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INCREASING OFFICE EMPLOYMENT VS. SHORTAGE OF SPACE

OPPORTUNITIES FOR INVESTORS AND DEVELOPERS AT LARGER SERVICE LOCATIONS

RESEARCH REPORT
JUNE 2019

Increasing office employment vs. shortage of space

Opportunities for investors and developers at larger service locations

The markets for office space have almost been forgotten in the wake of the ongoing discussion surrounding residential rents and construction land prices. Yet in recent years the prices here have also seen a continual increase, and earlier vacancy rates have now been reduced by a considerable degree. In the meantime a shortage of space can be observed in many cities. For the future economic development of a region, however, the available office space and the associated number of office workplaces are an important factor. A shortage of space effectively limits the potential economic growth. For individual companies a tight office market generally means more time and effort being expended on sourcing, less alignment with needs, and higher rental costs.

The current market development offers a number of opportunities for developers and investors. Not every town and city is equally promising, however. The decisive factors are location-related parameters for demand and price development such as dynamism, stability and structural aspects. The following study examines the market development at 15 large office locations in Germany.

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1. Office space is becoming scarce and expensive

In the wake of the constant discussion surrounding the shortage of residential housing and the regulation of residential real estate markets, the developments to be seen with commercial real estate are less striking. The corresponding areas are considered to be available, investments relatively simple. In this respect there is now considerable competition, and in particular in the office property segment. The investment activity in the field of commercial real estate is clearly dominated by the office segment on the German market. According to the latest Property Report 2019 from BNPPRE the share in all commercial investments last year was 48.2%. In earlier years office properties had already been the most frequently traded asset class among commercial real estate with shares of more than 40% (DZ Hyp, Immobilienmarkt Deutschland 2018/2019). In this respect, the transaction volume for office real estate has practically increased continually and in part to a strong degree. In a ten-year comparison from 2008 (EUR 6.9 bn) to 2018 (EUR 29.7 bn) the transaction volume has increased more than four-fold (BNPPRE, Investmentmarktüberblick Deutschland 2019).

Economic trend indicators such as the monthly Deutsche Hypo Real Estate Climate continue to show a high level for the office segment. Among the individual usage types, with an index value of 142.3 the level here in April 2019 is only slightly behind the housing segment – which has been booming for many years already – and is in part significantly ahead of the indices for other commercial real estate. The recent IW Immobilien-Index Spring Real Estate Survey sees the office market as the only partial sector not yet affected by a downward trend. The office market appears to still represent a stable and interesting investment segment.
Investments in office real estate are being rewarded by a booming rental market. Office premises are in short supply in virtually all the larger markets in the meantime. The level of new construction has until now not been in a position to keep pace with demand for office space, let alone bring any relief to the situation. Excess demand has often led to perceptibly higher rents with new lease agreements. This development is not only true for the markets primarily considered, the Top 7 markets, but is also applicable nationwide. The mean vacancy

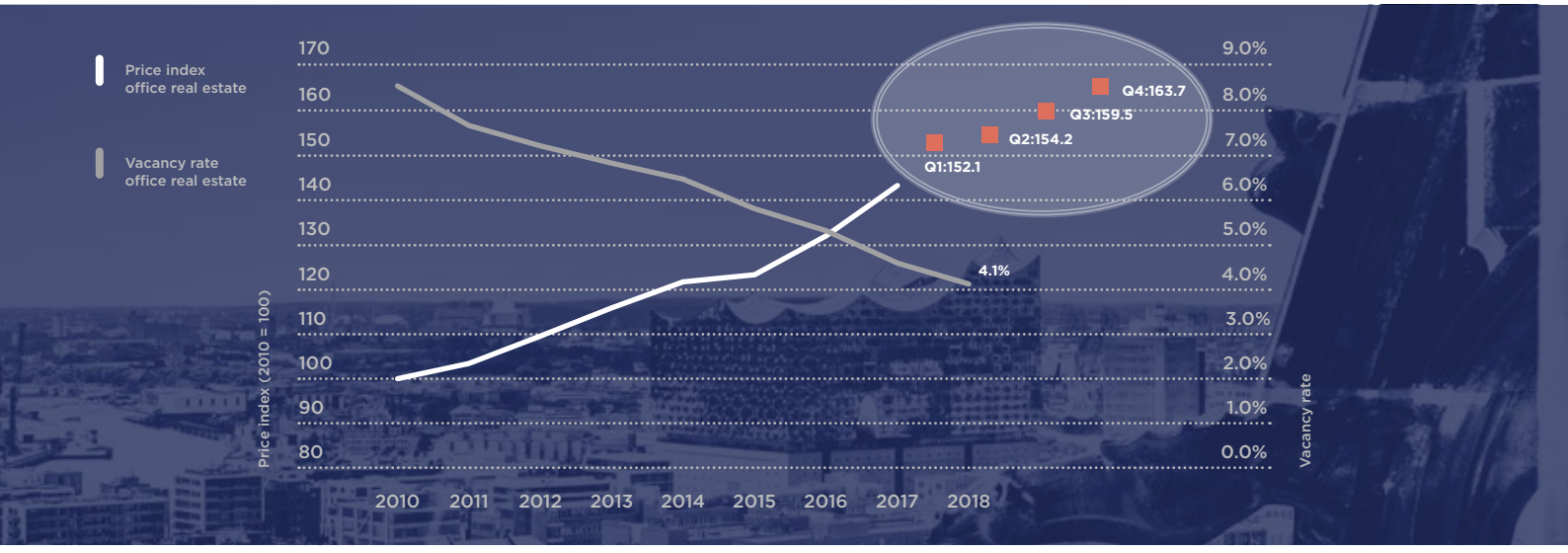


Figure 1: Price index and vacancy rate for office real estate – Germany (vacancy rate for 127 cities)
Sources: Deutsche Bundesbank (on the basis of data from bulwiengesa AG), vdp Research GmbH; own illustration

rate for office real estate for the 127 German cities currently only amounts to 4.1% and the price index has increased by more than 60 points from its base value in 2010.

It is not only demand for office space that has increased significantly in recent years. As a reaction to a relatively low level of construction activity and declining vacancy rates, office rents nationwide have also continually risen. In 2018 average office rents in the mid segment increased by approx. 4.0% year on year. In the Top 7 the rise for mid office properties was as high as 7.4%. This has led to high prime rents in the major cities above all. In Munich, Frankfurt am Main and Berlin prime rents of more than 30.00 EUR/m² are the norm in the meantime (IVD, Gewerbe-Preisspiegel 2018/2019). While the average rents – which are of greater relevance for the broad market segment – are likely to be approx. 30 to 50% lower, the price developments are substantial. Most recently the growth rates of the rent index for office properties published by vdp Research were actually higher than those for the housing market (Figure 2). Office properties are thus becoming ever more expensive. Investors are already accepting prime yields of some 3.0%. According to JLL (Investmentmarktüberblick 4. Quartal 2018), among the Top 7 markets Berlin is currently the most expensive city in terms of yield with less than 3.0% already, albeit the other locations follow closely behind by just a few base points.

Figure 2: Change in rent index for office and residential real estate (multi-family houses) over previous year and comparison of rates of change – Germany, new contract rents
Source: vdp Research GmbH; own calculation and illustration

In the long term real estate markets follow cyclical developments. Thus there are slumps followed by recovery phases, as seen most recently in 2002/2003 and 2008/2009 for example. The typical features of such crises are a market-driven downturn in demand, an increase in vacancy rates, and a decline in prices for rents and sales. Often this is followed by weaker construction activity, albeit with a slight delay, which sees the market regain its balance. The resulting cycle spans a number of years. It is thus only recognisable if longer periods of at least 15 or 20 years are analysed. The intensity of the wave effect is rarely of a textbook nature, and there may be significant differences between individual markets. The transaction volumes and prices on the commercial real estate markets frequently fluctuate to a greater degree than those on the residential real estate markets. One reason for this, in addition to contractual clauses (for example graduated rents, li-

mited term), is the fact that office leases are economically dependent on the underlying economic developments (investment goods and uses dependent on such developments), whereas apartments and housing always represent essential consumer goods.
Nevertheless, the current excellent sales opportunities for office space mean there are opportunities for project developers and lessors. For property owners with a long term orientation and also for opportunistic investors the corresponding dynamism of the office market is very much an interesting aspect. Risk consciousness increases above all in an already advanced phase of the real estate cycle, as does the corresponding need for information and analyses. Investors, tenants and municipal administrations have to analyse and plan office markets in accordance with the respective market phases. In this regard real estate, labour and business markets are to be considered holistically and also with a view to their mutual interdependence.

2. Increasing office employment level, but stagnating office construction

A decrease in vacancies, an increase in rents and a shortage of space result from the fact that nearly eleven million people in Germany work in offices nowadays (Figure 3). This corresponds to growth of more than 20% since 2008. The estimated number is based on an aggregation of individual figures and is to be regarded as an approximation. As office employment is not explicitly shown separately in the employment figures of Germany's Federal Employment Agency, for the purposes of this study the employees subject to social insurance contributions and marginally employed persons in sections J to O and U of the Classification of Economic Activities, Issue 2008 have been pooled as office employees. These sections encompass industries in which it may be assumed that the majority of employees, albeit not all of them, perform an office task. At the very least this approach allows for rough estimates of needs and for comparisons at local level.
Accordingly, office employees account for some 26% of all the employees subject to social insurance contributions and marginally employed persons in Germany. The growth trend has been unbroken for many years now. The transition to a service economy is unmistakable. Despite modern working worlds, which are associated, among other things, with desksharing and home offices, these growth figures for office employees ultimately mean there is significant additional demand for office workplaces and thus also for office space.

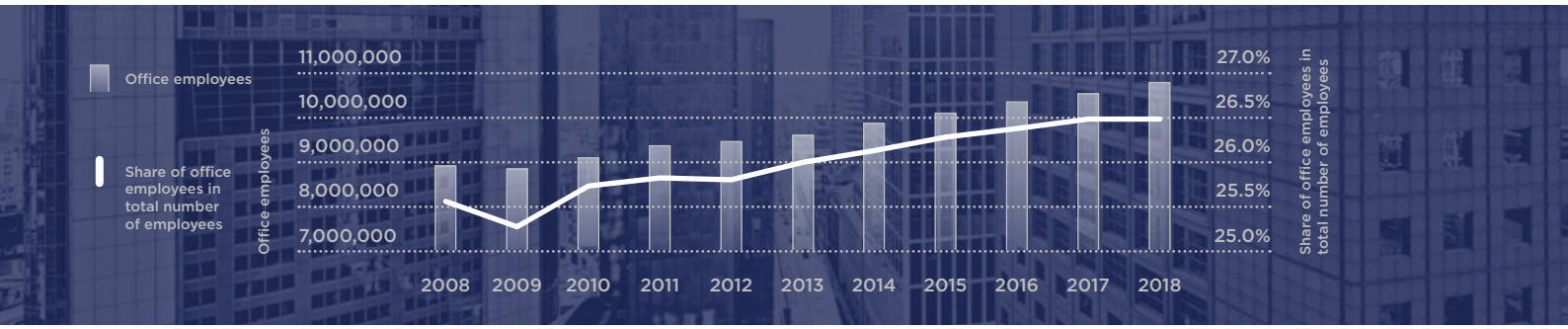


Figure 3: Development of number of office employees and their share in total number of employees – Germany, as at June of respective year
Source: Federal Employment Agency; own calculation and illustration

The growth in office employment results to a large extent from the generally positive development of employment levels in past years (Figure 4). The number of employees – as the sum of employees subject to social insurance contributions and marginally employed persons – rose from nearly 35 million in 2008 by approx. 5.8 million employees through to 2018 (approx. 17%). At the same time the nationwide unemployment rate decreased from 7.8% to 5.2%. This has come about as a consequence of an extremely pleasing economic development in the course of the past nine years. The last year-on-year negative growth rate for GDP in real terms was recorded in 2009.
There has to be further differentiation of the general growth trend with office employees to allow for a concrete estimation of demand. The manner, scope and quality of the form of employment have to be observed. Of interest, therefore, are certain structures within the labour market. In this respect it becomes clear that since 2003 the number of marginal employment has increased much more sharply (40%) than the number of employees subject to social insurance contributions (growth of 22%). Other employees (among others these include freelancers and professional soldiers) decreased by as much as 38%. In total the number of people in employment in Germany has increased by approx. 15% since 2003.

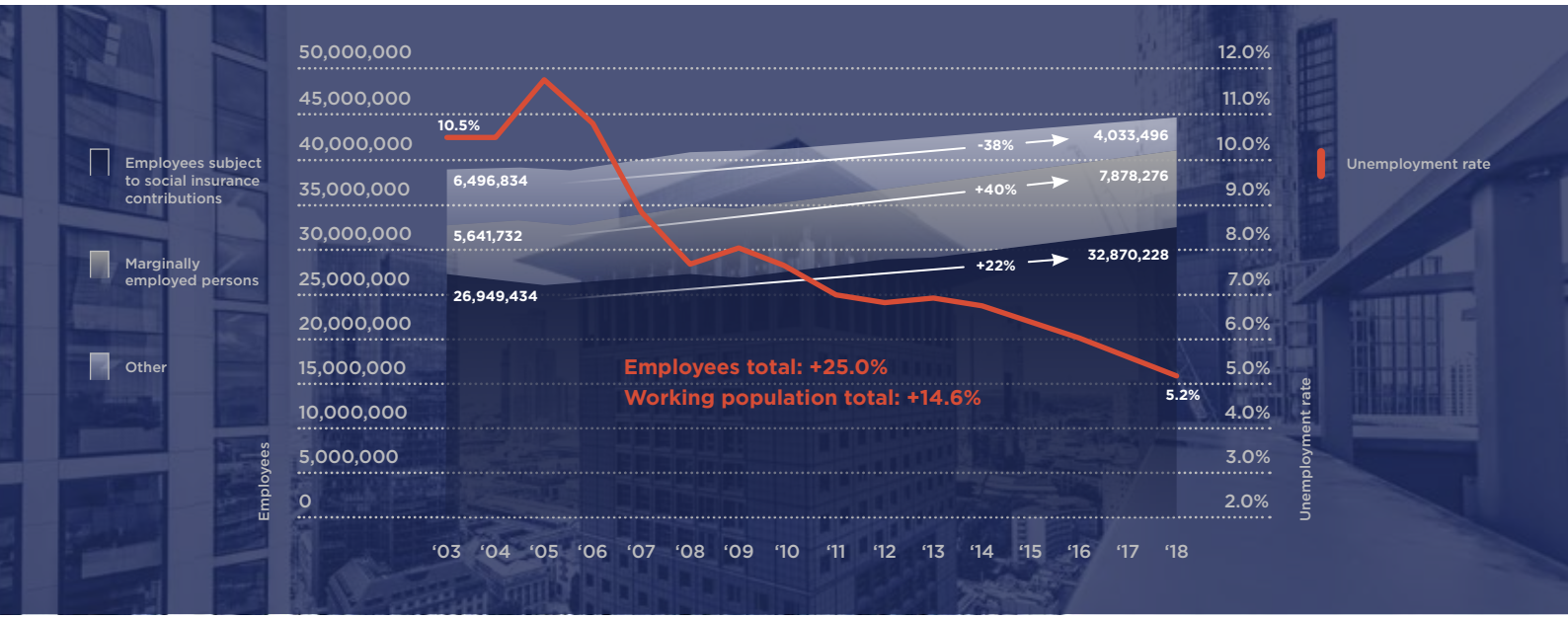


Figure 4: Labour market development in Germany – employees subject to social insurance contributions and marginally employed persons, as at June or Q2 of each year; unemployment rate in average annual values
Sources: Federal Employment Agency, Federal Office of Statistics; own calculation and illustration

In connection with the known proportion of office employees it is thus possible to draw certain conclusions regarding the need for workplaces and workstations. Thus a large number of marginally employed persons are also to be found in service sector jobs. Call centres are one example of this. The corresponding workstations may in part be shared by one or more employees below the reporting threshold. The observed increase in employment levels does not lead in its entirety to a need for additional office space therefore. Even if calculations of requirements and forecasts have to be conducted in a correspondingly differentiated manner, the employment trends in recent years can nevertheless be used for an

initial estimation of office demand.

The trend observed nationwide towards a reduction in vacancies (see Figure 1) results not only from the dynamics of the employment market. In view of the strong focus placed on the residential housing market in recent years, commercial real estate construction has often been neglected. In the office sector this is not just a capacity problem. Office space offerings often have to be specifically geared to needs. These encompass new technological standards as well as individual operational requirements. The availability of large interconnected areas (even going as far as single-tenant properties) plays a role, just as do efficient locations situated close to downtown areas or so that they are convenient for traffic access. Thus shortages also come about as a consequence of the special demands made on the property quality and on the location. In the recent past this has led to supply and demand drifting apart, and particularly so at the top locations with strong employment growth.

After many years of heavy construction activity at the beginning of the millennium, the new development of office space in the past ten years has levelled out at an annual figure of approx. 1,700 buildings with some 2.3 million m² of floor space. Given an office space stock of some 400 million m² (ZIA, Marktdaten Büroimmobilien 2019) and a certain amount of age-driven stock decline, it seems probable that there has been scarcely any net new office space on the market of late. With regard to needs: a growth of 1 million office workplaces, for example, would require at least 10 million m² of new work space. In addition to this would be a need for floor space for conference rooms, equipment rooms and archiving areas. Moreover, replacement needs have to be taken into account. Accordingly, an area factor of at least 10, more likely 15 however, would have to be utilised to meet the needs for each unit increase in the number of office employees. The new construction activity in recent years of approx. 2.3 million m² of floor space contrasts with a growth in office employment of approx. 220,000 persons per annum. For each new office employee this corresponds to slightly more than 10 m² of new office space. Based on this calculation of needs, supply is only just meeting demand. This is true above all in view of the generally cautious estimate of the number of office employees; thus the actual number of office workplaces and demand could undoubtedly be higher. Furthermore, congruence between regional space offerings and the demand there are questionable. The corresponding distribution problems require additional reserve areas.

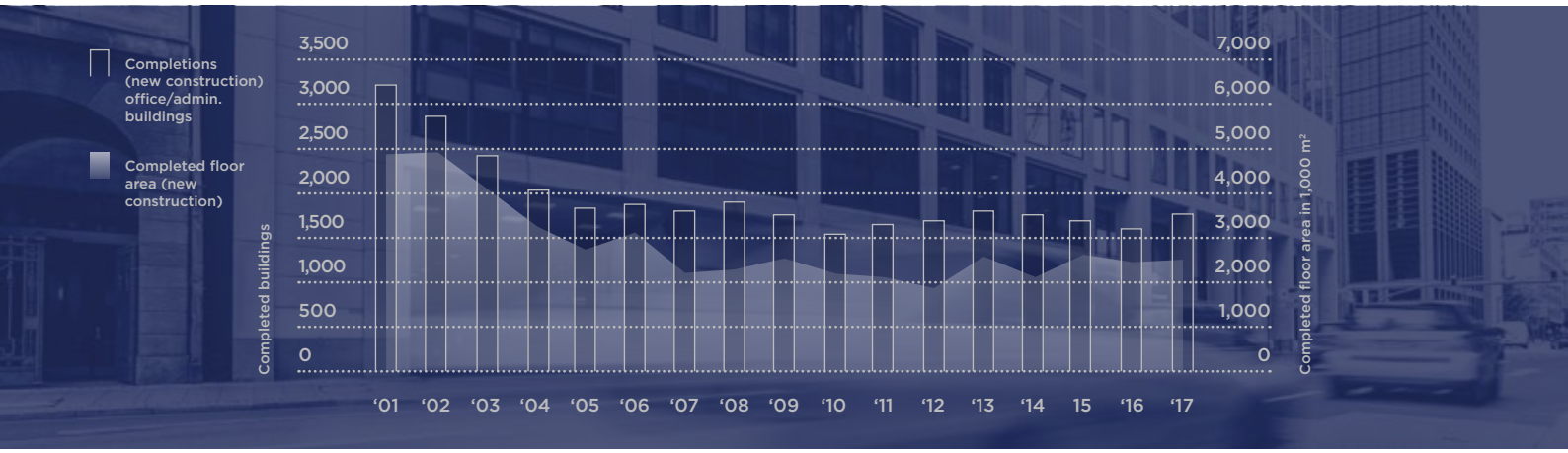


Figure 5: Completions of office and administration buildings as well as associated floor space (above ground construction, minus residential areas in such buildings) – Germany, new construction
Source: Federal Office of Statistics; own illustration

In general the market for office real estate throughout Germany is experiencing an upward trend. Prices are increasing, vacancies are being reduced and valuation yields are decreasing. Within this overall picture individual locations may see very different developments, however.

3. Differences among individual office locations

Institutional investments generally focus on specific locations. The office locations that are actually relevant, speaking classically, are the German Top 7 cities. What is interesting is the extent to which their development differs from the trend for Germany as a whole.

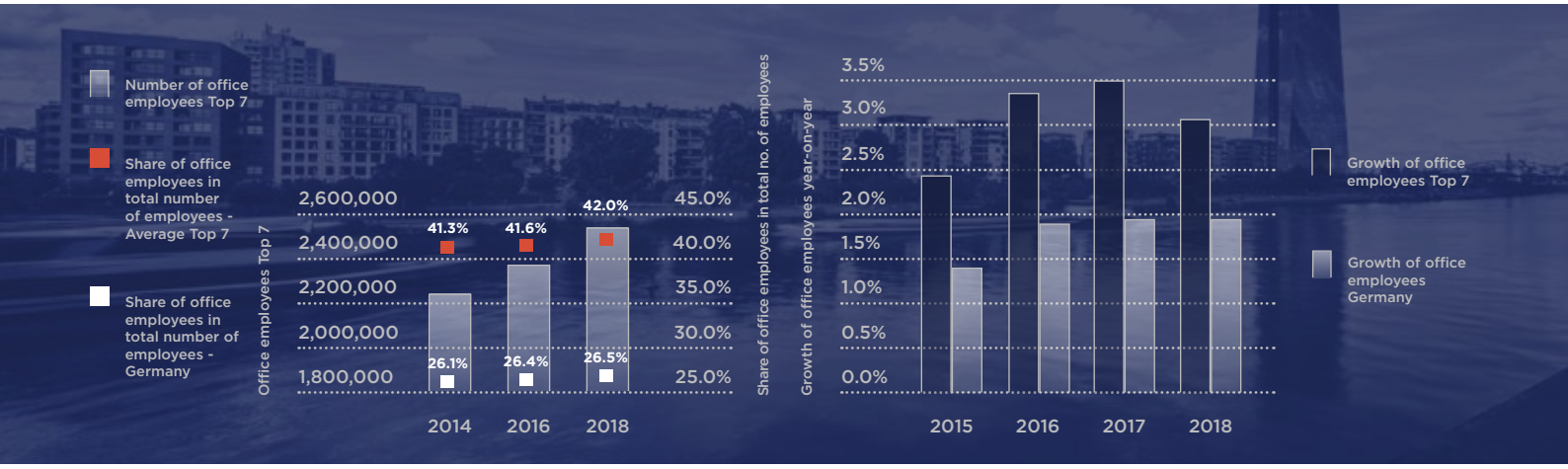


Figure 6: Development of number of office employees and share of total number of employees – Comparison Germany and Top 7 locations, as at June of respective year
Source: Federal Employment Agency; own calculation and illustration

Special position of the Top 7 office locations

If employment levels are taken as a basis, it may be seen that the proportion of office employees in the Top 7 is – at more than 40% – significantly higher than the mean for Germany as a whole (Figure 6, left). The annual growth in office employment was most recently also more than one percentage point higher (Figure 6, right).

The rising office employment levels have led to a decrease in vacancies for office real estate in the Top 7 in particular (Figure 7). Over a longer period the vacancy rate for the Top 7 was higher than the mean for the whole of Germany (shown here for 127 cities incl. the Top 7). Since 2010 the reduction in vacancies in the Top 7 has been much higher than in other markets, however. Since 2015 the vacancy rate has been lower than the average for Germany as a whole. As the rate for all of Germany includes the Top 7 markets, the overall vacancy reduction may well be due to these in demand locations to a large extent. Consequently the dynamism of the remaining locations is probably less pronounced.

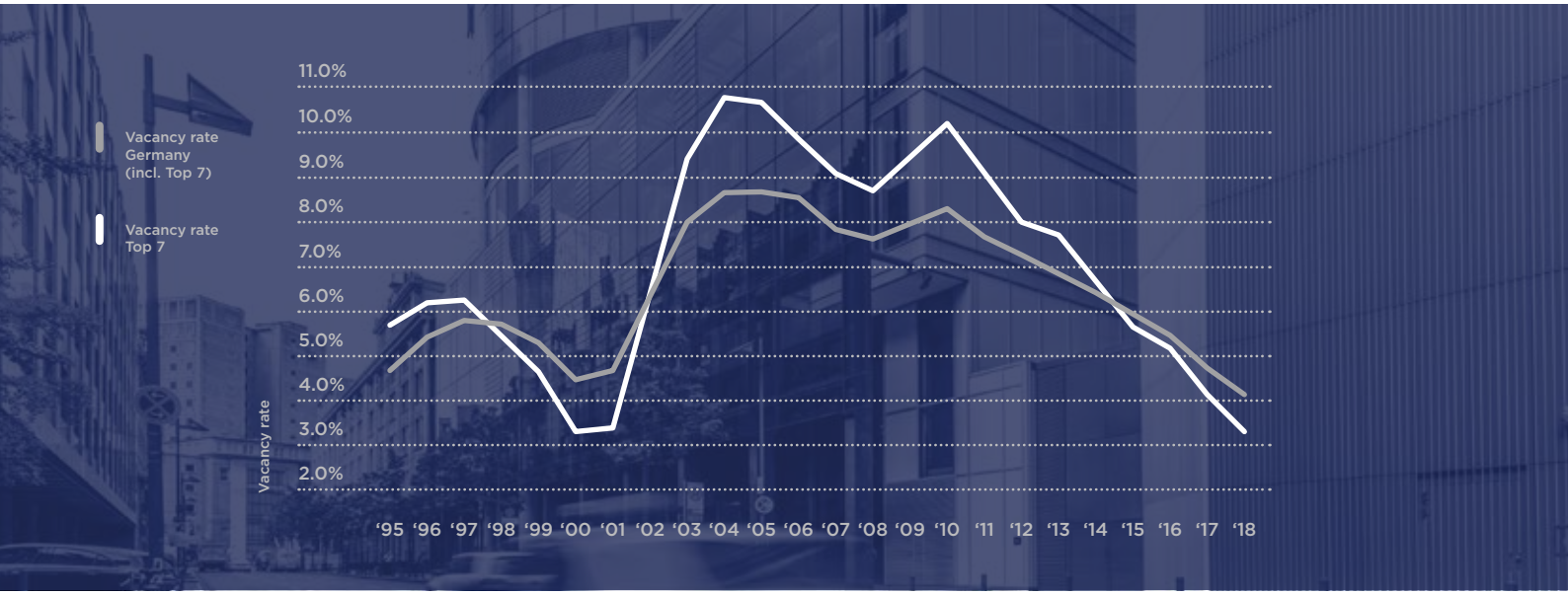


Figure 7: Vacancy rates for office real estate – Comparison Germany (127 cities incl. Top 7) to Top 7
Source: Deutsche Bundesbank (on the basis of data from bulwiengesa AG); own illustration

The Top 7 also occupy a special position in terms of the valuation yields. The yield differential for commercial real estate (here: retail + office) between the Top 7 on the one hand and other German locations on the other hand (here 120 cities, excl. Top 7) has continuously increased in recent years. This is also an indication of differing development dynamics. In the major German markets the attainable yield with commercial real estate investments is, on average, currently 2.2 percentage points lower than the average expected yield in the rest of the country. Ten years ago this difference was 1.6 percentage points and 20 years ago a mere 0.9 percentage points.

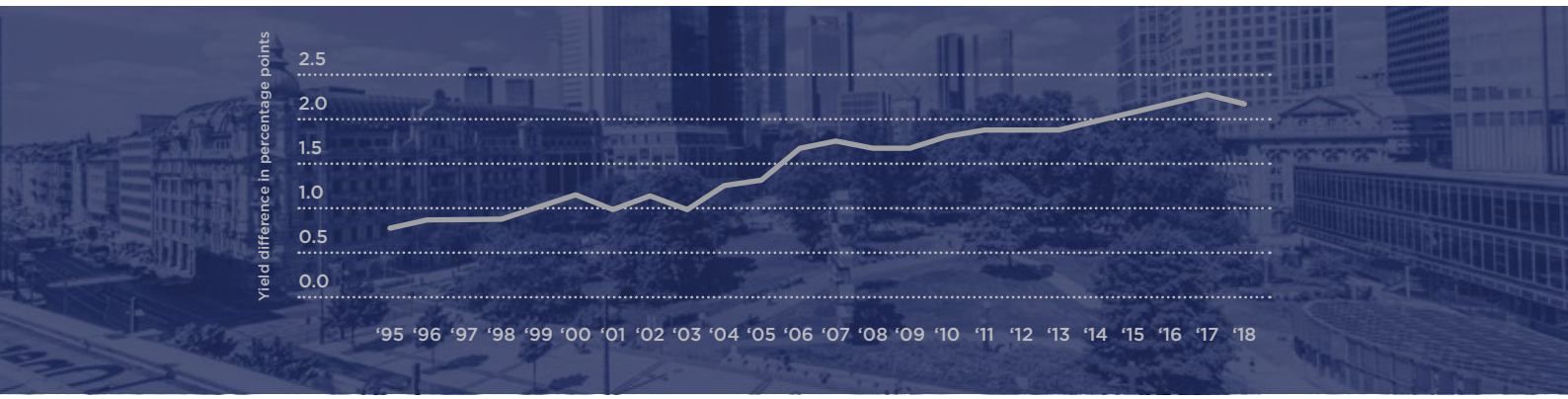


Figure 8: Yield difference (on the basis of yields for retail + office) between Germany and Top 7
Source: Deutsche Bundesbank (on the basis of data from bulwiengesa AG); own illustration

Expanded consideration of 15 large office locations

The limitation to the Top 7 locations substantially confines the range of possible investments – especially in view of the restricted availability of real estate. On the other hand, very small locations are of little relevance for institutional investments as there is a lack of the necessary transaction frequency, product differentiation and market liquidity. On the basis of the established special features of the Top 7, downstream yet sufficiently large office locations may also be interesting. The following analysis will therefore take into account eight additional locations, which given their market size, regional significance or sector structure could be attractive target markets. This group comprises Bonn, Bremen, Hanover, Dortmund, Nuremberg, Essen, Leipzig and Dresden.

Reduction in vacancies

The vacancy rate is to serve here as an indicator of scarcity and a sign of forthcoming price increases. Whereas Bonn, Berlin, Munich, Stuttgart and Cologne all have a vacancy rate of less than 3% and thus hardly any available reserves, in cities such as Leipzig, Dresden, Dusseldorf and Frankfurt am Main the vacancy rates are still somewhat higher. But here too there is a clear trend towards a shortage of office real estate. The vacancy rates there have in part more than halved compared to 2010. Although the rates in Hanover, Bremen and Dortmund declined by less than two percentage points and thus less significantly, this was due to the already very low starting figures. At present the vacancy rates here are less than 4.0%. It is only in Essen that the office vacancy rate has increased slightly (+0.6 percentage points since 2010). At 4.6% the current vacancy rate for the office market in Essen is likewise also at a low level, however.
The Top 7 cities Dusseldorf and Frankfurt am Main also stand out with office vacancy rates of more than 7%. The reasons for this are to be seen in the alignment of certain offerings. Thus small – and also very large – high-quality inner-city areas are definitely in demand. In the central banking district in Frankfurt and in the Gallus district there are scarcely any vacancies for example. The reduction in vacancies in Leipzig is striking. The decrease since 2010 amounts to 9.5 percentage points – the highest reduction of all the cities considered here. The "neighbouring" city of Dresden is displaying a similar, albeit somewhat slower development.

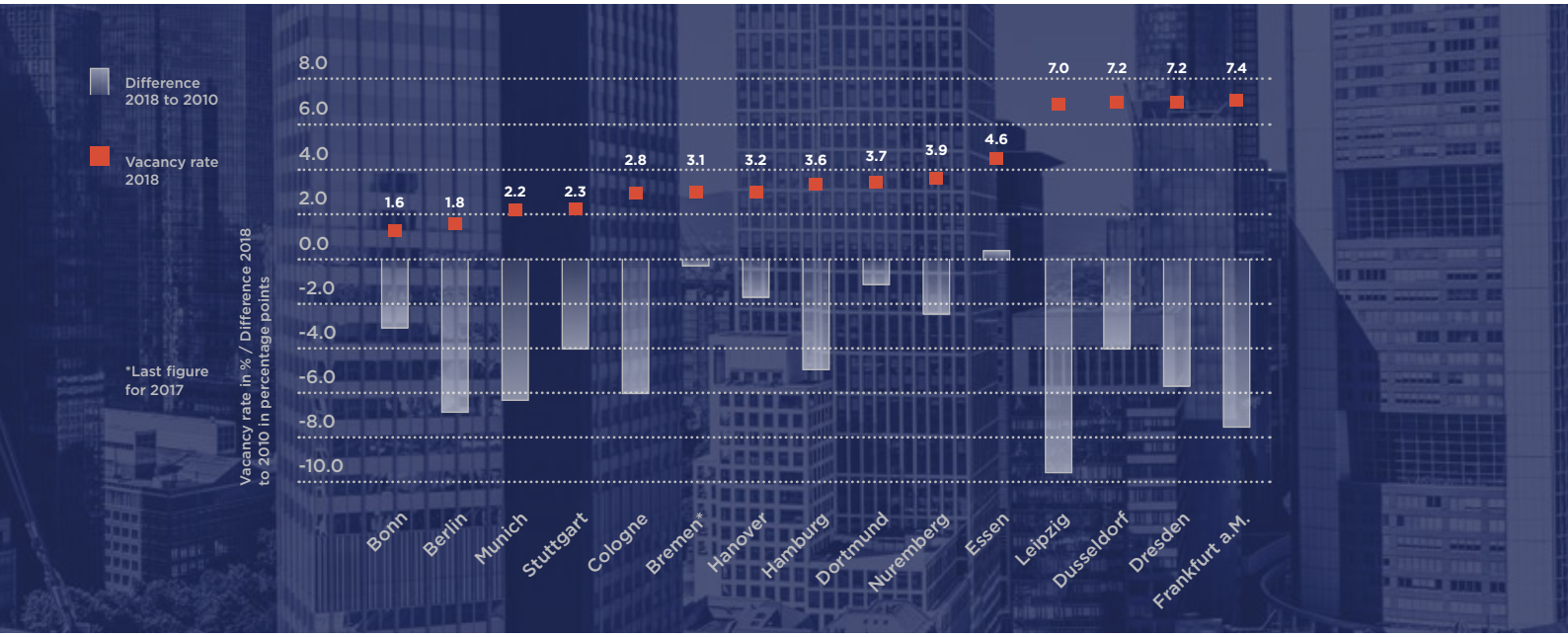
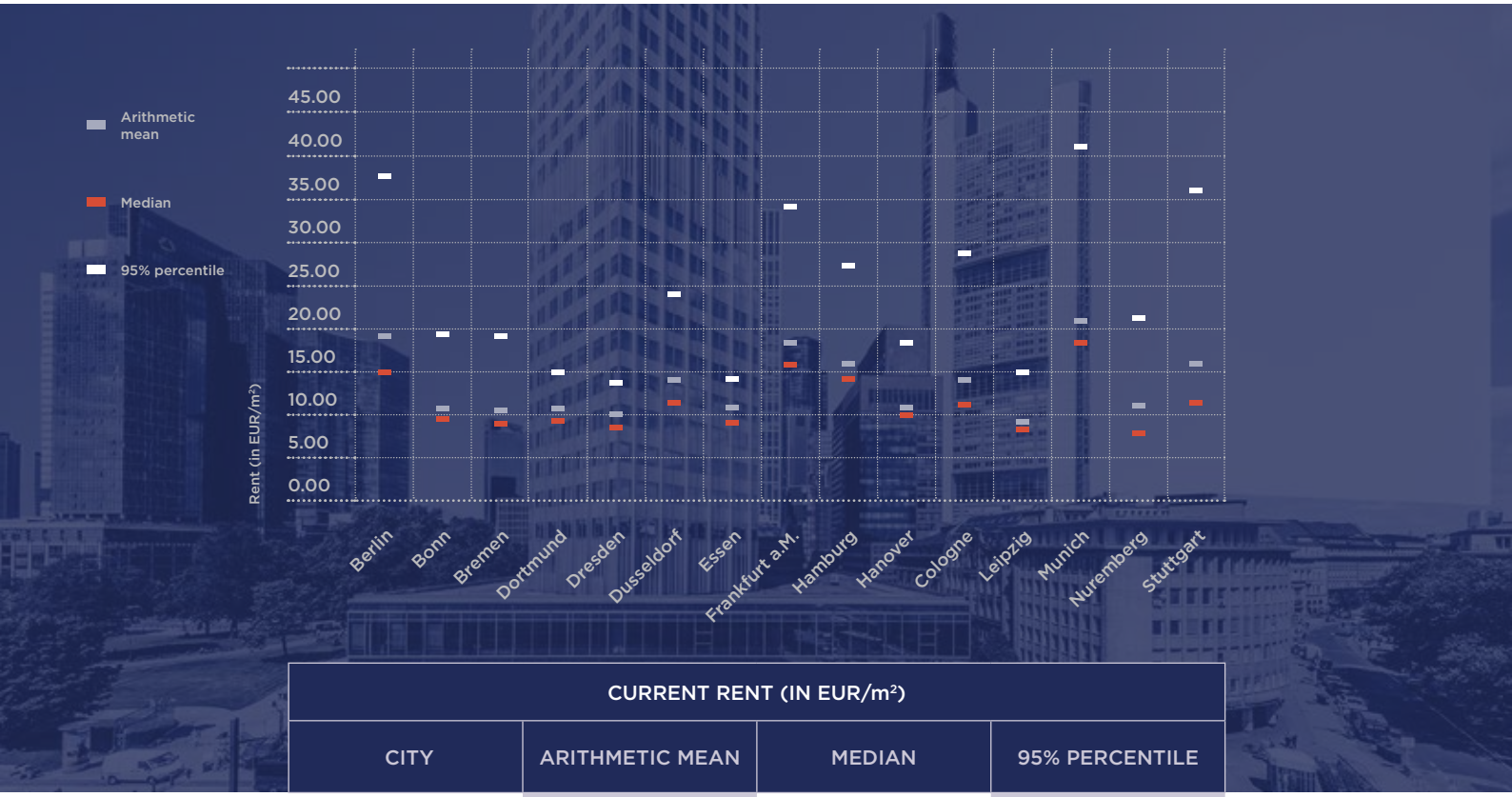


Figure 9: Vacancy rate for office space 2018 and development compared to 2010 – selected locations
Source: Thomas Daily 100 Cities Survey; own calculation and illustration

Rent levels

In part the office rents at the individual locations differ greatly (Figure 10). Whereas at the most expensive office location – Munich – 21.00 EUR/m² has to be paid for office space (arithmetic mean), the sum is nearly EUR 12.00 less at the extremely favourably-priced Leipzig. Accordingly, for every office in Munich one could open two offices in Nuremberg or Dresden for instance. Also price-intensive are Berlin and Frankfurt am Main. Favourable locations with rents of less than 11.00 EUR/m² are – alongside the above-mentioned Leipzig, Dresden and Nuremberg – Bremen, Bonn and Dortmund.

Also interesting is the bandwidth of rents. Top properties (upper 5%) in the Bavarian capital attain rents of more than 40.00 EUR/m². In Berlin, Frankfurt am Main and Stuttgart the 95% percentile is more than 30.00 EUR/m². In contrast, top properties in Leipzig and Essen are to be had for as little as approx. 15.00 EUR/m². The statistical analysis calculates the arithmetic mean above the median in all 15 locations. This discrepancy results in a right-skewed distribution, i.e. prices for the "better" half of office properties which differ to a much greater degree and are in part significantly more expensive than the remaining subset.



CURRENT RENT (IN EUR/m²)			
CITY	ARITHMETIC MEAN	MEDIAN	95% PERCENTILE
Berlin	19.34	15.00	37.38
Bonn	10.68	9.17	19.01
Bremen	10.13	8.50	18.66
Dortmund	10.70	9.00	15.07
Dresden	10.11	8.00	14.24
Dusseldorf	14.22	12.00	23.68
Essen	11.10	9.00	14.00
Frankfurt a. M.	18.43	16.00	34.00
Hamburg	15.98	14.00	26.88
Hanover	11.28	9.87	18.18
Cologne	14.40	12.00	29.55
Leipzig	9.49	8.00	15.00
Munich	21.18	18.00	41.18
Nuremberg	10.89	8.17	21.00
Stuttgart	15.89	12.00	36.67

Figure 10: Office rents – current figures on the basis of the arithmetic mean, median and 95% percentile, selected locations
Source: F+B GmbH; own illustration

Rent dynamics

In the past five years there have in part been substantial rent increases. Rents have increased more rapidly than the general increase in prices (inflation). The ten-year observation also reflects these market dynamics. While Berlin displays the highest growth rates in both periods, the former German capital Bonn brings up the rear. Since 2013 office rents in Berlin have grown in nominal terms by 71.2%, in Bonn by 10.8%. Likewise, strong growth rates have been observed in this period in Stuttgart (51.6%), Nuremberg, Leipzig, Dresden and Munich (each more than 40%). In the ten-year period the mean rent level in Berlin has increased by 87.1%, with Bonn posting a growth rate of 20.5% here.
In this context an overview of the annual growth rates (geometric mean) for the five- and ten-year periods is also interesting (Figure 11). Here too Berlin stands out with an annual growth rate of more than 11% since 2013. In the same observation period Bonn again brings up the rear with an annual increase of 2.1%, which is still, however, higher than the average inflation rate of 1.2% (here for the period since 2008, since 2013 an average of 1.1%). The average rent growth in the shorter period since 2013 has been significantly more dynamic than the ten-year mean since 2008. This difference results from the strong price increases in the most recent past.
All in all the increases in rents for office space in all the cities listed here were in part more than able to compensate for the annual rate of inflation. Furthermore, the rent growth in the shorter period under consideration has been significantly more dynamic. The current rent level for office space is caused to a large extent by the pronounced price dynamism of the past five years, therefore.

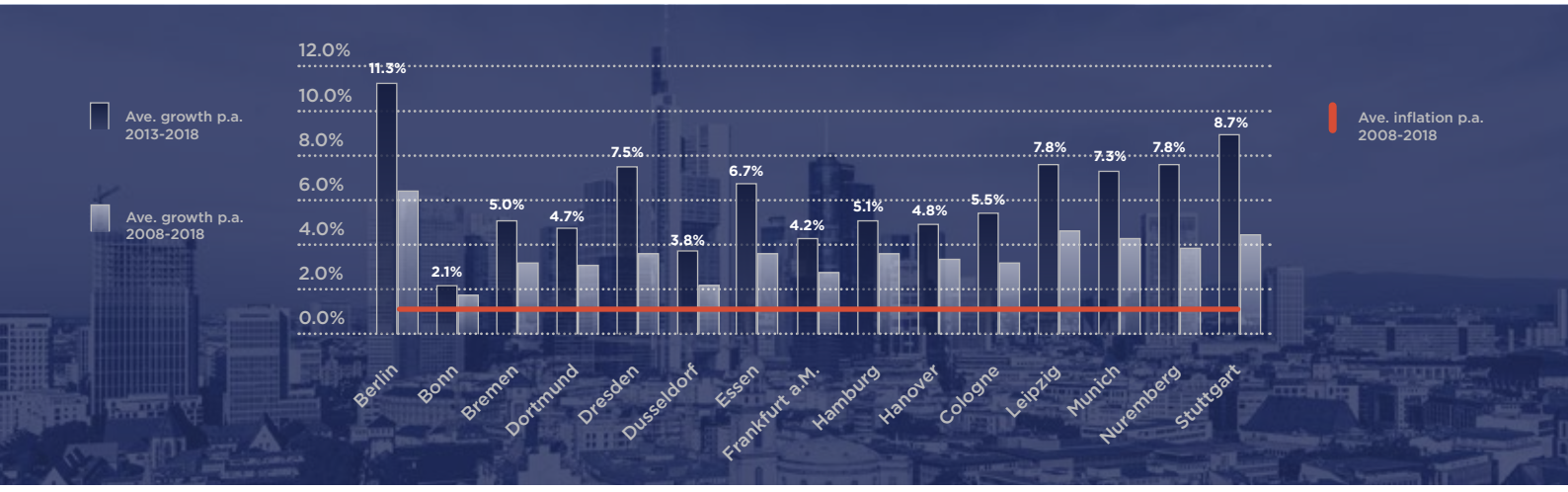


Figure 11: Development of office rents – average annual growth compared to average rate of inflation (respective geometric mean), selected locations
Sources: Federal Office of Statistics, F+B GmbH; own calculation and illustration

Yield development

A glance at the yields also reveals a clear trend: the prime yields have been declining continually since 2012 (Figure 12). The top and flop locations with regard to the attainable prime yield among the cities studied here have changed in the course of time. Whereas since 2010 Munich has frequently been the city with the lowest yield, Berlin is currently the office location with the lowest prime yield (2.8%). Dortmund is currently, as in a number of earlier years, at the top end of the yield ranking among the 15 cities studied here with a yield

of 5.5%. In 2010 7.0% could still be attained for office space in the then "yield leaders" Dresden and Nuremberg. At that time Berlin was still attaining more than 5.0%. In the wake of the yield compression this has declined across all 15 cities by an average of two percentage points since 2010. In contrast, the gap between the cities with the highest and lowest yields has widened. In 2010 this spread was 2.1 percentage points, in 2014 it was 2.0 and it is currently 2.7 percentage points (following on from 2.5 in 2016 and 2.7 also in 2017). The identification of the existing and the emerging differences in attainable yields are – and in particular in the framework of portfolio allocation – of fundamental significance for investors, this finding not only allows for conclusions to be drawn regarding the financial theory-based yield on capital but also on the risk profiles of the investment.

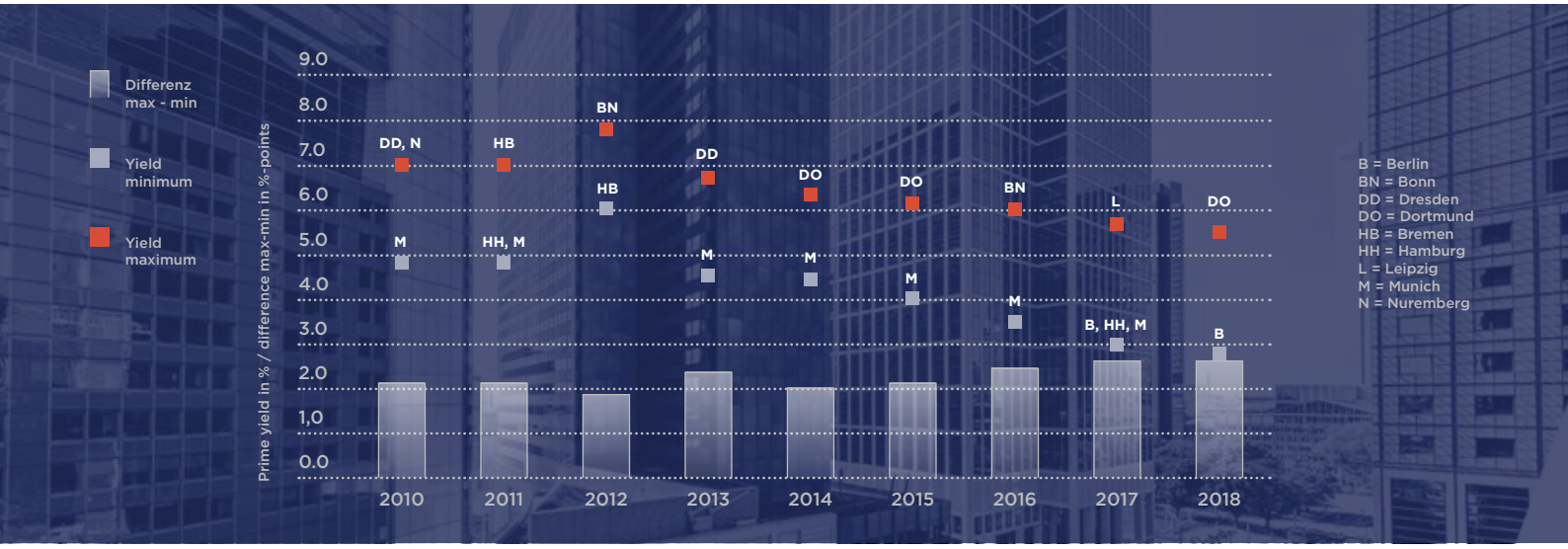


Figure 12: Development of the maximum and minimal prime yields and of the difference between maximum and minimum per year – selected locations
Source: Thomas Daily 100 Cities Survey; own calculation and illustration

Location differences

On the whole a positive trend may be identified for the 15 analysed office locations; in past years this has been reflected in rising rents, declining vacancy rates and decreasing yields. In this respect the development in some cities is particularly striking. Above all Berlin and Munich stand out among the large, established office markets. Both have displayed substantial decreases in vacant office areas with simultaneous strong growth rates for rents, which in the case of Berlin was the highest of the 15 locations by far. There has been a considerable increase in office space in Munich despite the already high starting level, thus ensuring the Bavarian capital takes the leading position when it comes to the current rents. On the other hand the yields in both cities are also the lowest by comparison, whereby Munich, which for many years posted the lowest yield, has now been superseded by Berlin.
In the case of Nuremberg and Stuttgart two more southern German cities stand out in a positive sense with respect to rent growth

and the decline in vacancies. On the other hand, highly dynamic developments can be ascertained in Leipzig and Dresden. The two metropolises in Saxony are thus displaying clear catch-up trends, and with respect to their dynamism are well ahead of classical investor targets in the office segment such as Hamburg, Dusseldorf and Frankfurt am Main. Although the latter two cities have been able to significantly reduce their vacancy rates, these are still at a relatively high level of more than 7%. The average annual rent growth since 2013 has been the lowest among all 15 cities, albeit against the background of comparatively high starting figures. Merely Bonn came behind these two Top 7 markets with mean rent increases of 2.1% per annum. Fundamentally, the bandwidth of rents and yields is also becoming larger. The strongest office markets have pulled ahead of their competitors in the recent past. Investors continue to direct their attention towards traditionally good performers such as Munich und Stuttgart, yet also have an eye on interesting alternatives such as Leipzig, Dresden and, above all, Berlin.

4. What is driving developments on the office markets?

The positive market developments, and in particular the corresponding changes with regard to vacancy rates, rents and yields, are a consequence of socioeconomic and economic developments. Upstream markets and value added stages generate demand, purchasing power and dynamism which are later reflected by the office real estate markets. In economic theory and in empirical studies on real estate markets developments are often explained or forecasted with leading, coincident and lagging indicators. Thus, for example, Deutsche Bundesbank provides an indicator system to evaluate the situation on the German commercial real estate market. This system differentiates between price-related, financial and real economic indicators. Based on the general findings of various studies and observation systems the following different (socio) economic parameters are used to analyse and explain the office market developments at the 15 locations. In the impact analysis it is above all employment, economic output and economic structure parameters which are examined.

Employment

The development of the labour market in a region or city induces a corresponding demand for office space and other places of work. More employees fundamentally mean an additional need for working space, be this in offices, factories, stores or other facilities (discounting certain qualitative or organisational adjustments arising from home office or desksharing, for instance). An important indicator is thus the unemployment rate and the corresponding development of employment figures.

Analogously to the development in Germany as a whole, in recent years all the locations under consideration have experienced what has sometimes been a considerable downturn in the number of unemployed persons. Above all in the past three to four years employment levels have produced positive headlines with record highs at times. The unemployment rates declined at many locations (Figure 13). Leipzig, which at the beginning of the observation period still had the highest unemployment rate among the 15 cities examined more closely, has been able to lower this rate since 2006 by twelve percentage points to 6.7% (2018). The bottom positions are now occupied by a number of cities in the Ruhr District. Dortmund and Essen still have figures of more than 10%. Berlin has also been able to post a major decrease in the unemployment rate. Compared to 2003 this is now ten percentage points lower.

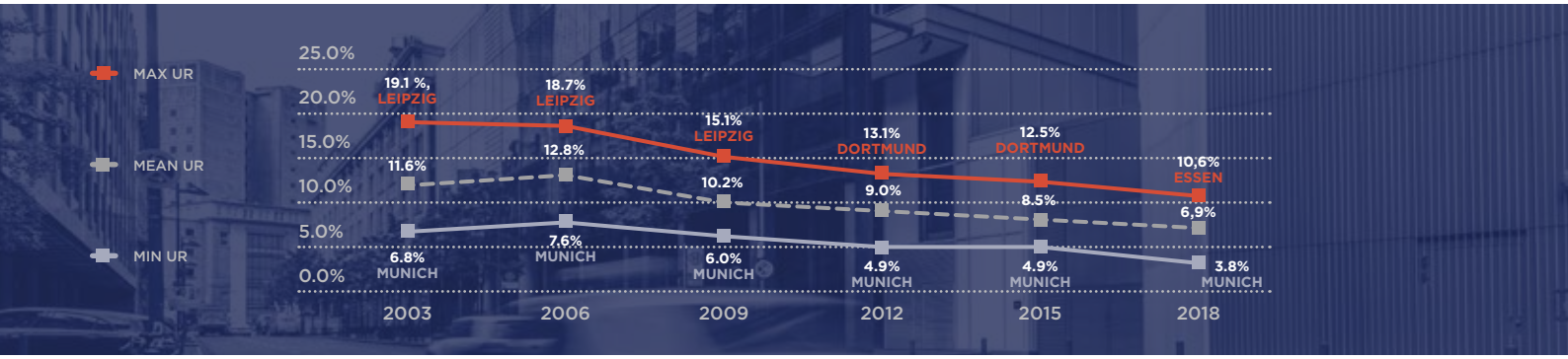


Figure 13: Development of unemployment rate (UR) – maximum and minimum values in each case as well as average of the 15 locations
Sources: Federal and State Offices of Statistics (on the basis of the labour market statistics of the Federal Employment Agency); own calculation and illustration

The location with the lowest unemployment rate throughout this period is the Bavarian capital Munich. In 2018 the rate was a mere 3.8%. The ratio is similarly low in Stuttgart at 4.2%. Frankfurt am Main and Nuremberg, each with 5.4%, find themselves at about the same level as the rate of 5.2% for Germany as a whole. The mean for the 15 cities is currently 6.9% and thus nearly six percentage points lower than twelve years ago. The unemployment rate is an initial indicator of the real employment effects and the corresponding demand for production, administration, trade and other areas. The improvements in the labour market situation thus directly or indirectly benefit the office real estate markets.

While the unemployment rate is a much acknowledged ratio, its size is influenced by statistical effects, however, and is scarcely meaningful when it comes to the reasons for unemployment (structural or frictional for instance) or employment structures, for example. The decline in the unemployment rate is not necessarily the same as a corresponding rise in employment levels.

The employment density is an alternative ratio which states the number of jobs subject to social insurance contributions as a proportion of the number of people of employable age in a city. In the corresponding analysis Frankfurt am Main stands out very clearly. The metropolis on the River Main has the highest value of all the cities. In this respect the figure is actually greater than one. There are more jobs in the city than residents of employable age. The background to this is the many commuters who travel to work in the city every day. Dusseldorf also recently attained a value with which the supply of jobs and the number of employable residents were balanced in statistical terms at least. Stuttgart, Nuremberg, Hanover, Munich and Bonn are locations at which there are employment opportunities subject to social insurance contributions for at least 80% of the residents of an employable age. The rear is brought up here by Berlin with a value of 0.6. Thus for four out of every ten residents of Berlin aged between 15 and 64 who are in principle available to the labour market there is no job subject to social insurance contributions (without however taking into account the reported vacant positions). This is also reflected in the relatively high unemployment rate in a comparison with the cities analysed here (in 2017: 9.0%; only Dortmund, Essen and Bremen with a higher rate). Differences also result from other people in paid work and from other persons not available to the labour market. With regard to the rate of change, the figure for the German capital has increased most clearly of all the 15 cities in the comparison to 2007 with the figure of 0.45 at that time.

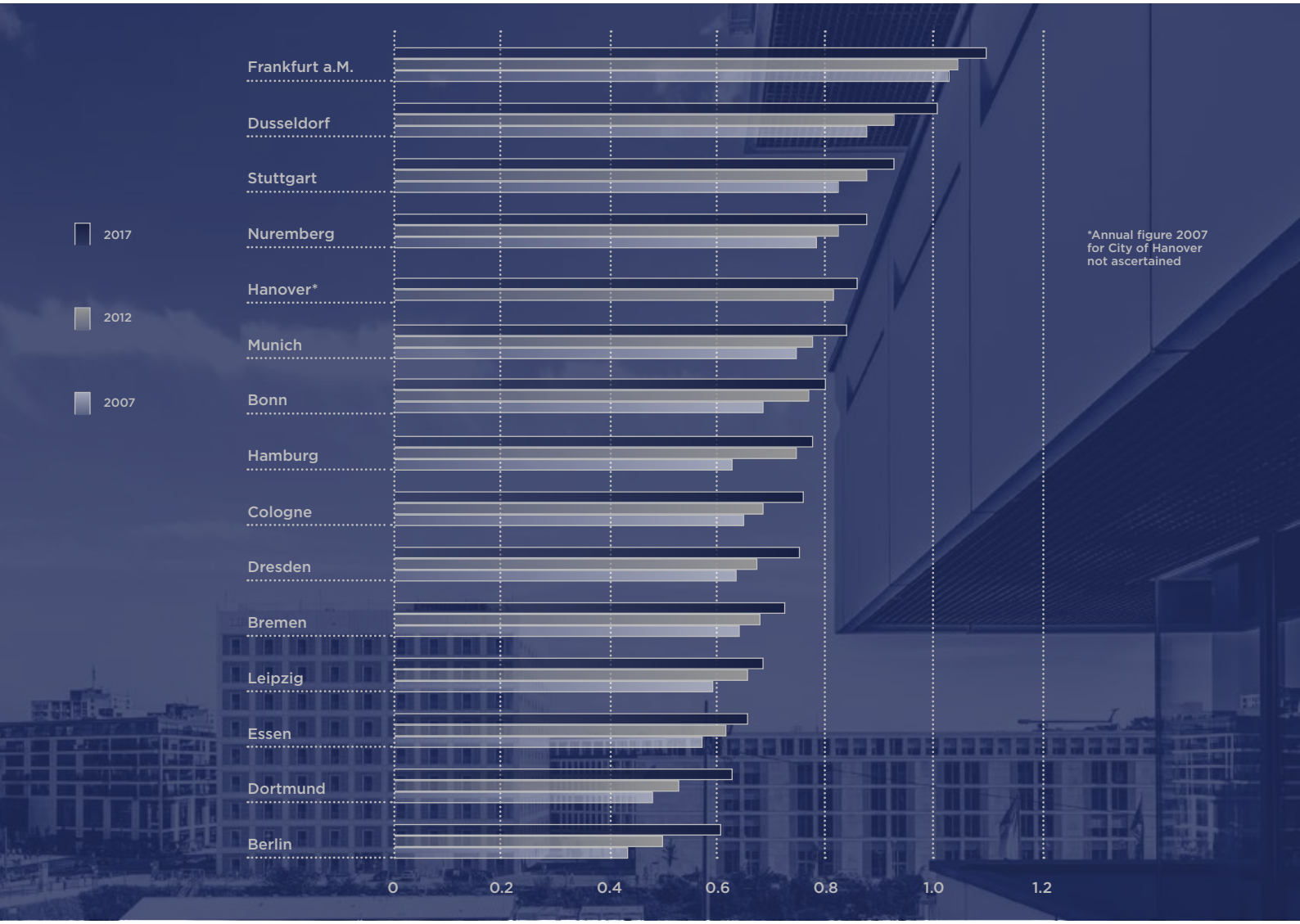


Figure 14: Development of employment density (employees subject to social insurance contributions compared to residents of employable age) – selected locations in comparison, as at 31.12. of respective year, employees subject to social insurance in Hanover as at 30.06. of the respective year
Sources: Federal Employment Agency, State Office of Statistics Lower Saxony, City of Hanover, Federal Office of Statistics; own calculation and illustration

Alongside the purely quantitative consideration of this "supply ratio", qualitative features – and therefore matching effects – are of course crucial to a concluding assessment of the local labour market for the resident population. That the number of local residents and labour market figures do not necessarily (have to) conform is clearly illustrated by the in part considerable positive commuter flows of the 15 locations (Figure 15). As with employment density Frankfurt am Main is also the leader in terms of commuter flow. In 2018 the daily number of commuters into the banking metropolis exceeded the number commuting out of the city by nearly 278,000. Five years previously it had been some 259,000. Frankfurt am Main is followed by Hamburg and Munich with positive commuter flows of

approx. 225,000 and 208,000, respectively. The largest leap in both absolute and relative terms to 2013 is to be seen in Berlin. Here the commuter flow increased by 31,000 or 30%. Merely Leipzig has posted a downturn over the period of time taken for the study; this is to be explained firstly by people moving into the city to live (who previously commuted into the city), and secondly by the creation of new jobs in neighbouring communities (new commuters out of the city).

It is also interesting that the smallest location in this analysis by far in terms of the number of residents, Bonn, posts relatively high figures with respect to commuter numbers. Bonn's commuter flow is more than double that of Dortmund's. Over 103,000 people commuted into Bonn daily in 2018 – testimony to the supra-regional significance of the labour market in the former German capital, which

Figure 15: Commuter flow – selected locations; cut-off dates: 30.06.2018, 30.06.2013
Sources: Federal Employment Agency, State Office of Statistics Lower Saxony; own calculation and illustration

is still home to a number of federal agencies and national federations and where Deutsche Telekom, Deutsche Post AG and Postbank still have their headquarters. In the interpretation and appraisal of the office market a positive commuter flow can be regarded as an indication of the attractiveness of the respective labour market. Other factors such as a tense housing market can also play a role.

Economic output (GDP, GVA)

The labour market provides initial pointers to economic activity and to the demand for office space and other work areas. In this respect the analysis is oriented to people, to a quantity therefore. A financial, value-based observation is of particular importance for the development of rents (and ultimately also purchase prices), however. This is generally to be evaluated through the economic output of a region or city. The per capita gross domestic product serves as a parameter here. As this parameter can only be recorded and stated with a time delay, it is merely possible to analyse figures through to 2016. For the purpose of comparing growth the year 2010 has been utilised as a point of reference. As a further comparison the development of rents for new properties in the corresponding period has been utilised.

The analysis shows that virtually all the cities were able to increase their per capita GDP. The increase was greatest in Munich at 22.1%. Leipzig, Cologne, Dresden and Nuremberg then followed as the cities with the strongest economic growth. In Essen the per capita GDP virtually stagnated, with growth of a mere 0.3%. Bonn was the only city to post a negative development, namely of minus 2.2%. In a comparison it is noticeable that the direction and strength of the GDP change is not necessarily congruent with the development of rents. Thus, for example, rents for new properties in Bonn increased by 11.2% from 2010 to 2016 – despite a downturn in per capita GDP. In Hamburg, where economic output picked up by 13.0%, office rents only increased to a slightly higher degree, namely by 11.8%.

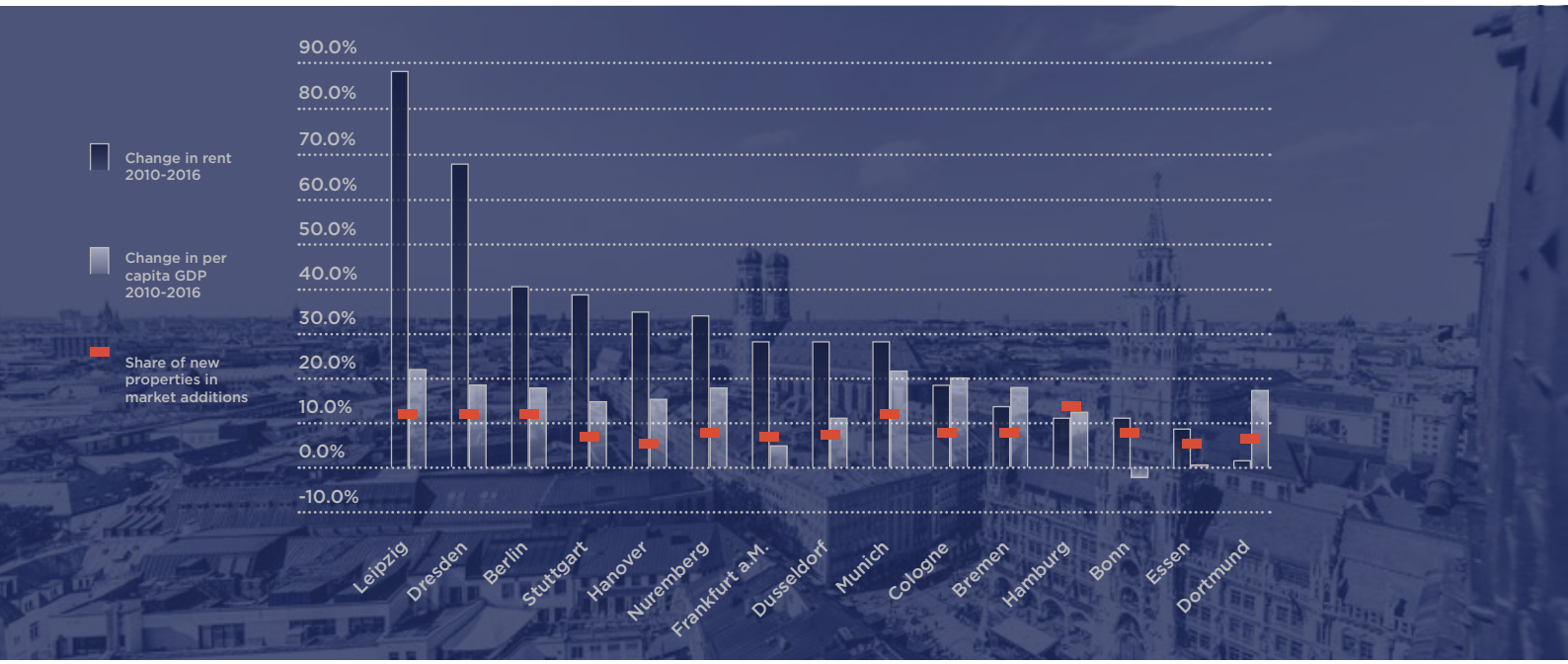


Figure 16: Development of economic output (per capita GDP) and office rents (new construction, arithmetic mean), portrayal of proportion of new office construction in all traded market properties (arithmetic mean 2010-2016) – selected locations in a comparison
Sources: F+B GmbH, Chamber of Industry and Commerce Hanover, Federal and State Offices of Statistics; own calculation and illustration

The cities of Leipzig and Dresden in Saxony are displaying signs of the expected correlation. Here the economic development catching-up processes also seem to be driving the prices on the real estate market. Per capita GDP and office rents at both locations are showing clear signs of an upward trend.
Several locations display a factor of two to four for rent increases in terms of economic growth. With a factor of 5.7 (28.2% rent to 4.9% GDP growth) the figure for Frankfurt am Main is actually even higher than this. In purely arithmetical terms there is also a very high factor for Essen, but this is due to the fact that the figure for GDP growth is virtually zero. All the comparisons are based on rents for new properties as these react relatively quickly to changes in the economic framework conditions. Their mean share of market developments in the period under consideration for the 15 locations amounted to approx. 8%. Although it is possible to detect a correlation between economic dynamism and rents, in view of the wide spread of rent development it is to be assumed that there are also other influencing factors.

Economic structure (tertiarisation)

While the GDP shows the economic output of a region or city as an overall result, office markets are dependent on specific uses and sectors. An insight into the respective economic structures is offered by the GDP output approach using the differentiated gross value added (GVA). The latter differentiates sector-related information in its statistics. Relevant for office markets are the service sectors listed within GVA (sections G-T of the Classification of Economic Activities, Issue 2008).
Accordingly, the service sectors currently account for at least 66% of the regional GVA at all 15 locations. Thus a good two thirds of GVA are accounted for by the service sectors, whereby in 12 of the 15 cities the share is actually higher than 75%. The field is clearly headed here by Bonn, where service industries account for 94.3% of economic activity. The lowest share in the entire GVA is displayed by the service sectors in Stuttgart. This is due above all to the dominant role in the value added process played by local companies in the car-making and engineering industries.
Of interest are the rates of change for gross value added in the service sectors and the degree of tertiarisation in a ten-year comparison (Figure 17). With respect to the first parameter Bonn has remained virtually constant (low minus of 0.1 percentage points); similar developments are to be seen for Dusseldorf, Hamburg and Munich. The largest downturn is posted by Leipzig with a decrease of 2.7 percentage points, whereby this change is only relative and is explained by the considerable increase in the manufacturing industry (for example BMW and Porsche). Strong growth is also posted by Dresden and Essen with 6.4 and 5.7 percentage points, respectively, which reflects the economic transformation processes at the two locations. In total seven cities display an increase in the share of the service sectors, five a minor decrease and three (Frankfurt am Main, Nuremberg and Bremen) no change.
The economic structural change may be measured using the degree of tertiarisation. This shows the proportion of employees subject to social insurance contributions in the tertiary sector (service industries) to all employees subject to social insurance contributions at the work location. Here too the rates of change for the development of office demand are decisive (Figure 17). The degree of tertiarisation in Germany amounts to approx. 70.8%, whereby the service sector has seen an above-average increase compared to other sectors in recent years. The degree of tertiarisation in the cities observed here is generally much higher than the figure for Germany as a whole. The lowest proportion is displayed by Bremen with a current figure of approx. 77%, the highest by Bonn with nearly 92% of the employees subject to social insurance contributions in the tertiary sector. Bonn is followed by Frankfurt am Main with 89.3% and Dusseldorf with 87.4%. Depending upon the qualifications and earnings of the employees the tertiarisation is not necessarily accompanied by a higher GVA. Thus Munich posted

the strongest increase in the share of employees in the service sector (5.4 percentage points), but saw a percentage decline on the part of the service industries in the GVA. This was also seen to a lesser extent in Nuremberg, Bremen and Dusseldorf. In Essen, Dortmund, Dresden, Stuttgart and Hanover (region) the gross value added shares increased to a much greater extent than the levels of employment in the service sectors. This can be a sign of greater strength on the part of service sectors (or comparatively weak industries).

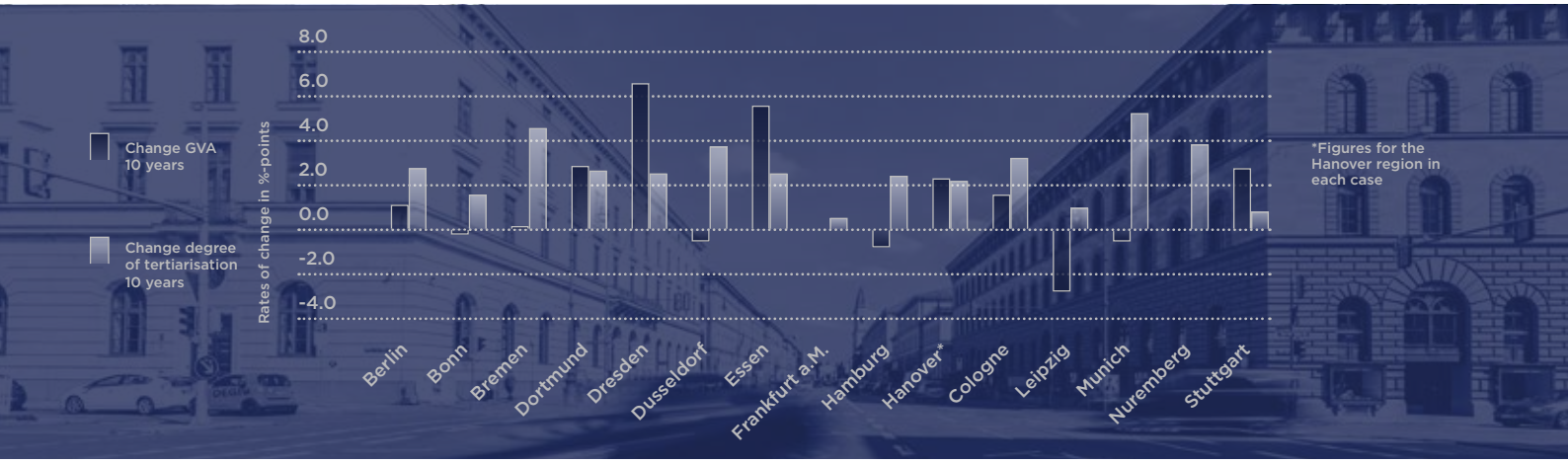


Figure 17: Development of the share of the gross value added for service industry sectors (sections G-T in the Classification of Economic Activities, Issue 2008) in the gross value added as a whole as well as degree of tertiarisation (share of employees subject to social insurance contributions for the service sector in all employees subject to social insurance contributions) – selected locations in comparison
Sources: Federal Employment Agency, Federal and State Offices of Statistics; own calculation and illustration

Office workplaces

The illustrated developments for employment intensity and sector structures lead to the concrete demand for office space. The number of office employees serves as an indicator. This number has increased in virtually all the cities in recent years, apart from in Leipzig and Essen (Figure 18). In Berlin the number of office employees has increased by 20% to more than 600,000, the biggest change in absolute and in relative figures. Dortmund follows with an increase of 15.3% ahead of Munich with 13.5%. Other locations have growth rates of between 7.5% (Bonn) and 11.7% (Cologne and Nuremberg).

The share of office employees in the total number of employees (subject to social insurance contributions and marginally employed persons) is highest in Frankfurt am Main at 46.5%. Then follow Dusseldorf, Munich, Stuttgart, Cologne and Bonn, all with shares of over 40%. The lowest share is posted by Bremen with 30.3%. The shares and growth rates lead to substantial demand on the local office markets. Corresponding areas have to be sufficient in quantitative terms and meet qualitative needs. Differing features such as layout, fit-out and location presuppose a certain surplus of office space so that the regional economy continues to function.

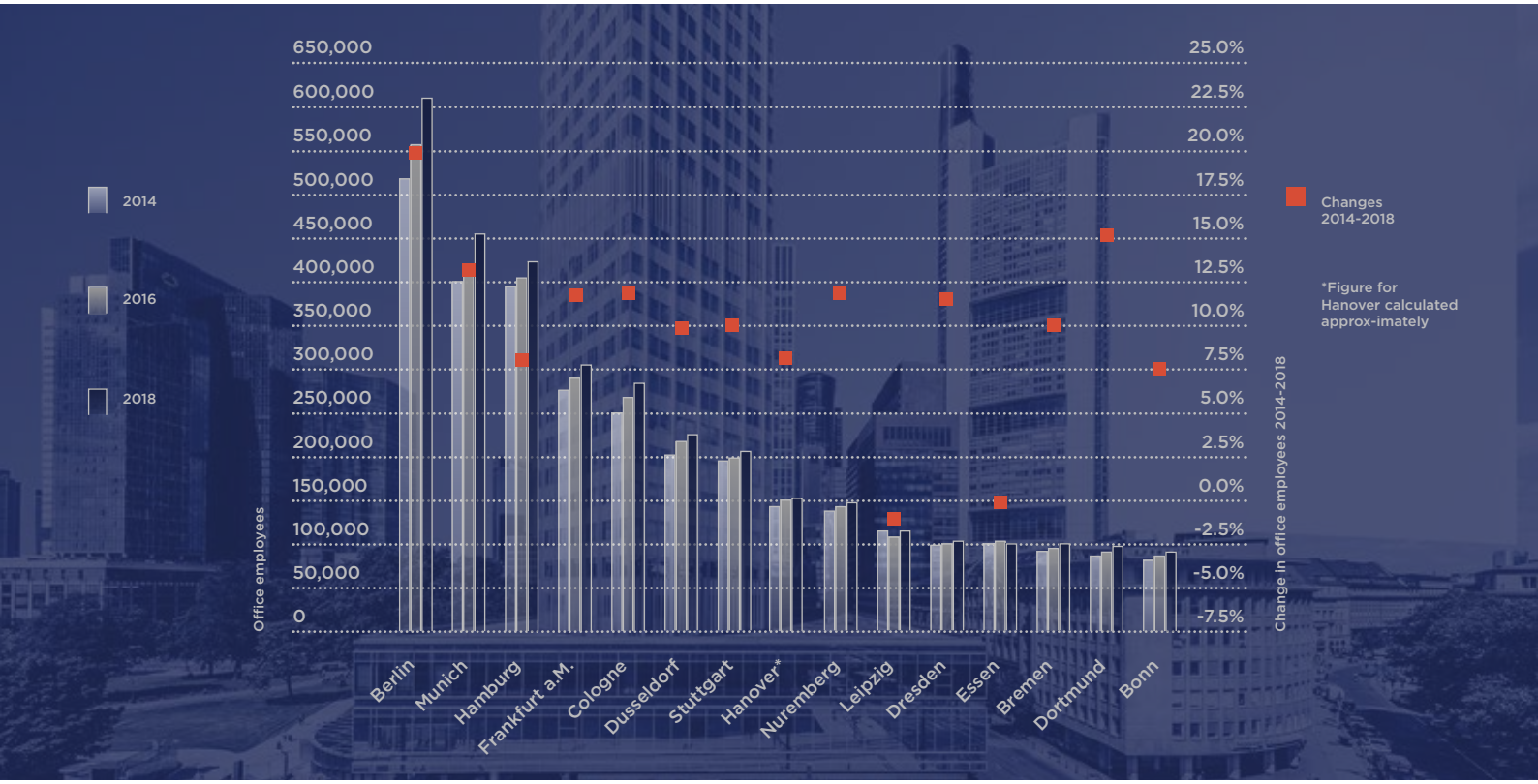


Figure 18: Development of number of office employees (subject to social insurance contributions and marginally employed persons) – selected locations in comparison, as at June of each year
Sources: Federal Employment Agency, City of Hanover; own calculation and illustration

5. Prioritisation of office real estate markets

The German real estate market as a whole has developed extremely positively in recent years. Demand has been driven by the excellent economic development and the associated increase in employment levels. A prioritisation of office real estate markets as investment locations can be conducted on the basis of their most important socioeconomic, structural and market-related key ratios.

Overview »Market ratios and value drivers«

The value drivers studied for the 15 observed office locations addressed the labour market, economic growth, the degree of tertiarisation and the gross value added of the service sectors. What could be seen were in part significant growth rates in the tertiary sector with regard to employment and value added. As a consequence there was a substantial increase in the number of office employees and thus the demand for office space. It may be assumed that there are additional office jobs in the industrial sector; these have not explicitly been shown here. Likewise it can be assumed that the structural changes will be sustainable as a result of the general trend towards a service-based economy, while the intensity of employment levels is more dependent on market conditions. In part the developments are based on regional transformation processes, for example at locations such as Dortmund, Essen, Leipzig and Dresden. Other locations such as Munich, Frankfurt am Main

and Dusseldorf are to be regarded as already long-established, stable office locations. Particular dynamism is displayed by Berlin.
The following table (Figure 19) once again summarises the fundamental data on the absolute and comparative assessment of the cities as an investment location. The best (green) and worst (red) three values have been highlighted for each category.

LOCATION	Current rent (arith. mean)	Rent Δ '14-'18	Current vacancy rate	Vacancy rate Δ '14-'18	Current number of office empls.	No. of office employees Δ '14-'18	Share of office empls. in total no. of empls.	Available area per office empls.
Berlin	**19.34 EUR/m²**	**+67.0 %**	**1.8 %**	**-4.7 %-P.**	**618,240**	**+20.0 %**	36.5 %	31.5 m²
Bonn	10.68 EUR/m²	**+19.1 %**	**1.6 %**	**-1.8 %-P.**	**87,077**	**+7.5 %**	40.4 %	**44.4 m²**
Bremen	**10.13 EUR/m²**	**+19.1 %**	3.1 %	**-0.3 %-P.**	**102,063**	+9.9 %	**30.3 %**	34.9 m²
Dortmund	10.70 EUR/m²	+34.4 %	3.7 %	-2.0 %-P.	**96,926**	**+15.3 %**	**32.9 %**	30.7 m²
Dresden	**10.11 EUR/m²**	+34.3 %	**7.2 %**	-4.4 %-P.	107,972	+11.4 %	35.7 %	**23.1 m²**
Dusseldorf	14.22 EUR/m²	**+19.1 %**	**7.2 %**	-3.6 %-P.	222,601	+9.7 %	**45.2 %**	34.5 m²
Essen	11.10 EUR/m²	**+43.8 %**	4.6 %	**-0.4 %-P.**	102,886	**-0.4 %**	33.8 %	30.1 m²
Frankfurt a. M.	**18.43 EUR/m²**	+22.0 %	**7.4 %**	-4.6 %-P.	309,168	+11.4 %	**46.5 %**	**37.5 m²**
Hamburg	15.98 EUR/m²	+24.6 %	3.6 %	-2.8 %-P.	**425,990**	+8.3 %	37.0 %	32.2 m²
Hanover	11.28 EUR/m²	+29.9 %	3.2 %	-2.6 %-P.	152,653	+8.5 %	**32.5 %**	29.7 m²
Cologne	14.40 EUR/m²	+29.3 %	2.8 %	-4.2 %-P.	280,604	+11.7 %	41.0 %	**27.8 m²**
Leipzig	**9.49 EUR/m²**	**+40.3 %**	7.0 %	**-5.5 %-P.**	116,288	**-1.1 %**	38.1 %	28.5 m²
Munich	**21.18 EUR/m²**	+37.8 %	**2.2 %**	**-5.0 %-P.**	**458,570**	**+13.5 %**	**44.6 %**	**44.2 m²**
Nuremberg	10.89 EUR/m²	+39.5 %	3.9 %	-3.6 %-P.	145,606	+11.7 %	39.4 %	**24.4 m²**
Stuttgart	15.89 EUR/m²	+38.1 %	2.3 %	-2.0 %-P.	210,807	+10.0 %	43.2 %	**37.5 m²**

Figure 19: Key ratio overview; current market situation and dynamism; Top 3 (green) and Flop 3 (red) marked; selected locations
Sources: Federal Employment Agency, F+B GmbH, State Office of Statistics Lower Saxony, City of Hanover, TD 100 Cities Survey; own calculation and illustration

For the eight benchmark figures Berlin and Munich each have six values marked as positive (Top 3), whereby in the comparison of the 15 locations from an investor stance Munich appears once in the least favourable classification with a current available area of 44.2 m² per office employee. On the whole the two cities have proved themselves to be very attractive office locations in the recent past, and on the basis of the current data also display a promising outlook for future investments.
The remaining Top 7 cities likewise display solid values and developments, whereby Hamburg and Cologne both make it into the Top 3 clas-

sification in one category. The banking metropolis Frankfurt am Main features twice among the best three in the respective category, for the current rents and the share of office employees in the total number of employees. This contrasts, however, with two unfavourable key ratios, namely the highest vacancy rate of all 15 locations and the third-highest available area per office employee (tied with Stuttgart). Outside of the Top 7 Nuremberg is the only office market which is not among the worst three cities in any of the eight categories, but is one of the Top 3 in terms of available area. Despite two negative parameters, rent levels and the development of the number of office employees, Leipzig presents itself as an interesting market with two Top 3 places in the dynamism rankings, for rent development and the reduction in vacancy rates. In the tabular comparison Bremen performs poorly among the analysed locations with five negative categories, whereby it is above all the current rents and the low proportion of office employees in the total working population which are comparatively unfavourable.

All in all the majority of the 15 office locations are on a more or less comparable level for many parameters. The individual values often ensure compensation between positive and negative outliers in the comparison. Merely Berlin and Munich stand out somewhat with practically consistently promising values, whereas this position at the other end of the ranking is occupied by Bremen in most cases.

Matrix »Office rents and vacancy rates«

So as to include two relevant parameters in the market selection in each case and obtain an overall view of the parameter relationships, the 15 locations are shown below in matrix portrayals.

Figure 20 shows the status quo and the development of rents and vacancy rates for the 15 office locations. To be highlighted are those locations found in the lower left and upper right areas. Here a high vacancy rate is found with low rents and a low vacancy rate with high rents, respectively. From an investor stance particularly negative and positive markets can be identified relatively simply in this manner. In the area covered by the diagonals certain partial ratings cancel one another out. For example there are markets here with a low vacancy rate (high occupancy rate) yet with comparatively low rents (lower right corner).

Berlin and Munich prove to be the most attractive locations in terms of rents and occupancy rates. The smaller location Bonn has a very low vacancy rate, but the rents here are somewhat lower. The four locations Frankfurt am Main, Dusseldorf, Dresden and Leipzig tend to have a more negative positioning when it comes to vacancy rates, whereby Dresden and Leipzig also have relatively low rents.

The picture is a different one if the dynamism is taken into account (Figure 20, lower matrix). Leipzig has been able to reduce its office vacancies to the greatest degree since 2010 and make a significant improvement with respect to rents (+48.8%). A similar development has been displayed by the office market in Dresden, albeit not as pronounced. The capital Berlin stands out conspicuously. The vacancy rate here was lowered by nearly seven percentage points. In the period under consideration rents increased by more than 82%, the strongest growth rate in a comparison of the 15 locations. In Essen rents rose by 35.2%, but the vacancy rate here also rose by 0.6 percentage points. All in all the dynamic comparison shows a differentiated picture compared to the current figures – the spread across the matrix area is more distinct. Above all the lower left-hand area here contains several cities in which vacancy rates and rents are only seeing a moderate change.

Matrix »Office rents and office employees«

In Figure 21 the office rents are shown compared to office employment levels. The ideal situation, namely a large number of office employees, and thus high demand for office space, coupled with high rents, is one to which of all the locations Munich and Berlin come closest. Munich has the highest rents;

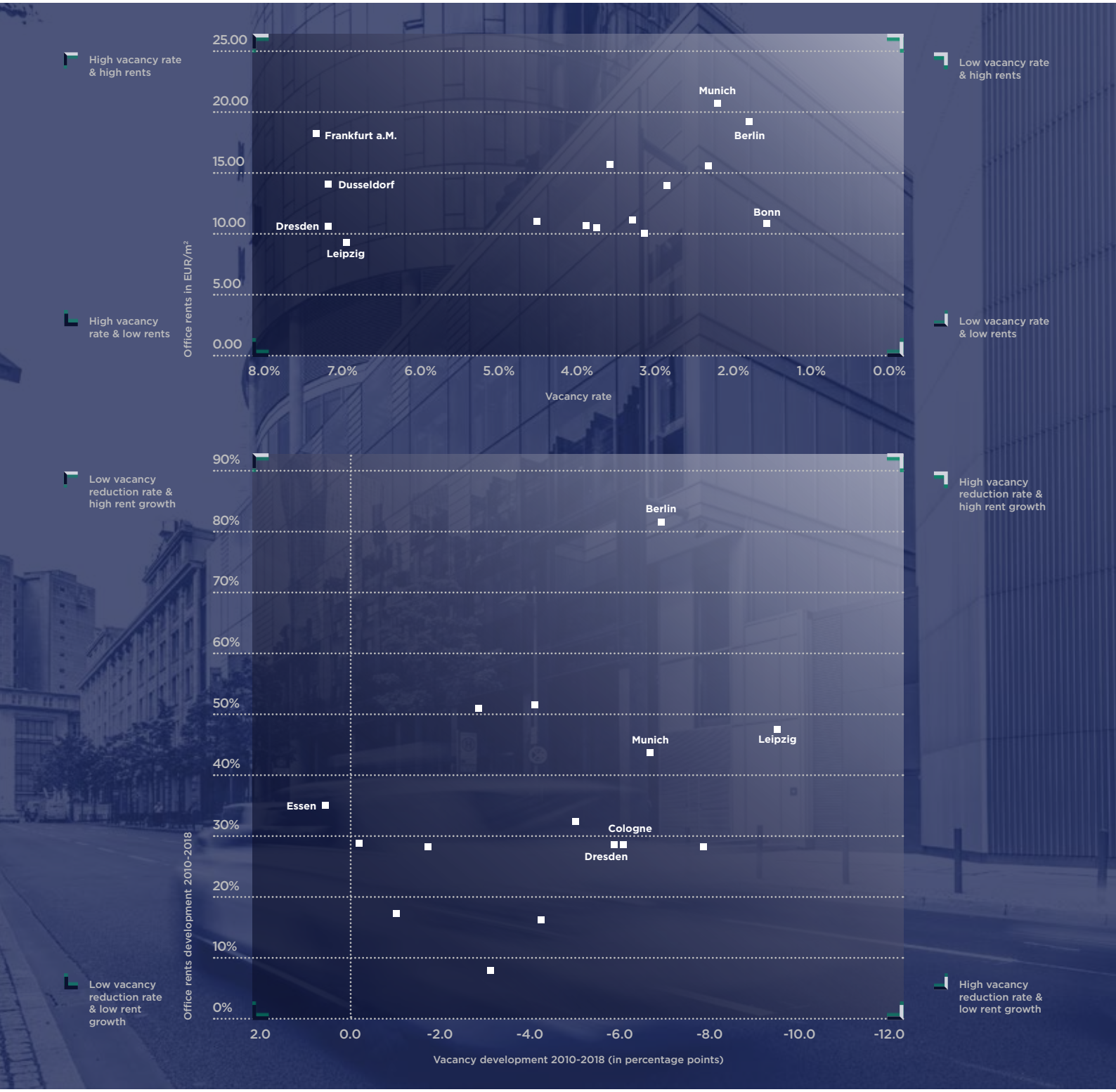


Figure 20: Matrix comparison of office rents and vacancy rates – current situation and dynamism, selected locations
Sources: F+B GmbH, TD 100 Cities Survey; own calculation and illustration

the number of employees in Berlin is approx. 160,000 persons higher as a consequence of the market size, however. The smallest location, Bonn, is to be found in a group of several similar cities, with Leipzig, Dortmund, Bremen and Dresden, for example, all displaying comparable ratios.

This more unfavourable constellation, at least in graphical terms, on the left-hand side of the matrix results from the substantially smaller number of employees compared to the larger office markets. This in turn results in other market structures, which can be attractive, however. More detailed analyses would be necessary in this respect.

In contrast the development matrix shows, alongside Berlin and Munich, which are once again favourably positioned, Dortmund and Nuremberg, which in the period considered here, 2014 to 2018, displayed high growth rates for rents and the number of office employees. Following Berlin, Essen and Leipzig displayed the highest rent growth rates, 43.8% and 40.3%, respectively, but they are also the only locations in which the number of office employees has decreased compared to 2014. The remaining locations are all at about the same level in terms of the short-term development of rents and office employment levels.

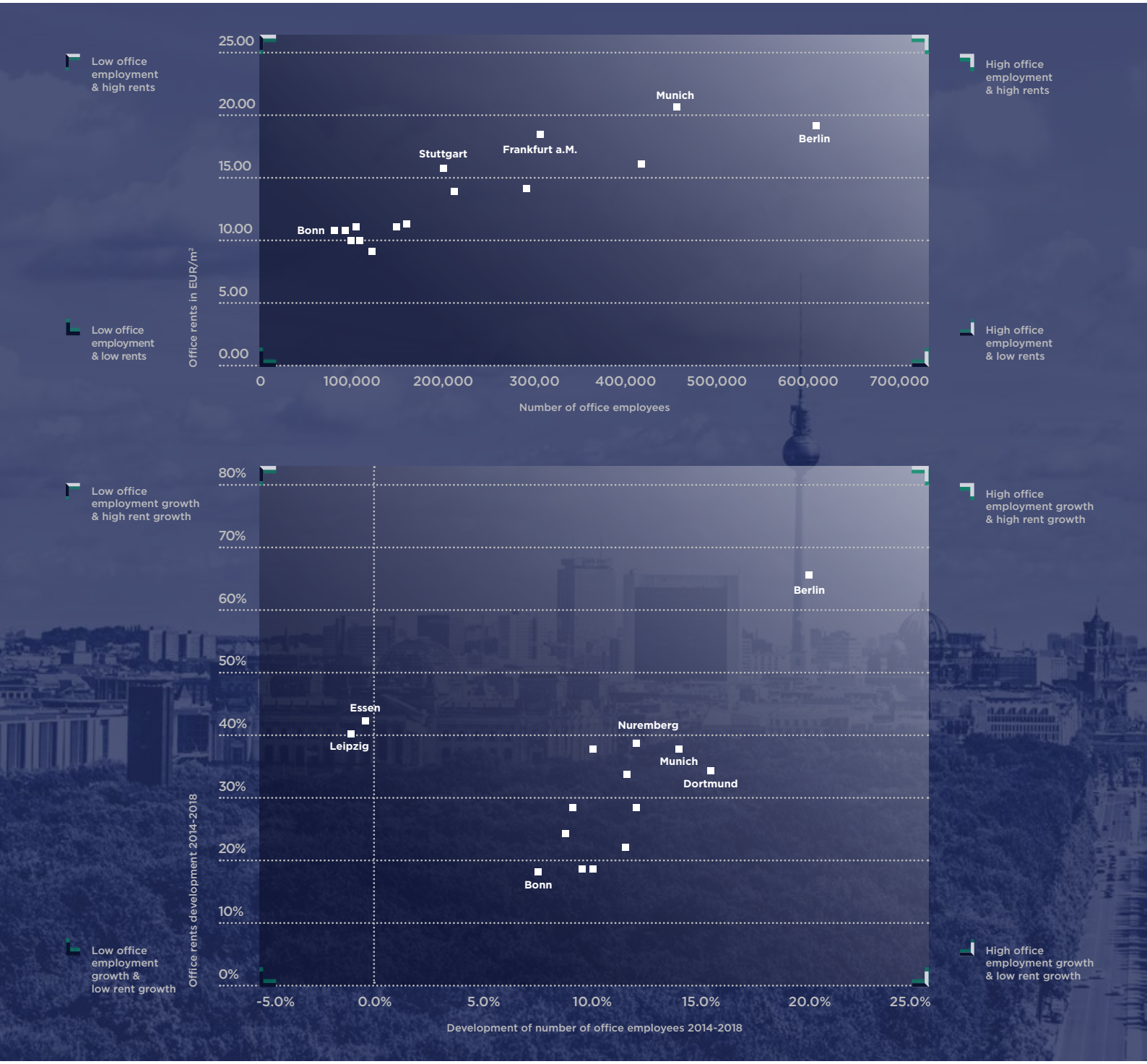


Figure 21: Matrix comparison of office rents and office employees – current situation and dynamism, selected locations
Sources: Federal Employment Agency, F+B GmbH, City of Hanover; own calculation and illustration

Matrix »Office employees and office space«

Apart from rents and purchase prices, purely quantitative relationships are also interesting for the market development. These represent upstream factors, which indicate requirements and shortages which lead to the corresponding price developments. Initially the available area per office employee is to be contrasted in a matrix with the proportion of office employees in the total working population at a work location (Figure 22).
It can be seen that Dusseldorf and Frankfurt am Main are the only two locations with an office employee proportion of more than 45%. At the same time they have a relatively high per capita available area. There would appear to be an adequate offering for the requirements, which have fundamentally existed for some time, in these cities.
In contrast, Cologne and Nuremberg likewise have an office employee proportion of about 40% but much lower per capita available areas. The figures for these two office markets are significantly less than 30 m². In a consideration of the matrix Bremen catches the eye. The available area is relatively high at just under 35 m² per office employee. At the same time the proportion of the total working population is very low at just approx. 30%. Structures of this nature result – in interplay with other factors – in comparatively low office rents, as shown by the location Bremen.

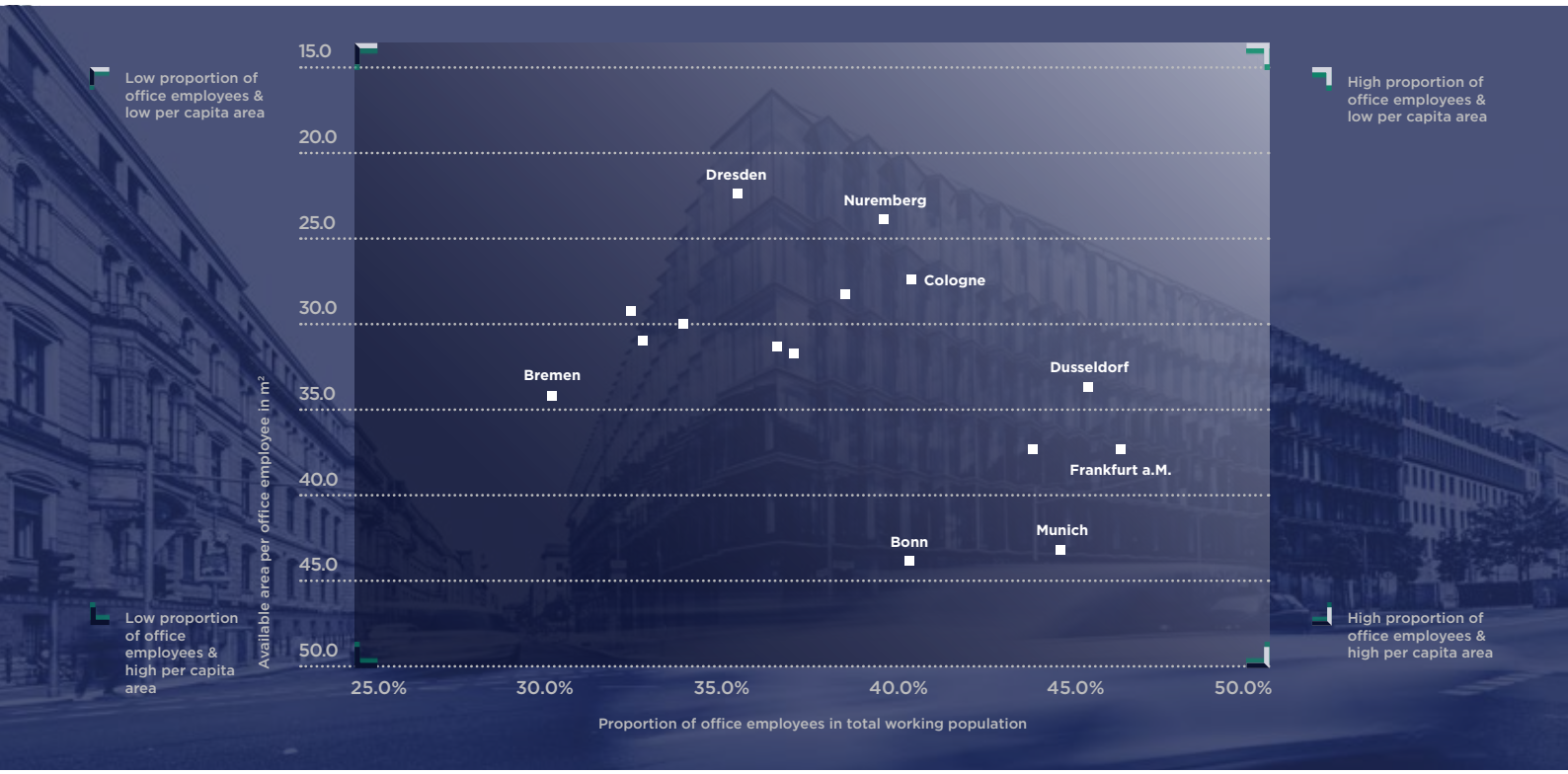


Figure 22: Matrix comparison per capita office space and proportion of office employees – current situation, selected locations
Sources: Federal Employment Agency, City of Hanover, TD 100 Cities Survey; own calculation and illustration

Matrix »Office space and vacancy rates«

The ratio of available office space per office employee to the office vacancy rate forms the final volume-based comparison (Figure 23). Markets that are of interest to investors in this sense would display a combination of low space availability and a low vacancy rate. Based on these criteria Nuremberg, Cologne and once again Berlin are to be regarded as attractive locations for office investments. Berlin has a very low vacancy rate of just 1.8% and the available area per office employee of 31.5 m² is also average at best. In Nuremberg there is a mere 24.4 m² of office space per employee with a vacancy rate of just less than 4%. While Bonn currently has the lowest vacancy rate (1.6%), it offers a very large 44.4 m² of office space per office employee. In Dresden and Leipzig the situation is precisely the reverse: the vacancy rates are very high at 7.0% and 7.2%, respectively, but office space is scarce at less than 30 m² per office employee, however. If the comparatively high vacancy rate is factored in, employees here effectively have only very small areas available to them. The two Top 7 locations Dusseldorf and Frankfurt am Main both have relatively high vacancy rates as well as comparatively high space availability.

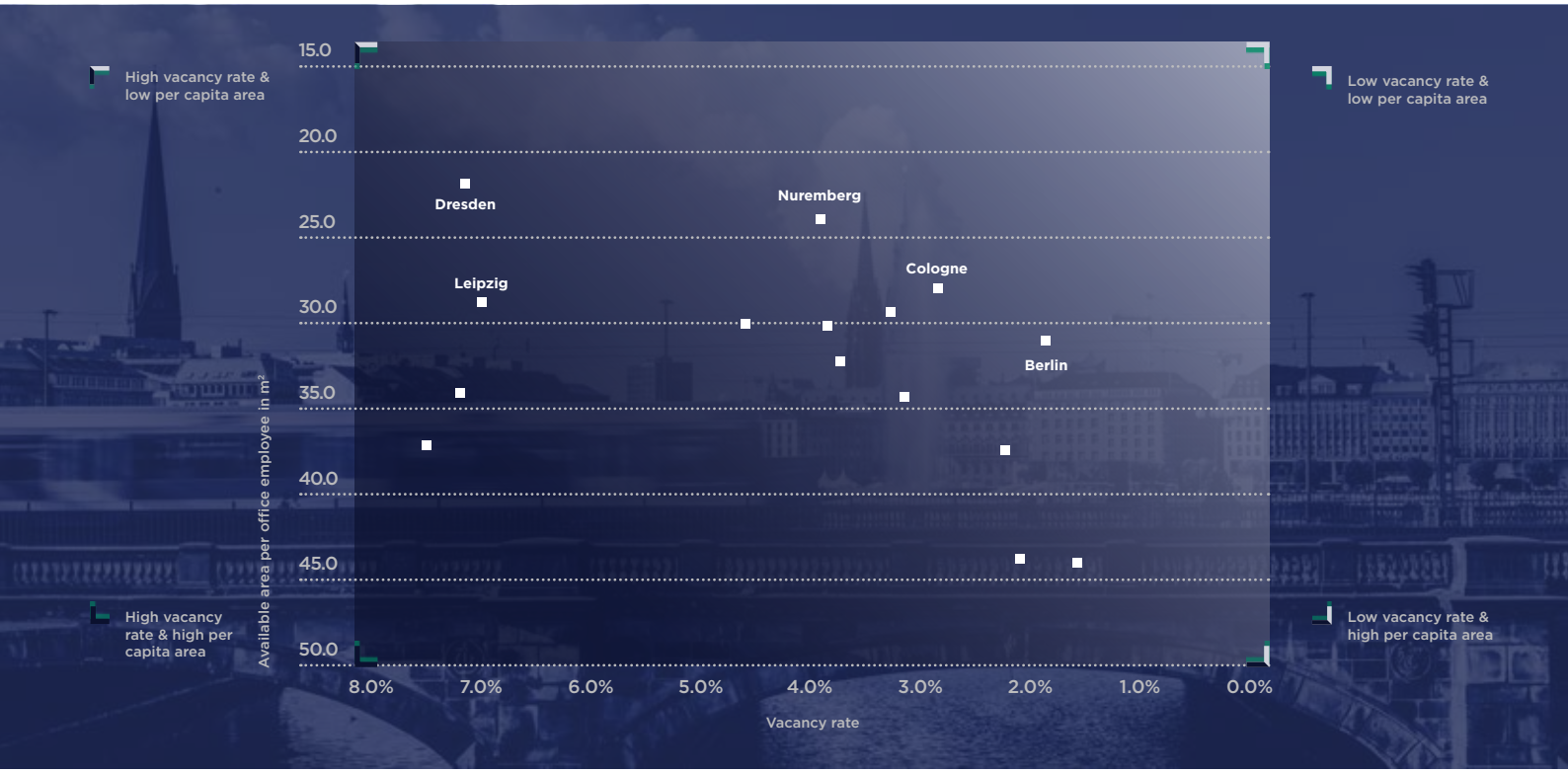


Figure 23: Matrix comparison of per capita office space and vacancy rate – current situation, selected locations
Sources: Federal Employment Agency, City of Hanover, TD 100 Cities Survey; own calculation and illustration

6. Conclusion

The excellent lettability of office real estate is currently an investment argument at nearly all locations. Office markets are currently displaying a clear upward trend: the number of office employees is constantly increasing, rents are on the rise, and vacancy rates are declining. At the same time the corresponding products are often scarce and expensive. In individual cases consideration has to be given to alternatives, for instance the purchase of a plot of land and a subsequent independent project development followed by a leasing phase (develop-and-hold strategy).

When choosing a market not only do the parameters presented here play a role, but also specific determinants such as location, fit-out, area structure, transport connections etc.. These would also need to be surveyed at the micro level (individual case study). Nevertheless, the findings from this study may be used as a fundamental guide when selecting a location.

So as to ascertain differences between office locations and markets, various parameters on levels and dynamism have been compared. In eight of the 15 locations the vacancy rates are currently at a very low level of between 2% and 4%. The spread of average rents outside the Top 7 is a mere 1.79 EUR/m². The most favourable market in this respect is Leipzig, the most expensive Hanover. The number of office employees has generally increased considerably: since 2014 the growth rate in eleven of the 15 locations has been between 7.5% and 13.5%.

Differences which enable a prioritisation exist for individual parameters and cities. Berlin and Munich both appear to be very positive in terms of both the levels they have reached and their dynamism. To be stated in this respect are the market size, the absolute number of office employees, the growth in the employment rate, the vacancy rates and their development, and the level of rents. Provided this trend continues, they are a favourable investment environment.

The other Top 7 locations have also underlined their positions as established office locations and primary target markets. As a banking location Frankfurt am Main requires extensive office space and impresses with its high rents. The proportion of office employees in the total working population is highest here. The high employment density is testimony to a labour market embedded in a larger region. Stuttgart and Hamburg score with their high rents, with the capital of Baden-Wuerttemberg also excelling in terms of its very low vacancy rate and high prime rents. Cologne and Dusseldorf on the Rhine post generally solid figures. Both cities have recently been able to significantly lower their vacancy rates and have a high proportion of office employees.

Outside the Top 7 Nuremberg and Leipzig stand out in a positive sense. Leipzig is convincing thanks to its development in terms of vacancy reduction and rents, for example, which are in part a result of catching-up effects. In an overall consideration of all key ratios Nuremberg does not display any negative results. Growth in rents since 2014 has been high at some 40%, while the number of office employees has increased substantially by 11.7% in the same period. Of all the locations analysed only Bremen stands out negatively somewhat, but here too the office vacancy rate is low.

Although the future economic development is somewhat uncertain, some fundamental trends remain. The tertiary sector will gain in significance even further in Germany. The classical office locations will continue to exist. Ultimately this also applies to all the office markets analysed here, which thus also represent potential investment locations. As the presented key ratios show, there are very different locations in terms of market levels, dynamism and structure, each with their own specific characteristics. Suitable target markets can thus be identified on the basis of the key ratios.

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