverkusen.

PRIMARY LOCATIONS	DEVELOPMENT OF GROSS WAGES AND SALARIES PER EMPLOYEE (IN EUR)		
	2007-2017	2012-2017	2016-2017
Cluster Mean	total +22.39 % (+7,338) p.a. +2.04 % (+734)	total +13.30 % (+4,673) p.a. +2.53 % (+935)	p.a. +2.63 % (+1,007)
City Max.	Frankfurt a. M.: total +28.33 % (+9,625) p.a. +2.53 % (+963)	Stuttgart: total +14.83 % (+5,506) p.a. +2.80 % (+1,101)	Berlin: p.a. +4.56 % (+1,428)
City Min.	Cologne: total +16.91 % (+5,493) p.a. +1.57 % (+549)	Frankfurt a. M.: total +10.35 % (+4,088) p.a. +1.99 % (+818)	Dusseldorf: p.a. +1.38 % (568)
Max.-Min.	total 11.42 pp p.a. 0.95 pp	total 4.48 pp p.a. 0.82 pp	p.a. 3.17 pp
Corr. GWSE in t to rent	0.198	0.280	0.519
Corr. GWSE in t-1 to rent	-0.140	0.100	0.359
Corr. GWSE in t-2 to rent	-0.104	-0.241	-0.636

SECONDARY LOCATIONS	DEVELOPMENT OF GROSS WAGES AND SALARIES PER EMPLOYEE (IN EUR)		
	2007-2017	2012-2017	2016-2017
Cluster Mean	total +22.70 % (+6,028) p.a. +2.06 % (+603)	total +14.00 % (+4,009) p.a. +2.65 % (+802)	p.a. +2.43 % (+770)
City Max.	Chemnitz: total +38.33 % (+8,209) p.a. +3.30 % (+821)	Magdeburg: total +20.88 % (+4,879) p.a. +3.87 % (+976)	Halle (Saale): p.a. +6.19 % (+1,656)
City Min.	Mainz: total +15.81 % (+4,809) p.a. +1.48 % (+481)	Mainz: total +9.32 % (+3,003) p.a. +1.80 % (+601)	Bochum: p.a. -0.05 % (-17)
Max.-Min.	total 22.52 pp p.a. 1.82 pp	total 11.56 pp p.a. 2.07 pp	p.a. 6.24 pp
Corr. GWSE in t to rent	-0.229	-0.141	-0.199
Corr. GWSE in t-1 to rent	-0.391*	-0.243	-0.047
Corr. GWSE in t-2 to rent	-0.383*	-0.291	0.041

TERTIARY LOCATIONS	DEVELOPMENT OF GROSS WAGES AND SALARIES PER EMPLOYEE (IN EUR)		
	2007-2017	2012-2017	2016-2017
Cluster Mean	total +24.64 % (+7,255) p.a. +2.21 % (+726)	total +15.51 % (+4,905) p.a. +2.91 % (+981)	p.a. +2.72 % (+940)
City Max.	Wolfsburg: total +40.98 % (+15,033) p.a. +3.49 % (+1,503)	Wolfsburg: total +28.71 % (+11,536) p.a. +5.18 % (+2,307)	Cottbus: p.a. +4.63 % (+1,244)
City Min.	Wurzburg: total +15.59 % (+4,169) p.a. +1.46 % (+417)	Erlangen: total +7.15 % (+3,020) p.a. +1.39 % (+604)	Leverkusen: p.a. +0.46 % (+186)
Max.-Min.	total 25.39 pp p.a. 2.03 pp	total 21.56 pp p.a. 3.79 pp	p.a. 4.18 pp
Corr. GWSE in t to rent	-0.100	0.268	-0.119
Corr. GWSE in t-1 to rent	-0.053	-0.170	-0.158
Corr. GWSE in t-2 to rent	-0.015	0.226	-0.577*

**statistically significant correlation at 5% level*

Fig. 15: Overview development of gross wages and salaries per employee (GWSE) – clustering by primary, secondary, tertiary investment locations, various periods; growth rates p.a. as geometric mean, absolute growth p.a. as arithmetic mean; best/worst city in the cluster on the basis of the percentage growth in the period; due to lack of data availability without Aachen and Saarbrücken
Sources: F+B GmbH, Federal Statistical Office and State Statistical Offices (VGRdL); own calculation

The data series under consideration show hardly any significant correlations. The coefficients change frequently between negative and positive figures, thus making any interpretation difficult. At best the secondary cluster with the leading long-term wage series of one and two years provides statistically significant results; contrary to expectations these are negative, however. Here high wage rises (e.g. Chemnitz, Halle (Saale), Magdeburg, Leipzig, Dresden) have contrasted with moderate rent growth over many years. It is probable that the effects on rents will only occur with a further time lag, which would require further data and new calculations. On the whole the development of wages, salaries and incomes remains important for the assessment of regional housing markets.

4. Structural differences between the individual locations

On the basis of the long-term trends and developments the resulting actual ratios and structural data are compared. Various demographic, socio-economic and real estate market-related parameters which impact on the stability of the real estate market and the risks it faces are presented. Following the preceding cluster observation the level of analysis now focuses on the individual towns and cities. The result is a variety of rankings. Where differing perspectives are possible from case to case, for example with supply reserves, the ratio assessment is conducted from the stance of investors and finance providers.

The upper and lower manifestations, spreads and means have been calculated for the individual ratios. The indicators are allocated to the areas "Economy & Labour Market" (market environment) and "Supply & Demand" (market in the narrower sense).

Economy & Labour Market:
Where is the market supported by a strong environment?

Important ratio areas in the socio-economic market environment are the level of employment, the purchasing power, the level of education and the urban-rural relationships portrayed using commuter flows.
The per capita purchasing power is a commonly used indicator for the regional income levels. It allows for the sales potential to be estimated and compared. Correspondingly, higher purchasing power is to be viewed as positive. Among the 60 cities Munich heads the ranking with 31,667 EUR. It is followed by Erlangen with a figure that is more than 3,700 EUR lower. Among the first ten are three more Top 7 locations – Dusseldorf, Frankfurt a. M. and Stuttgart. At the end of the ranking is Gelsenkirchen with 18,503 EUR, more than 13,000 EUR less than Munich. The figures for Halle (Saale) and Duisburg are also short of the 20,000 EUR level. In locations with lower purchasing power higher rents may be attained more rarely, with vacancies and rent defaults also being encountered more frequently. The budgets of households which are already constrained offer hardly any reserves if there are economic difficulties. An interesting indicator for a business location is the commuter flow. A positive commuter flow (number of commuters into the location exceeds the number of commuters out of the location) points to an attractive labour market. At the same time it can be an indicator for a strained innercity housing market. In this sense a commuter inflow offers additional potential for population influx. Based on 1,000 inhabitants the VW city Wolfsburg clearly heads the ranking for this ratio. For every 1,000 inhabitants there are 554 net commuters (balance taking into account those commuting to other locations). Among the Top 7 only Frankfurt a. M., Dusseldorf and Stuttgart have values that exceed the mean for the 60 locations. Major industrial locations such as Ingolstadt or cities with an economically weak urban environs such as Saarbrücken and Koblenz tend to be more typical here. Offenbach a. M., Oberhausen, Gelsenkirchen and Wuppertal are all to be regarded as residential locations with little local employment. Here the commuter flows are negative. As a result of the proximity to urban agglomerations (e.g. Ruhr area, Rhine/Main) there can nevertheless be a certain need for housing in these cities, yet there is a fundamental migration risk if housing becomes available at the place of work. Size effects can also play a role with this ratio. For example Berlin has a relatively low value (37.5), but this is due to the tendency towards longer journeys and a sparsely populated commuter belt.
For qualitative assessments the proportion of employees with a complex occupation is interesting. A corresponding indicator is reported by the Federal Employment Agency. This indicator is based on the allocation of the required level of professional performance to the categories aid workers, skilled personnel, specialist or expert. The figure calculates the ratio of specialists and experts to all employees subject to social security contributions based on the place of residence principle. A higher proportion of employees with a complex occupation is fundamentally to be regarded as positive for the market. The occupation is often conducted in special areas which cannot be so easily substituted by technology, therefore. In addition to greater employment security and flexibility, it may be assumed that the remuneration is higher. The stability of the location as a whole is thus fostered. The leader in this ranking, Heidelberg, has a ratio of 47.9% and thus nearly 17 percentage points higher than the mean for all 60 cities (31.2%). Munich, Erlangen, Jena and Darmstadt also have a ratio of more than 40%. In contrast, in Gelsenkirchen and Duisburg less than one in five employees can be allocated to a specialist or expert profile. In other locations such as Oberhausen, Monchengladbach, Wuppertal and Krefeld the employee structure is also heavily dominated

by aid workers and skilled personnel.
Alongside the ratio just stated the employed persons without professional training can also be drawn on. Employed persons without training tend to be at greater risk of becoming unemployed and remaining for longer in this status. Ultimately the local housing market is also affected by the economic consequences. Positive values are displayed above all by cities in what was eastern Germany; Chemnitz leads the ranking with a mere 7.8%. The better locations in this respect are at least seven percentage points below the average for all 60 cities. Particularly negative values are to be found in Offenbach a. M. and Duisburg, where more than one quarter of the employed persons have no professional training. In general, a fragile income structure and greater risk of unemployment are most pronounced in locations with low performances in terms of education level and the proportion of complex occupations. Thus, such locations are characterized by a greater risk for their local housing markets. Of note here are Duisburg, Gelsenkirchen, Krefeld, Monchengladbach, Ludwigshafen am Rhein, Offenbach a. M. and Wuppertal, above all.

Other indicators for the labour market and – at least indirectly – for income are the proportion of long-term unemployed persons and the employment rate. In the case of the proportion of long-term unemployed persons it is above all a number of locations in Bavaria (among others Regensburg, Ingolstadt, Munich, Nuremberg) as well as Ulm which have good figures (a lower rate). Leipzig and Berlin are also to be found in the Top 10 here. Unfavourable figures are found with Oberhausen (half of the unemployed persons have been out of work for one year or longer), Krefeld, Bremen, Duisburg, Gelsenkirchen and Bielefeld. Gelsenkirchen and Duisburg are also amongst the ten worst cities in terms of employment. The leader from a negative stance here – actually unexpectedly – is Heidelberg with a mere 45.2% (possible special effects such as students and civil servants outside the circle of persons subject to social security contributions, low female employment rate). In contrast, in Ingolstadt, Munich and Wolfsburg about two thirds of the population aged 15 to 64 have an occupation subject to social security contributions. Dresden, Nuremberg, Leipzig and Offenbach a. M., which has performed unfavourably with other ratios, have employment levels of more than 60%.

PURCHASING POWER PER CAPITA (2018)

UPPER 10		LOWER 10	
City	**Value**	**City**	**Value**
Munich	31,667 €	Gelsenkirchen	18,503 €
Erlangen	27,933 €	Halle (Saale)	19,277 €
Dusseldorf	27,656 €	Duisburg	19,408 €
Ingolstadt	26,651 €	Leipzig	20,108 €
Frankfurt a, M,	26,624 €	Rostock	20,380 €
Stuttgart	26,605 €	Oberhausen	20,418 €
Ulm	26,600 €	Magdeburg	20,548 €
Wolfsburg	26,195 €	Kaiserslautern	20,600 €
Bonn	26,189 €	Kiel	20,792 €
Regensburg	25,864 €	Schwerin	20,797 €
Mean all cities	**23,089 €**	**Max.-min. all cities**	**13,164 €**

COMMUTER FLOW PER 1.000 INHABITANTS (2018)

UPPER 10		LOWER 10	
City	**Value**	**City**	**Value**
Wolfsburg	554.0	Offenbach a. M.	-41.6
Regensburg	397.7	Oberhausen	-41.0
Erlangen	388.8	Gelsenkirchen	-10.0
Frankfurt a. M.	368.8	Wuppertal	-0.1
Ulm	333.1	Duisburg	4.8
Ingolstadt	330.2	Bochum	7.4
Wurzburg	304.2	Leverkusen	9.6
Koblenz	289.1	Monchengladbach	10.3
Dusseldorf	280.0	Berlin	37.5
Saarbrücken	269.0	Halle (Saale)	41.8
Mean all cities	**150.7**	**Max.-min. all cities**	**595.6**

PROPORTION OF EMPLOYEES WITH A COMPLEX OCCUPATION (2018)			
UPPER 10		LOWER 10	
City	Value	City	Value
Heidelberg	47.9%	Gelsenkirchen	17.7%
Munich	43.7%	Duisburg	19.4%
Erlangen	43.4%	Ludwigshafen a. Rhein	20.6%
Jena	42.7%	Oberhausen	20.7%
Darmstadt	40.8%	Monchengladbach	21.1%
Stuttgart	39.9%	Offenbach a. M.	21.5%
Mainz	39.4%	Wuppertal	22.9%
Bonn	38.9%	Krefeld	23.6%
Karlsruhe	38.2%	Leverkusen	24.1%
Dusseldorf	37.5%	Lübeck	24.5%
Mean all cities	**31.2%**	**Max.-min. all cities**	**30.2pp.**

PROPORTION OF EMPLOYED PERSONS WITHOUT PROFESSIONAL TRAINING (2017)			
UPPER 10		LOWER 10	
City	Value	City	Value
Chemnitz	7.8%	Offenbach a. M.	28.9%
Cottbus	8.6%	Duisburg	25.3%
Erfurt	8.8%	Gelsenkirchen	24.2%
Dresden	8.9%	Wuppertal	24.0%
Jena	9.4%	Ludwigshafen a. Rhein	22.9%
Potsdam	9.5%	Kaiserslautern	22.5%
Schwerin	9.5%	Krefeld	22.4%
Leipzig	10.2%	Monchengladbach	22.2%
Rostock	10.5%	Bielefeld	22.0%
Magdeburg	10.6%	Essen	21.7%
Mean all cities	**17.6%**	**Max.-min. all cities**	**21.1pp.**

PROPORT. OF LONG-TERM UNEMPLOYED TO TOTAL NO. OF UNEMPLOYED PERSONS (2018)			
UPPER 10		LOWER 10	
City	Value	City	Value
Regensburg	19.2%	Oberhausen	50.2%
Ulm	20.9%	Krefeld	47.7%
Ingolstadt	25.1%	Bremen	44.7%
Munich	25.3%	Duisburg	44.3%
Nuremberg	25.5%	Gelsenkirchen	44.1%
Augsburg	25.8%	Bielefeld	44.0%
Wurzburg	26.4%	Cologne	43.6%
Karlsruhe	26.8%	Bochum	42.4%
Leipzig	27.0%	Offenbach a. M.	42.4%
Berlin	27.4%	Monchengladbach	42.1%
Mean all cities	**34.8%**	**Max.-min. all cities**	**31.0pp.**

EMPLOYMENT RATE (2018)			
UPPER 10		LOWER 10	
City	Value	City	Value
Ingolstadt	67.0%	Heidelberg	45.2%
Munich	65.7%	Gelsenkirchen	48.8%
Wolfsburg	65.0%	Freiburg i. B.	50.6%
Dresden	63.7%	Duisburg	52.1%
Nuremberg	63.1%	Kiel	52.1%
Chemnitz	62.0%	Munster	52.4%
Erlangen	61.3%	Bonn	52.6%
Offenb. a.M.	61.2%	Essen	52.8%
Leipzig	61.1%	Kaiserslautern	53.0%
Magdeburg	61.1%	Bochum	53.1%
Mean all cities	**57.2%**	**Max.-min. all cities**	**21.8pp.**

Fig. 16: Overview indicators Economy & Labour Market – illustration of ten best and worst cities respectively
Sources: Federal Employment Agency, Thomas Daily (on basis of MB Research), Federal Statistical Office and State Statistical Offices; own calculation

Supply & Demand:
Where is housing still being sought and correspondingly in short supply?

In addition to environment-related structural parameters, the situation on the housing market in the narrower sense is to be considered. The relevant indicators refer to supply and demand – each with regard to quantity (inhabitants, apartments) and quality (structure). The first structural indicator of demand is the proportion of under-30-year-olds in the population as a whole. A high proportion can be regarded as a sign of an attractive residential location, as greater dynamism (inward migration tendency) is associated with younger

age groups. Younger population groups also offer potential for the local labour market and are capable of development with respect to their income. It comes less surprisingly that typical student towns such as Aachen, Heidelberg and Munster are represented among the upper ten cities in the ranking. On the contrary, Cottbus und Schwerin are exemplary locations in structurally weak regions which young people often leave for lack of positive employment prospects. With Wolfsburg, however, a strong location for the manufacturing industry is among the worst cities.

The migration balance (difference between inward and outward migration) is another indicator for demand. As this is a flow figure which accordingly can fluctuate heavily, a mean has been considered for the years 2015 to 2017. A high positive migration balance is an indication of the attractiveness of a city. Leipzig heads this ranking with a balance of 21.2 per 1,000 inhabitants, just ahead of Potsdam with 21.0. Two cities in Lower Saxony, Osnabrück and Oldenburg, as well as the capital of the state of Mecklenburg-West Pomerania, Schwerin, posted considerably high net migration in the period from 2015 to 2017. Somewhat surprisingly, the Top 7 locations Munich and Dusseldorf are among the lower ten cities. Braunschweig is the worst location in this ranking; it still has a positive balance of 0.9, however.

Building completion figures for apartments in residential and non-residential buildings, again as the mean from 2015 to 2017, are an important supply indicator. The corresponding construction activity not only has to compensate for properties that are no longer available but also has to meet fresh demand. A high level of construction activity creates a greater amount of available housing and thus tends to slow down the development of rents. From an investor stance a very high degree of construction activity and expansion of the housing offering is likely to be unfavourable for stable leasing results. The mean across all 60 cities is 3.3 new apartments per 1,000 inhabitants per annum. A much lower figure is posted by Wuppertal, Duisburg and Bochum with about one new apartment; a much higher figure is reported by Oldenburg, Potsdam and Regensburg. The frontrunner is Ingolstadt with an average of 9.3 completions per year. Among the Top 7 locations Frankfurt a. M. and Munich are among the ten cities with the most dynamic construction activity.

On the supply side, in addition to the change in the stock of housing as a result of demolition and construction, the status quo for housing supply is also important. A housing supply ratio is defined as the quotient of the number of housing units to the number of private households. A ratio of 100% would correspond to a balanced market from an arithmetical stance. Naturally this excludes qualitative demand aspects such as apartment size, location and fit-out. Statistical peculiarities in the calculation of the number of households are also disregarded (places in care homes etc. as non-households, student flat shares as several independent households per apartment). With a ratio of 100% from an arithmetical stance there are no reserves for

households wishing to migrate to a location, if one discounts the establishment of flat shares and similar residential forms. In Hamburg this ratio points to a strained housing market. With a value of 93.7% there are far fewer apartments available than the number of households. In the German capital the ratio of 94.2% is also low. In contrast, sufficient housing is probably available in Chemnitz, Regensburg, Halle (Saale) and Duisburg. The average for all 60 analysed cities is, at 99.2%, less than 100%, which indicates a lack of apartments in the cities selected for the study.

The vacancy rate corresponds with the ratio considered above. Accordingly, cities with a low housing supply ratio and a low vacancy rate offer a stable leasing perspective. This applies to Hamburg, for example, with a vacancy rate of just 0.5%. Karlsruhe, Darmstadt and Stuttgart are also in this situation. Munich has a barely perceptible vacancy rate of 0.2%, two percentage points lower than the mean for all 60 cities (2.2%). Among the ten cities with the highest vacancy rates are a number of eastern German cities. Schwerin and Chemnitz have a vacancy rate of more than 8%. If both the housing supply ratio and the vacancy rate are high, this indicates a difficult market for rented accommodation (as in Chemnitz for example: the highest supply ratio, the second-highest vacancy rate, the lowest rents). Halle (Saale), Magdeburg and several cities in North-Rhine Westphalia, e.g. Krefeld, Duisburg and Gelsenkirchen, also have relatively high vacancy rates.

Relativisation of the size of rents is possible using the rent-purchasing power ratio. The annual rent for a statistical per capita living space of 46.5 m^2 is calculated as a ratio of the per capita purchasing power. Low ratios point to the rents being extremely viable and possibly also to a potential for rent increases. The mean across all 60 cities with this ratio is 20.5%. Chemnitz is the most favourable location with a ratio of just 13.2%, and so higher rents would be viable with the corresponding correction of the offering in this city in Saxony. At the other end of the ranking is, as expected, Munich. Although Munich has the highest per capita purchasing power by far of all the cities considered here, the capital of the state of Bavaria is also the clear leader in terms of rent size. With Stuttgart, Frankfurt a. M. and Berlin three other Top 7 cities are also represented in the ranking for the "Lower 10". Positioned between Munich and the three aforementioned cities is Freiburg i. B., where the rent-purchasing power ratio per capita amounts to 28.7%.

PROPORTION OF POPULATION UNDER-30 (2017)

UPPER 10		LOWER 10	
City	**Value**	**City**	**Value**
Aachen	39.8%	Cottbus	27.7%
Heidelberg	38.5%	Chemnitz	27.8%
Freiburg i. B.	38.1%	Schwerin	28.1%
Darmstadt	37.8%	Oberhausen	29.8%
Munster	37.6%	Lübeck	30.3%
Osnabrück	36.5%	Wolfsburg	30.4%
Erlangen	36.5%	Leverkusen	30.5%
Wurzburg	36.4%	Erfurt	30.5%
Mainz	36.2%	Krefeld	30.5%
Kiel	35.9%	Rostock	30.7%
Mean all cities	**33.2%**	**Max.-min. all cities**	**12.1pp.**

MIGRATION BALANCE PER 1,000 INHABITANTS (MEAN 2015-2017)

UPPER 10		LOWER 10	
City	**Value**	**City**	**Value**
Leipzig	21.2	Braunschweig	0.9
Potsdam	21.0	Munich	2.4
Regensburg	18.1	Wiesbaden	2.6
Schwerin	16.6	Wolfsburg	3.3
Osnabrück	16.0	Bielefeld	3.5
Karlsruhe	14.8	Aachen	5.0
Erlangen	13.9	Dortmund	5.3
Augsburg	13.8	Leverkusen	5.7
Oldenburg	12.9	Dusseldorf	6.1
Darmstadt	12.4	Kiel	6.3
Mean all cities	**9.6**	**Max.-min. all cities**	**20.3**

BUILDING COMPLETION PER 1,000 INHABITANTS (MEAN 2015-2107)			
UPPER 10		**LOWER 10**	
City	**Value**	**City**	**Value**
Wuppertal	0.9	Ingolstadt	9.3
Duisburg	0.9	Regensburg	8.9
Bochum	1.0	Potsdam	8.6
Gelsenkirchen	1.3	Oldenburg	7.5
Krefeld	1.3	Frankfurt a. M.	6.2
Chemnitz	1.3	Erlangen	6.0
Braunschweig	1.5	Jena	5.4
Essen	1.6	Wurzburg	5.4
Saarbrücken	1.6	Offenbach a. M.	5.3
Leverkusen	1.7	Munich	5.1
Mean all cities	**3.3**	**Max.-min. all cities**	**8.4**

HOUSING SUPPLY RATIO (2017)			
UPPER 10		**LOWER 10**	
City	**Value**	**City**	**Value**
Hamburg	93.7%	Chemnitz	108.3%
Kiel	93.9%	Regensburg	105.0%
Berlin	94.2%	Halle (Saale)	104.4%
Karlsruhe	94.7%	Duisburg	104.1%
Heidelberg	94.8%	Wuppertal	102.9%
Bremen	95.0%	Gelsenkirchen	102.6%
Stuttgart	95.0%	Ludwigshafen a. R.	102.5%
Darmstadt	95.4%	Krefeld	102.4%
Saarbrücken	95.5%	Monchengladbach	102.4%
Augsburg	95.7%	Magdeburg	102.4%
Mean all cities	**99.2%**	**Max.-min. all cities**	**14.6pp.**

VACANCY RATE (2017)			
UPPER 10		**LOWER 10**	
City	**Value**	**City**	**Value**
Munich	0.2%	Schwerin	8.6%
Frankfurt a. M.	0.4%	Chemnitz	8.5%
Munster	0.4%	Halle (Saale)	7.6%
Freiburg i. B.	0.4%	Krefeld	5.7%
Hamburg	0.5%	Magdeburg	5.2%
Darmstadt	0.5%	Gelsenkirchen	4.7%
Ingolstadt	0.5%	Duisburg	4.4%
Stuttgart	0.6%	Kaiserslautern	4.1%
Karlsruhe	0.6%	Oberhausen	3.9%
Erlangen	0.6%	Cottbus	3.8%
Mean all cities	**2.2%**	**Max.-min. all cities**	**8.4pp.**

RENT-PURCHASING POWER RATIO PER CAPITA (2018)			
UPPER 10		**LOWER 10**	
City	**Value**	**City**	**Value**
Chemnitz	13.2%	Munich	30.1%
Cottbus	15.3%	Freiburg i. B.	28.7%
Wuppertal	15.6%	Stuttgart	26.8%
Magdeburg	16.0%	Frankfurt a. M.	26.6%
Krefeld	16.2%	Berlin	26.5%
Mönchengladb.	16.4%	Offenbach a. M.	26.4%
Oberhausen	16.5%	Heidelberg	26.3%
Halle (Saale)	16.7%	Augsburg	25.1%
Essen	16.8%	Mainz	24.7%
Schwerin	16.8%	Darmstadt	24.6%
Mean all cities	**20.5%**	**Max.-min. all cities**	**16.8pp.**

Fig. 17: Overview indicators Supply & Demand – illustration of ten best and worst cities respectively
Sources: F+B GmbH, MB-Research, City of Hanover, City of Saarbrücken, Federal Statistical Office and State Statistical Offices, Thomas Daily (on basis of CBRE-empirica vacancy index, MB Research, TD market survey); own calculation

5. Sustainability of residential housing markets

Residential housing markets can be evaluated as relatively stable and investments as sustainable if fundamental ratios for the market and its environment are positive. This does not exclude the possibility of general risks, and in particular economic risks. Locations with a correspondingly good positioning tend to be less susceptible to the impact of a possible crisis and stabilise more quickly.

For an overall assessment two partial ran-

kings have been formed for the 60 cities – on the one hand for "Economy & Labour Market" (market environment) and on the other hand for "Supply & Demand" (market in the narrower sense). Ten indicators are considered in each of the two partial rankings.

Depending upon the size of the ratios the indicators are allocated to one of the three classes: positive (+), negative (-) and neutral. The combined points awarded (without any further weighting and calculated using the +1, 0, -1 values) form the basis for the ranking.

Whether an indicator is assessed as positive, negative or neutral depends on the threshold values. To this end the upper and lower quartiles of the respective sample are used. The interquartile area is assessed as being neutral. Example purchasing power: the threshold for a positive rating of the purchasing power per capita is 24,761 EUR (upper quartile of the 60 cities). With the same or a higher value the location is awarded a "+" (or +1 point). Up to a lower threshold value of 21,199 EUR the location is awarded a "-" or -1 point). Values between these are given a "0". With the proportion of persons who are in long-term unemployment this is reversed because a lower proportion is to be regarded as positive. Accordingly a "+1" is awarded here up to the threshold value of 30.1%, a "-1" with values of 40.2% and higher. Values between the two thresholds for this indicator are again given a neutral assessment (0). In this sense the assessment is dynamic: it is oriented in a relative manner to the respective study sample.

Partial ranking Economy & Labour Market

In the partial ranking "Economy & Labour Market" the following values from Chapter 4 are used: per capita purchasing power, commuter flow per 1,000 inhabitants, proportion of employees with a complex occupation, employed persons without professional training, proportion of long-term unemployed persons and the employment rate. The following dynamic ratios from Chapter 3 are used: employment dynamism (period from 2013 to 2018), development of gross wages and salaries per employee (2012-2017). In addition, the current unemployment rate is taken into consideration (reporting month July 2019).

Moreover, the proportion of the manufacturing sector in the gross added value as a whole (as a monetary ratio in EUR) is considered so as to indicate the significance and dependence of the local economic structure vis-à-vis the manufacturing sector. In this respect the assessment is conducted in a somewhat more differentiated manner. Fundamentally, a strong manufacturing sector at a location is not a negative factor. The existence of manufacturing companies is usually associated with large numbers of jobs with comparatively good remuneration in the industry itself as well as in upstream and downstream sectors. Nevertheless, a negative assessment is awarded from the quartile threshold of 29.2% upwards as the city is then dependent to a relatively large extent on the resident firms. The manufacturing sector is very sensitive to economic developments and usually affected first and more strongly in the event of an economic downturn. On the other hand a positive assessment cannot be awarded to locations without any notable industrial sector. It is regarded as positive if cities are positioned between the two thresholds and have a balanced mix of sectors. A neutral assessment is given to locations with a high proportion of service industry companies (proportion of manufacturing sector less than 16.7%).

The aggregation of the ten indicators produces two locations – Munich and Ulm – each with seven points at the top of the ranking. In second place is Ingolstadt with six points, ahead of Braunschweig and Frankfurt a. M. each with five points. The two frontrunners each have seven positive and three neutral indicators. None of the indicators for the economy and the labour market is negative. Ingolstadt is the first city in the ranking with a negative assessment, for the high proportion of manufacturing in the economy as a whole.

Nearly all the Top 7 cities have positive overall values (Munich +7, Frankfurt a. M. +5, Stuttgart +4, Dusseldorf +3, Hamburg +3, Berlin +1). An exception is formed by Cologne. The metropolis on the Rhine does not have any positive values in the ten categories, and the two labour market-related indicators proportion of long-term

unemployed persons and employed persons without professional training are actually negative. The German capital Berlin merely has a point deducted as a consequence of its naturally low commuter flow per 1,000 inhabitants. The city scores points for the strong employment dynamism since 2013 as well as the low proportion of long-term unemployed persons.

High total scores were also attained by Leipzig, Freiburg i. B., Wolfsburg, Regensburg, Dresden and Karlsruhe, whereby the latter two cities did not have a negative assessment for any of the indicators.

At the lower end of the ranking are a number of locations in North-Rhine Westphalia. The worst performers were Gelsenkirchen and Krefeld – each with seven minus points – whereby Gelsenkirchen at least received a plus point for its economic structure. With only one minus point less Duisburg and Oberhausen are also to be regarded as being fraught with risk.

In terms of the mean for the clusters the primary investment locations have the best result with a value of 3.0. Accordingly the Top 7 markets have good economic and labour market structures, something which promotes the stability of the residential rent markets. The mean for the tertiary locations (1.0) is higher than that for the secondary locations (-0.8). On an individual level the results are very heterogeneous, however, with the effect that in general it is not possible to draw conclusions about a city from its cluster.

	Purchasing power per capita (2018)	*Employment dynamism (2013-2018)*	*Proportion of long-term unemployed persons (2018)*	*Employment rate (2018)*	*Unemployment rate (07/2019)*	*Proportion of employees without professional training (2017)*	*Proportion of employees with complex occupation (2018)*	*Commuter flow per 1,000 inhabitants (2018)*	*Dynamism gross wages and salaries per employee (2012-2017)*	*Proportion of manufacturing sector in gross value added (2017)*	**SCORING ECONOMY & LABOUR MARKET**
THRESHOLD +	**24,761 €**	**15.5%**	**30.1%**	**60.3%**	**5.1%**	**14.7%**	**36.5%**	**211.4**	**16.2%**	**16.7-29.1%**	
THRESHOLD -	**21,199 €**	**10.6%**	**40.2%**	**54.0%**	**8.3%**	**21.1%**	**26.9%**	**68.0**	**11.9%**	**29.2%**	
Munich	+	+	+	+	+	0	+	0	0	+	**7**
Ulm	+	+	+	+	+	0	0	+	0	+	**7**
Ingolstadt	+	0	+	+	+	+	0	+	+	-	**6**
Braunschweig	+	-	0	+	+	+	0	0	+	+	**5**
Frankfurt a. M.	+	+	0	0	+	0	+	+	-	+	**5**
Dresden	0	0	0	+	0	+	+	0	0	+	**4**
Freiburg i. B.	0	+	+	-	+	0	+	0	0	+	**4**
Karlsruhe	0	0	+	0	+	0	+	0	0	+	**4**
Leipzig	-	+	+	+	0	+	0	-	+	+	**4**
Regensburg	+	+	+	0	+	0	0	+	0	-	**4**
Stuttgart	+	+	0	0	+	0	+	+	0	-	**4**
Wolfsburg	+	-	0	+	+	+	0	+	+	-	**4**
Dusseldorf	+	0	0	0	0	0	+	+	0	0	**3**
Erfurt	-	0	+	+	0	+	0	0	+	0	**3**
Hamburg	+	0	+	0	0	0	0	0	0	+	**3**
Heidelberg	0	+	0	-	+	0	+	+	-	+	**3**
Nuremberg	0	0	+	+	0	0	0	0	0	+	**3**
Potsdam	0	0	0	+	0	+	0	0	+	0	**3**
Wurzburg	0	+	+	0	+	0	0	+	-	0	**3**

Augsburg	0	+	+	0	+	0	0	0	0	-	**2**
Chemnitz	-	-	0	+	0	+	0	0	+	+	**2**
Darmstadt	+	+	0	0	0	-	+	+	0	-	**2**
Erlangen	+	-	0	+	+	0	+	+	-	-	**2**
Aachen	0	+	0*	0*	0	0*	0*	0	0*	0*	**1**
Berlin	0	+	+	0	0	0	0	-	0	0	**1**
Hanover	0	0	0*	0*	0	0*	0*	+	-	+	**1**
Mainz	+	0	0	0	0	0	+	0	-	0	**1**
Osnabrück	0	0	0	0	0	0	0	0	0	+	**1**
Cottbus	-	-	0	0	0	+	0	0	+	0	**0**
Jena	-	-	0	0	0	+	+	0	+	-	**0**
Kassel	0	0	0	-	0	0	0	0	0	+	**0**
Koblenz	0	0	0	-	0	0	0	+	0	0	**0**
Lübeck	0	0	0	0	0	0	-	0	0	+	**0**
Magdeburg	-	-	0	+	-	+	0	-	+	+	**0**
Mannheim	0	+	0	0	0	0	0	0	0	-	**0**
Munster	0	0	0	-	+	0	+	0	-	0	**0**
Oldenburg	0	0	0	0	0	0	0	0	0	0	**0**
Saarbrücken	0	0	0*	0*	-	0*	0*	+	0*	0*	**0**
Schwerin	-	-	+	0	-	+	-	0	+	+	**0**
Wiesbaden	+	0	-	0	0	0	0	0	-	+	**0**
Bonn	+	0	-	-	0	0	+	0	-	0	**-1**
Kiel	-	0	0	-	0	0	0	0	0	+	**-1**
Rostock	-	-	0	0	0	+	0	-	0	+	**-1**
Halle (Saale)	-	-	0	0	-	+	0	-	+	0	**-2**
Cologne	0	0	-	0	0	-	0	0	0	0	**-2**
Ludwigshafen am Rhein	0	0	0	0	-	-	-	+	+	-	**-2**
Bielefeld	0	0	-	0	0	-	-	0	-	+	**-3**
Dortmund	0	0	-	-	-	-	-	-	+	+	**-4**
Essen	0	0	-	-	-	-	0	0	-	+	**-4**
Leverkusen	0	-	0	0	0	0	-	-	0	-	**-4**
Offenbach a. M.	-	+	-	+	-	-	-	-	-	+	**-4**
Wuppertal	0	0	0	0	0	-	-	-	0	-	**-4**
Bochum	0	-	-	-	-	0	0	-	0	0	**-5**
Bremen	0	0	-	-	-	-	0	0	0	-	**-5**
Kaiserslautern	-	-	0	-	-	-	-	0	0	+	**-5**
Monchenglad-bach	0	0	-	0	-	-	-	-	-	+	**-5**
Duisburg	-	0	-	-	-	-	-	-	0	+	**-6**
Oberhausen	-	-	-	-	-	0	-	-	0	+	**-6**
Gelsenkirchen	-	-	-	-	-	-	-	-	0	+	**-7**
Krefeld	0	0	-	0	-	-	-	-	-	-	**-7**

**Neutral assessment (0) due to lack of data*

Fig. 18: Overview partial ranking Economy & Labour market – various indicators, thresholds on the basis of the upper and lower quartiles of the sample
Sources: Federal Employment Agency, Federal Statistical Office and State Statistical Offices, Thomas Daily (on basis of MB Research); own calculation

Partial ranking Supply & Demand

The second partial ranking on "Supply & Demand" (market in the narrower sense) includes indicators on population development (since 2013), migration balance, building completion, housing supply, vacancies, the rent-purchasing power ratio, and population structure (under 30-year-olds, over 59-year-olds). In this respect building completion and planning permission approvals (per 1,000 inhabitants) are used as an indicator for construction activity and evaluated in accordance with the supply shortage (lower numbers of completions and approvals are thus positive). Among other things the natural population change (births/deaths surplus) serves as an indicator for demand. In this respect a higher value tends to point to greater demand and is thus evaluated as positive. The population structure is to be evaluated in a more differentiated manner. If the proportion of over-59s exceeds the threshold value (proportion of 27.7%) this leads to a minus point, as it is assumed that the purchasing power decreases when people retire or are about to do so and that the mortality risk increases with age. Relocations with the corresponding new rentals also become less frequent (decline in market dynamism). Fundamentally such evaluation systems are always debatable and open to further optimisation. Contrary effects that have not been examined in greater depth can result from the specific distribution of purchasing power (under-30s lower than over-59s?) or interest in a longer lease agreement (less fluctuation with older residents?). The evaluations in this study are to be seen in Fig. 19.
On the whole the difference between the highest number of points (+5) and the lowest (-5) is much smaller than in the partial ranking "Economy & Labour Market" (+7 and -7). The ranking positions differ between the two partial rankings. Ulm, a leader in the other partial ranking, is at least still in the upper third with +2. Munich, which was also a leader in the Economy & Labour Market ranking, has a much poorer evaluation by far with a total score of -1. Although the very low vacancy rate has a positive impact, a high level of construction activity (completions, approvals) and the rent-purchasing power ratio have a negative impact. Other cities which scored well in the first partial ranking "Economy & Labour Market" likewise posted poorer results (Ingolstadt 0, Dresden -2). The low migration balance and a high degree of construction activity have a negative impact.
The frontrunner ist Heidelberg despite the fact that not all the indicators are positive – the ratio of rents to purchasing power is also unfavourable. This is more than compensated for by six positive indicators (incl. housing supply ratio, population development, vacancy rate), however. Karlsruhe – which also performed well in the other partial ranking – and Darmstadt both post very good scores of +4. The best Top 7 cities are Berlin and Stuttgart (each +3). At both locations the supply-demand structures are generally favourable. Cologne can at least post a slightly positive result (+1). The worst Top 7 location is Dusseldorf (-2), where the somewhat low migration balance per 1,000 inhabitants as well as the relatively low proportion of under 30-year olds is striking.
Cottbus brings up the rear (-5) in the market-related partial ranking. At least the rent-purchasing power ratio is favourable in this city in Brandenburg; possible rent increases could be afforded by the users, therefore. Six negative indicators (including population development since 2013, births/deaths surplus, housing supply ratio) are clear pointers against investment in the Cottbus housing market, however. Also low down the ranking are Lübeck and Wolfsburg with four minus points. Wolfsburg does not have one single positive indicator and performs poorly among other things due to the disadvantageous age structure (low proportion of under-30s, high proportion of over-59s). The dynamism of the population development since 2013 is low in the Volkswagen city. Lübeck at least has a positive indicator for housing supply.

In this partial ranking the primary locations (mean 1.1) again lead the way at cluster level ahead of the tertiary cluster (mean 0.1) and the secondary investment locations, which have a negative mean value (-0.2).

	Population development (2013-2018)	*Migration balance per 1,000 inhabitants (mean 2015-2017)*	*Births/deaths surplus per 1,000 inhabitants (mean 2015-2017)*	*Proportion of population under 30 (2017)*	*Proportion of population over 59 (2017)*	*Building completions per 1,000 inhabitants (mean 2015-2017)*	*Housing supply ratio (2017)*	*Vacancy rate (2017)*	*Rent-purchasing power ratio per capita (2018)*	*Approvals per 1,000 inhabitants (mean 2015-2017)*	**SCORING SUPPLY & DEMAND**
THRESHOLD +	**5.4%**	**11.3**	**1.5**	**35.1%**	**23.6%**	**1.9**	**96.7%**	**0.9%**	**17.9%**	**2.6**	
THRESHOLD -	**2.4%**	**7.2**	**-2.3**	**31.5%**	**27.7%**	**4.4**	**101.3%**	**3.2%**	**22.8%**	**5.4**	
Heidelberg	+	0	+	+	+	0	+	+	-	0	**5**
Darmstadt	+	+	0	+	+	-	+	+	-	0	**4**
Karlsruhe	0	+	0	+	0	0	+	+	-	+	**4**
Augsburg	+	+	0	0	0	0	+	+	-	0	**3**
Berlin	+	+	+	0	0	0	+	+	-	-	**3**
Erlangen	+	+	0	+	+	-	0	+	0	-	**3**
Freiburg i. B.	0	0	+	+	+	0	0	+	-	0	**3**
Mainz	+	0	0	+	+	0	0	+	-	0	**3**
Munster	0	0	+	+	+	-	0	+	0	0	**3**
Osnabrück	0	+	0	+	0	0	+	0	0	0	**3**
Stuttgart	0	0	+	0	+	0	+	+	-	0	**3**
Frankfurt a. M.	+	0	+	0	+	-	+	+	-	-	**2**
Hamburg	+	0	+	0	+	-	+	+	-	-	**2**
Kiel	0	-	0	+	0	0	+	0	0	+	**2**
Potsdam	+	+	+	0	0	-	0	+	0	-	**2**
Regensburg	+	+	0	+	+	-	-	+	0	-	**2**
Ulm	+	+	0	+	0	0	0	0	0	-	**2**
Wuppertal	0	0	0	0	0	+	-	0	+	+	**2**
Bonn	0	0	+	+	+	-	0	0	0	-	**1**
Braunschweig	-	-	0	0	0	+	+	0	0	+	**1**
Bremen	0	0	0	0	0	0	+	0	0	0	**1**
Hanover	0	-	0	0	0	+	0	0	0	+	**1**
Cologne	0	0	+	0	+	0	0	0	-	0	**1**
Leipzig	+	+	0	0	0	0	-	-	+	0	**1**
Nuremberg	0	0	0	0	0	0	0	+	0	0	**1**
Offenbach a. M.	+	0	+	0	+	-	+	0	-	-	**1**
Aachen	-	-	0	+	+	0	0	0	0	0	**0**
Duisburg	0	0	-	0	0	+	-	-	+	+	**0**
Erfurt	0	+	0	-	-	+	0	0	0	0	**0**
Halle (Saale)	0	+	-	0	-	+	-	-	+	+	**0**
Ingolstadt	+	0	+	0	0	-	0	+	-	-	**0**

Kassel	0	0	0	0	0	0	0	0	0	0	**0**
Koblenz	0	0	0	0	0	+	0	-	0	0	**0**
Ludwigshafen am Rhein	+	0	0	0	0	0	-	0	0	0	**0**
Mannheim	0	0	0	0	0	0	0	0	0	0	**0**
Saarbrücken	0	0	-	0	-	+	+	-	0	+	**0**
Bochum	-	0	-	-	-	+	0	0	+	+	**-1**
Leverkusen	-	-	0	-	-	+	0	0	+	+	**-1**
Munich	0	-	+	0	+	-	0	+	-	-	**-1**
Oldenburg	0	+	0	0	0	-	-	+	0	-	**-1**
Wiesbaden	-	-	+	0	0	0	0	0	0	0	**-1**
Bielefeld	-	-	0	0	0	0	0	0	0	0	**-2**
Dortmund	-	-	0	0	0	0	0	0	0	0	**-2**
Dresden	0	-	+	0	0	-	0	0	0	-	**-2**
Dusseldorf	0	-	0	-	0	0	0	0	0	0	**-2**
Essen	-	0	-	-	-	+	0	-	+	+	**-2**
Gelsenkirchen	-	-	-	0	0	+	-	-	+	+	**-2**
Jena	0	0	0	0	0	-	0	0	0	-	**-2**
Kaiserslautern	0	0	-	+	0	0	-	-	0	0	**-2**
Rostock	0	0	0	-	-	0	0	0	0	0	**-2**
Schwerin	0	+	-	-	-	0	0	-	+	0	**-2**
Chemnitz	-	0	-	-	-	+	-	-	+	+	**-3**
Krefeld	-	0	-	-	-	+	-	-	+	+	**-3**
Magdeburg	0	+	-	-	-	0	-	-	+	0	**-3**
Monchengladbach	0	0	-	-	0	0	-	-	+	0	**-3**
Oberhausen	-	-	-	-	-	+	0	-	+	+	**-3**
Wurzburg	0	0	0	+	0	-	-	0	-	-	**-3**
Lübeck	-	-	-	-	-	0	+	0	0	0	**-4**
Wolfsburg	-	-	0	-	-	0	0	0*	0	0	**-4**
Cottbus	-	0	-	-	-	0	-	-	+	0	**-5**

**Wolfsburg: In contrast to the other cities vacancy rate from 2016*

Fig. 19: Overview partial ranking Supply & Demand – various indicators, threshold values on the basis of the upper and lower quartiles of the sample
Sources: F+B GmbH, MB Research, Federal Statistical Office and State Statistical Offices, City of Hanover, City of Saarbrücken, Thomas Daily (on basis of CBRE-empirica vacancy index, MB Research, TD market survey); own calculation

Overall ranking Matrix & Aggregation

The graphic consolidation of both partial rankings may be seen in a result matrix (Fig. 20). Locations found in the upper right-hand quadrant have positive overall scores in both partial rankings. The reverse is true of locations in the lower left-hand quadrant.
On the whole investments in the locations found in the upper right-hand quadrant could be assessed as being stable and sustainable to a large extent. This applies, for example, to the four Top 7 locations Hamburg, Berlin, Frankfurt a. M. and Stuttgart. Cologne (partial ranking "Economy & Labour Market") and Dusseldorf (partial ranking "Supply & Demand"), which both have a negative overall score, appear to be somewhat more fraught with risk in this respect. Munich is not found in the quadrant for the most stable locations either, although (with Ulm) it has the highest score in the partial ranking "Economy

& Labour Market" and occupies a relatively neutral level with just one minus point in the supply-demand assessment. Among the secondary locations Karlsruhe (in both cases with a score of +4), Leipzig, Freiburg i. B. and Augsburg are the cities in which investments in the residential housing market are associated with little risk. Among the smaller, tertiary locations Ulm, Heidelberg and Regensburg stand out above all, and in accordance with this analysis they are to be seen as extremely "safe havens" for investors. In addition, Potsdam, Darmstadt, Ingolstadt, Erlangen and Osnabrück are also to be regarded as markets suitable for investment.

In contrast, in the lower left-hand side of the matrix are locations where investment in the residential housing markets there fundamentally appears to carry a greater risk. On the basis of this assessment both the indicators for the supply and demand side as well as fundamental ratios on the local economic structure and labour markets point to volatile market conditions, which are likely to be uninteresting for (risk-averse) investors. Among these are, for example, the locations Krefeld, Gelsenkirchen, Oberhausen and Monchengladbach. Above all there are other cities in the Ruhr area (e.g. Bochum, Dortmund) which also have negative overall scores in both partial rankings.

Accordingly the remaining areas of the matrix need to be considered in a more differentiated manner, as positive and negative scores are to be found here. With Mannheim, Saarbrücken, Kassel and Koblenz four cities are at the neutral point in the matrix (0.0). Here it would appear that indicative statements on stability and risks are scarcely possible. Sustainable investments here – and in other locations with a more or less neutral score – are on the whole not likely to result from the macro-outlook for the markets, but be dependent on the property in question and a specific micro-analysis in each individual case.

Alternatively the two partial rankings can be aggregated to form an overall ranking. This is conducted without any further weighting. The result is to be seen in Fig. 21. Right at the top of the ranking is a tertiary location. Ulm is the frontrunner with nine points, primarily as a result of the seven points in the partial ranking "Economy & Labour Market". It is followed by other cities in Baden-Württemberg: Karlsruhe (with four points in each of the two partial rankings) and Heidelberg (frontrunner in the partial ranking "Supply & Demand"), as well as Freiburg i. B. and Stuttgart. The latter two cities receive the same number of points as Frankfurt a. M. (+7). Munich, the leader in the partial ranking "Economy & Labour Market", has a total of six points and is on a par with the Bavarian tertiary locations Regensburg and Ingolstadt, as well as with Darmstadt and Braunschweig. In this respect Darmstadt scores well in the partial ranking

"Supply & Demand" whereas Braunschweig is strong in the partial ranking "Economy & Labour Market". The most successful locations in eastern Germany in this analysis are Potsdam and Leipzig with five points each. With a total score of four points Berlin is in the upper third of the 60 locations.

The majority of the cities at the lower end of the ranking in the aggregation are from North Rhine-Westphalia. The bottom four places are occupied by Krefeld, Gelsenkirchen, Oberhausen and Monchengladbach. In addition, with Bochum, Dortmund, Essen and Duisburg more cities from the German federal state with the highest population have very negative scores. Kaiserslautern, Cottbus, Bremen and Lübeck are other less favourable locations, and require a very precise individual analysis in the event of a potential investment.

At cluster level the Top 7 (primary investment locations) appear to be sustainable markets that promise successful investments with the mean of their total scores (4.1). Stuttgart and Frankfurt a. M. are the frontrunners in the cluster, Cologne brings up the rear. The tertiary cluster follows with a mean of 1.1. Here Ulm leads the cluster ahead of Heidelberg. Kaiserslautern brings up the rear for tertiary locations with seven minus points. In the secondary cluster with a mean of -1.0 there is a larger bandwidth with Karlsruhe at the top of the ranking and Krefeld at the bottom. The two locations are separated by as many as 18 points.

Fig. 20: Matrix assessment partial rankings – 60 selected locations
Sources: Federal Employment Agency, F+B GmbH, MB Research, City of Hanover, City of Saarbrücken, Federal Statistical Office and State Statistical Offices, Thomas Daily (on basis of CBRE-empirica vacancy index, MB Research, TD market survey); own calculation and illustration

Fig. 21: Overview overall standings – 60 selected locations
Sources: Federal Employment Agency, F+B GmbH, MB Research, City of Hanover, City of Saarbrücken, Federal Statistical Office and State Statistical Offices, Thomas Daily (on basis of CBRE-empirica vacancy index, MB Research, TD market survey); own calculation and illustration

6. Conclusion

The good performance to date of residential real estate investments is based, in addition to valuation effects, on the rise in market rents to a large extent. Insofar as these are based on fundamental data, and in particular through indicators from the areas "Economy & Labour Market" (market environment) and "Supply & Demand" (market in the narrower sense), it can be assumed that the development is sustainable. In this respect there are major location-specific differences. This study shows a correspondingly wide range of locations from very strong to weak in economic, socio-economic and market-related terms.
On the basis of the analysed indicators the Top 7 cities underline their position as sustainable investment locations. The corresponding proof may be furnished at cluster level and usually also at city level. Stuttgart, Frankfurt a. M. and Munich are particularly positive examples of this sustainability. Berlin and Hamburg are also in the upper third of the 60 locations examined. In the internal comparison of the seven primary investment locations Dusseldorf and Cologne do not perform as well.
Some smaller locations are of further interest. The overall ranking is headed by Ulm. Heidelberg, Regensburg, Ingolstadt and Darmstadt also have excellent key ratios. Alongside locations in southern Germany such as Karlsruhe, Freiburg i. B. and Augsburg, a number of cities in eastern Germany such as Potsdam, Leipzig and Erfurt are also to be regarded as stable and/or displaying dynamic growth. In this respect the secondary and tertiary city clusters are extremely heterogeneous, however. A totally different picture is presented by Kaiserslautern, Monchengladbach, Oberhausen, Gelsenkirchen and Krefeld, for example.
In volatile markets a two-pronged investment strategy can prove to be successful. A housing portfolio across the large Top 7 locations is probably always suitable as a base investment. Greater stability and more growth can be provided by selected secondary and tertiary cities. These should have predominantly positive key ratio values and in the best-possible case unique structures and features that differ from those of the Top 7. Pointers in this respect are leading industrial and service companies, a young and growing population, good connections to national transport networks and a stable labour market.

On the basis of this comparative study, which is oriented to statistical ratios, investors and analysts can include their own weightings and new indicators. The instruments used to make evaluations and comparisons, and to support decision-making may thus be individualised and constantly improved. Nevertheless, observation at location level is not a substitute for the consideration of an individual case. Specific investments may even be profitable in cities which initially appear unfavourable. Accordingly, research into such investments not only needs to be conducted continually but also has to take into account many different possible levels.

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