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Article

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German Cities To See Further Rises in Housing Prices and Rents in 2013

by Konstantin A. Kholodilin and Andreas Mense

Over the past few years, prices and rents for flats went up in most German cities. This trend is expected to continue in 2013. Berlin, Hamburg, Munich, and Frankfurt am Main will still see the highest increases in property prices and rents. In these cities, housing prices are rising much faster than rents. By contrast, stagnating or even falling prices are forecast for the cities in the Ruhr area.

The role of the housing market in the everyday life of society is difficult to overestimate. Home rents and prices directly affect the standard of living of every person. Furthermore, the bubbles on real-estate markets are likely to trigger financial crises, which in turn spill over to the real economy. For these reasons it is very important to estimate and forecast home rents and prices. An initial step is to construct indices capturing the evolution of home prices and rent prices and then make forecasts based on this information. The present study contributes to this analysis.

However, the first problem is the lack of data on German property prices both at national and regional levels. Because prices stagnated for a long time, no real effort was made to establish long time series of regional housing price indices. In the recent years, the situation started to change.¹ The second problem is a lack of studies on forecasting the housing prices in Germany.²

The present study aims at addressing both of these problems. First, housing price and rent indices are calculated for 25 German cities. Second, a model for forecasting housing prices and rents is proposed.

Home Prices and Rents in Many German Cities On the Increase Since 2007

The housing rent and price estimates used in the present study are based on data from the largest German real-estate portal, Immobilienscout24. The advantages

1 K.A. Kholodilin and A. Mense, „Internet-based hedonic indices of rents and prices for flats. Example of Berlin,” DIW Berlin Discussion Paper, no. 1191 (2012).

2 To the best of our knowledge, there is only one study forecasting real estate prices for different market segments in Germany: P. an de Meulen, M. Micheli, and T. Schmidt, „Forecasting house prices in Germany,” Ruhr Economic Papers, no. 0294, Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Ruhr-Universität Bochum, University of Dortmund, University of Duisburg-Essen (2011).

Box

Method

The flats vary significantly in terms of their structural and locational characteristics. Thus, in an initial step, hedonic regressions are estimated in order to compute quality-adjusted, comparable housing prices and rents. The hedonic regressions first estimate the effect on offer price or rent for flats of their size, type, and location. In a next step, the parameters are used to calculate quality-adjusted housing prices and rents of a typical flat. The features of a typical flat vary dramatically between the 25 cities (see table). In order to produce comparable results, the study uses the median of the following structural features: size, number of rooms, and housing type. Thus, the typical flat is identical in terms of its structural characteristics for all 25 cities. Namely, it is a three-room apartment located in the middle floors and having 75 square meters of total area. To allow for spatial heterogeneity within the cities, among other variables, hedonic regressions include dummy variables for zip code areas. In addition, prices and rents for a typical flat in the most expensive, cheapest, and median-priced areas of each city are computed.¹ The housing prices and rents for the median-priced residential areas are used as the representative values for each respective city.

The quality-adjusted prices and rents for flats in the 25 cities that were obtained from the hedonic regressions are used to make the forecasts. The study uses different dynamic forecasting models to extrapolate past developments into the future. Along with the dynamic models estimated for each city separately, the dynamic model estimated for all the cities simultaneously is employed. The latter also allows for spatial dependencies between neighboring cities. These dependencies can be explained by the spillover effects related, for example, to commuter movements and closer business relations between neighboring cities and resulting in similar trends of economic activity. In order to find the most reliable forecasting model, the study simulates out-of-sample forecasts within the dataset. On the basis of data from January 2007 to December 2009, housing prices and rents are predicted for the period from January 2010 to September 2012. As the actual property prices and rents for this period are

available, they can be compared to the forecasts, and hence the model producing the smallest forecast errors can be selected. The most reliable model has city-specific growth rates but the identical across all cities relationship between the past and the future. It also allows for the spillover effects between neighboring cities. This model is used in the third step to forecast prices and rents from October 2012 through September 2013.

Table

Structural Characteristics of a Typical Flat

	Flats for sale		Flats for rent	
	Number of rooms	Area in m ²	Number of rooms	Area in m ²
Augsburg	3	72.0	2	62.0
Berlin	3	81.9	2	67.5
Bielefeld	3	77.0	3	68.0
Bochum	3	78.0	3	64.0
Bonn	3	76.0	2.5	72.0
Bremen	3	70.0	3	63.1
Dortmund	3	75.0	3	64.6
Dresden	3	75.6	2	62.7
Düsseldorf	3	78.0	2	67.0
Duisburg	3	70.0	3	64.8
Essen	3	75.0	3	64.0
Frankfurt am Main	3	83.0	2.5	71.0
Gelsenkirchen	3	70.0	3	62.0
Hamburg	3	78.0	2.5	66.0
Hanover	3	73.0	3	66.5
Cologne	3	76.2	2	66.0
Krefeld	3	74.0	3	69.0
Leipzig	3	70.6	2	64.0
Mannheim	3	73.4	2	65.0
Mönchengladbach	3	76.0	3	70.7
Munich	3	75.0	2	66.2
Nuremberg	3	75.0	2	63.0
Stuttgart	3	76.5	3	69.5
Wiesbaden	3	84.0	3	71.0
Wuppertal	3	76.4	2	66.0

Source: Immobilienscout24, calculations by DIW Berlin.

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¹ Residential areas are demarcated approximately according to zip code area.

Table 1

Selected Factors¹ Affecting Prices and Rents for Flats

In euros per square meter

	Area in m ²	Normal apartment (Etagenwohnung) compared with ground floor apartment	Cheapest	Most expensive	Number of observations
			zip code area		
Flats for sale					
Augsburg	8.6	-28	-1,542	-	82,419
Berlin	8.1	-294	-1,457	1,677	432,803
Bielefeld	11.6	-101	-1,473	-	41,994
Bochum	7.1	-	-	975	40,651
Bonn	10.8	-114	-779	629	59,534
Bremen	10.5	-	-1,127	-	57,541
Dortmund	5.1	-22	-439*	712	73,982
Dresden	7.4	54	-	1,542	123,795
Düsseldorf	10.3	41	-1,290	1,265	133,878
Duisburg	7.0	-63	-	1,006	52,194
Essen	7.8	9**	-	1,286	90,421
Frankfurt am Main	11.5	-51	-1,265	2,396	148,244
Gelsenkirchen	2.4	41	-541	348**	24,480
Hamburg	10.0	26	-3,549	699	192,324
Hanover	8.8	-52	-1,033	-	89,871
Cologne	8.0	-172	-3,152	-	209,691
Krefeld	7.2	12*	-843	671	41,144
Leipzig	9.9	22**	-1,148	-	35,084
Mannheim	6.0	17**	-	1,176	61,539
Mönchengladbach	8.1	-75	-615	-	48,815
Munich	10.6	-316	-1,552	2,143	422,782
Nuremberg	7.7	84	-	2,523	114,371
Stuttgart	11.8	24	-	2,535	167,439
Wiesbaden	7.6	37	-	1,923	77,061
Wuppertal	5.8	-	-430*	623	77,154
Flats for rent					
Augsburg	-0.002	-	-1.48	1.04*	64,462
Berlin	-0.002	-0.68	-1.90	3.64	874,919
Bielefeld	-0.001	-0.14	-2.85	-	82,465
Bochum	-0.002	-0.05	-0.78*	2.77	90,274
Bonn	-0.011	-0.06	-2.01	2.29	123,434
Bremen	-0.005	-0.12	-1.74	3.18	109,694
Dortmund	-	-0.21	-	2.36	175,598
Dresden	-0.004	-0.15	-2.42	1.11**	455,375
Düsseldorf	0.008	0.13	-1.63	4.46	342,798
Duisburg	-0.001	-0.03	-2.15	1.14**	157,050
Essen	-0.003	0.03	-2.02	2.02	230,900
Frankfurt am Main	0.017	0.13	-4.89	5.26	349,884
Gelsenkirchen	-0.004	0.11	-1.76	-	97,382
Hamburg	0.015	-0.16	-5.29	3.88**	267,038
Hanover	-0.002	-0.06	-2.85	-	174,313
Cologne	-0.007	-0.12	-3.14	4.81	383,731
Krefeld	0.001	-	-	3.16	83,980
Leipzig	-0.006	-0.07	-2.48	-	334,509
Mannheim	-0.013	0.24	-1.77*	2.81	94,361
Mönchengladbach	-0.001	-0.06	-0.96*	1.39	98,742
Munich	-0.009	-0.36	-3.65	5.02	492,335
Nuremberg	-0.003	0.10	-3.22	-	109,705
Stuttgart	0.003	0.04	-3.77	3.19	165,300
Wiesbaden	-0.001	0.21	-3.34	3.79	155,481
Wuppertal	-0.004	0.03	-2.24	0.56*	161,820

1 Estimation results of a hedonic regression. Statistically insignificant parameters are not displayed. * significant at the 5 percent level, ** at the 1 percent level, otherwise at the 10 percent level.

Source: calculations by DIW Berlin.

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Size and location in an expensive residential area, in particular, result in higher property prices and rents.

of these data are that they are very up to date and have a relatively wide geographic and temporal distribution.

This study uses data contained in Internet advertisements on flats offered for sale and for rent in Germany.³ The data are monthly and cover the period from January 2007 to September 2012. About 2.9 million advertisements of flats for sale and 5.7 million advertisements of flats for rent are employed in the analysis.⁴ This indicates that, in Germany, housing rental is far more common than home ownership.

The dataset used for this study comprises 25 German cities with a total of over 20 million inhabitants, which makes up 25 percent of the entire German population. The cities were selected both on the basis of their size and also on the number of real estate advertisements in order to ensure the representativeness of the data (see Table 1). Too few advertisements may result in excessive volatility of the housing price or rent indices.

Since home prices and rents vary dramatically depending on structural and locational characteristics of flats, the study uses hedonic regressions in order to make quality adjustments. The impact on housing prices and rents of structural features such as size, number of rooms, and property type (apartment, studio, loft, maisonette, etc.) as well as of locational characteristics (see box) is estimated separately for each city. In Berlin, for example, the offer price of a flat increases by 8.10 euros per additional square meter of living space, whereas in Gelsenkirchen the corresponding figure is only 2.40 euros.

In most cities, prices of flats have increased since 2007 (see Figure 1). Initially, the average price for owner-occupied flats in the 25 cities, examined in the study, had been stagnating, but then it started to rise at an ever accelerating pace. As result, from 2010 to 2012, the annual price increase attained 5.4 percent. This upward trend can be observed in majority of cities. It is particularly pronounced in Berlin, Dresden, and Munich. In Hamburg, the aforementioned price increase occurred slightly later. In ten cities, including Dortmund, Duisburg, and Wuppertal, prices stagnated or even went down.

3 Data were provided by Immobilienscout24 as part of their „Transparency Campaign“, which aims at increasing transparency on the German real estate market. There are other online real estate portals but, based on its market share of approximately 30 percent, Immobilienscout24 has sufficiently representative data.

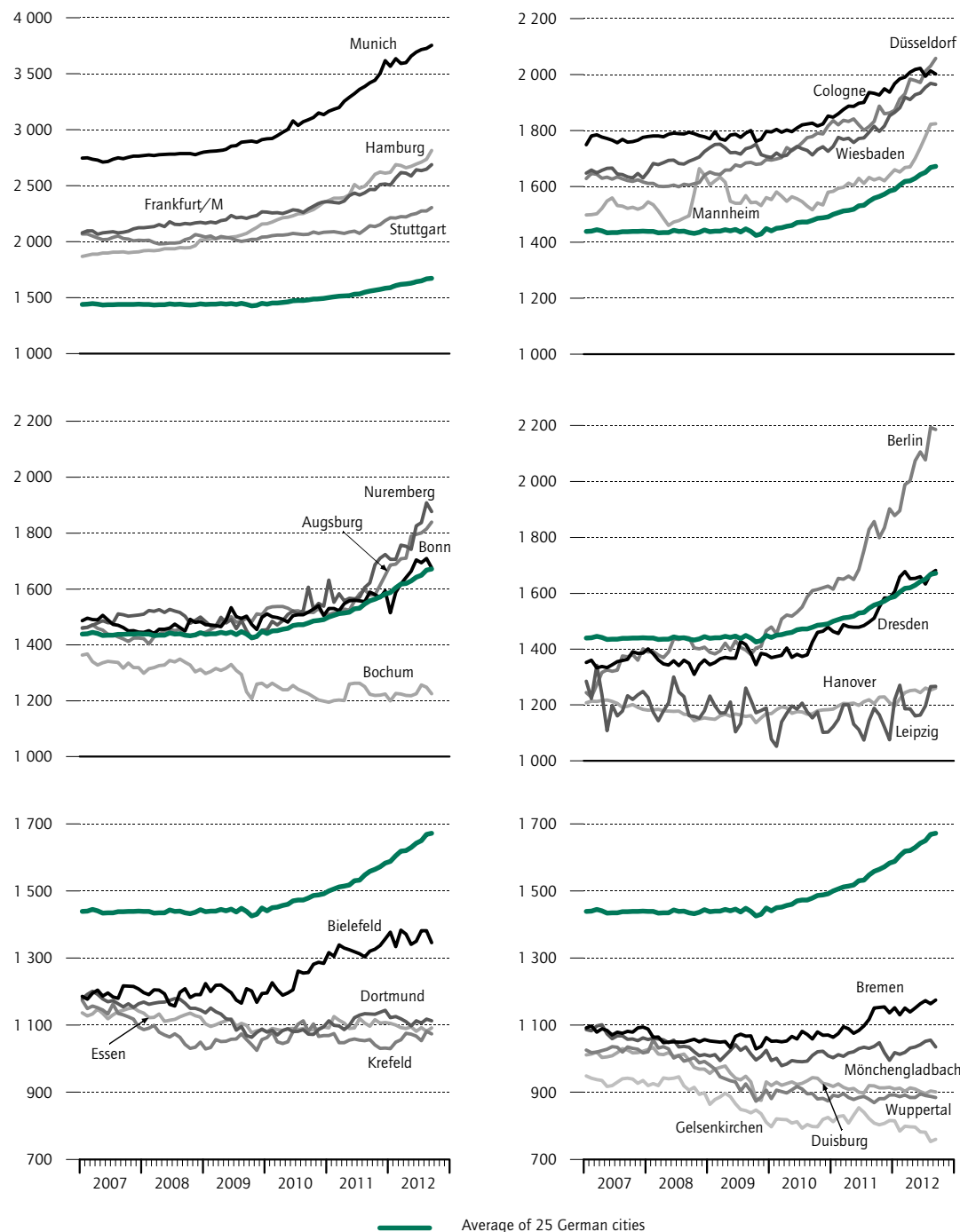
4 Data from surveyors' councils (Gutachterausschüsse) on actual house sale prices for every city considered in this study are not easily available. Therefore, offer prices are used. However, the trends identified in this study should apply also to the transaction prices and rents for flats.

GERMAN CITIES TO SEE FURTHER RISES IN HOUSING PRICES AND RENTS IN 2013

Figure 1

Prices for Flats in German Cities

In euros per square meter



Source: calculations by DIW Berlin.

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Cities with over a million inhabitants are booming, whereas the housing market in the Ruhr area is stagnating.

Increase of rents for flats was less dramatic (see Figure 2) with an average annual growth rate of 1.4 percent from January 2008 to September 2010, and 2.4 percent from October 2010 to September 2012. None of the cities analyzed experienced a drop in rents, and, in a few cases, for example, in Duisburg, Essen, and Wuppertal, rents remained more or less constant.

Flats in Munich, Hamburg, and Berlin are the Most Expensive

In September 2012, housing prices in Berlin, Düsseldorf, Frankfurt am Main, Hamburg, Cologne, Mannheim, Munich, Nuremberg, Stuttgart, and Wiesbaden were significantly higher than the average in the cities studied. The most expensive of all is Munich, where property prices are twice as large as the average of 25 cities. In Berlin, they were around average up until the end of 2010, but have subsequently grown at a far higher rate. Since January 2007, the beginning of our observation period, prices for flats in Berlin have increased by 73 percent, which corresponds to around ten percent a year. In Hamburg and Munich, the annual price increase was 7.3 and 5.6 percent, respectively. The sharp rise in Berlin can be partially explained by the relatively low starting point for such a large metropolis.

The ratio between the quality-adjusted prices in the most and least expensive zip code areas—approximately capturing locational characteristics of the various residential areas—provides an interesting insight into heterogeneity of the regional housing markets (see Table 2). It is 4 to 1 on average, that is, comparable properties in the most expensive location cost four times as much as in the cheapest one. This ratio is highest in Hamburg at 11.2. In Duisburg, Cologne, and Nuremberg, the differences between the most expensive and the cheapest residential areas are also relatively big. Berlin is only slightly above the average with a ratio of 4.7.

In cities where housing prices are above average, rents are also higher than average. At the end of 2011, rents in Berlin reached the average level, which was around 7.00 euros per square meter. The highest rents are in Munich (12.30 euros) and Hamburg (10.90 euros). The smaller differences between the most expensive and the cheapest districts in terms of rents show that the rental housing market is much more homogeneous than the market for owner-occupied housing. There are also only slight differences between the cities here.

However, the differences between the cities are significant as far as the price-to-rent ratio is concerned. This is the ratio between the price per square meter and the

annual amount of rent. The ratio of 19—the average for all the cities studied—means, for example, that tenants will have paid the landlord the full price of the apartment after 19 years. This figure is highest in Berlin (25.6), Munich (25.4), and Hamburg (24.6). Property prices in these three cities have clearly outpaced the rents (see Figure 3). In the long run, there are two alternatives left for these cities to restore the market equilibrium: either rents should adjust upwards, or selling prices should fall again.

At the other extreme, there are Gelsenkirchen, Duisburg, Bremen, and Wuppertal, where it only takes 13 to 15 years for landlords to recuperate the price they paid for their flats by letting them out.

On average, during the last five years, prices for flats in the 25 cities have been increasing by 1.9 percent annually. At the same time, the rents for flats have been growing at an average rate of 1.6 percent a year. The spatial correlation for both housing prices and rents is strong. This means that market developments in neighboring regions are relatively highly interdependent. If one region is experiencing a boom, price and rent increases are also to be expected in adjacent areas.

Growth in Property Prices and Rents Likely to Continue in Most Cities in 2013

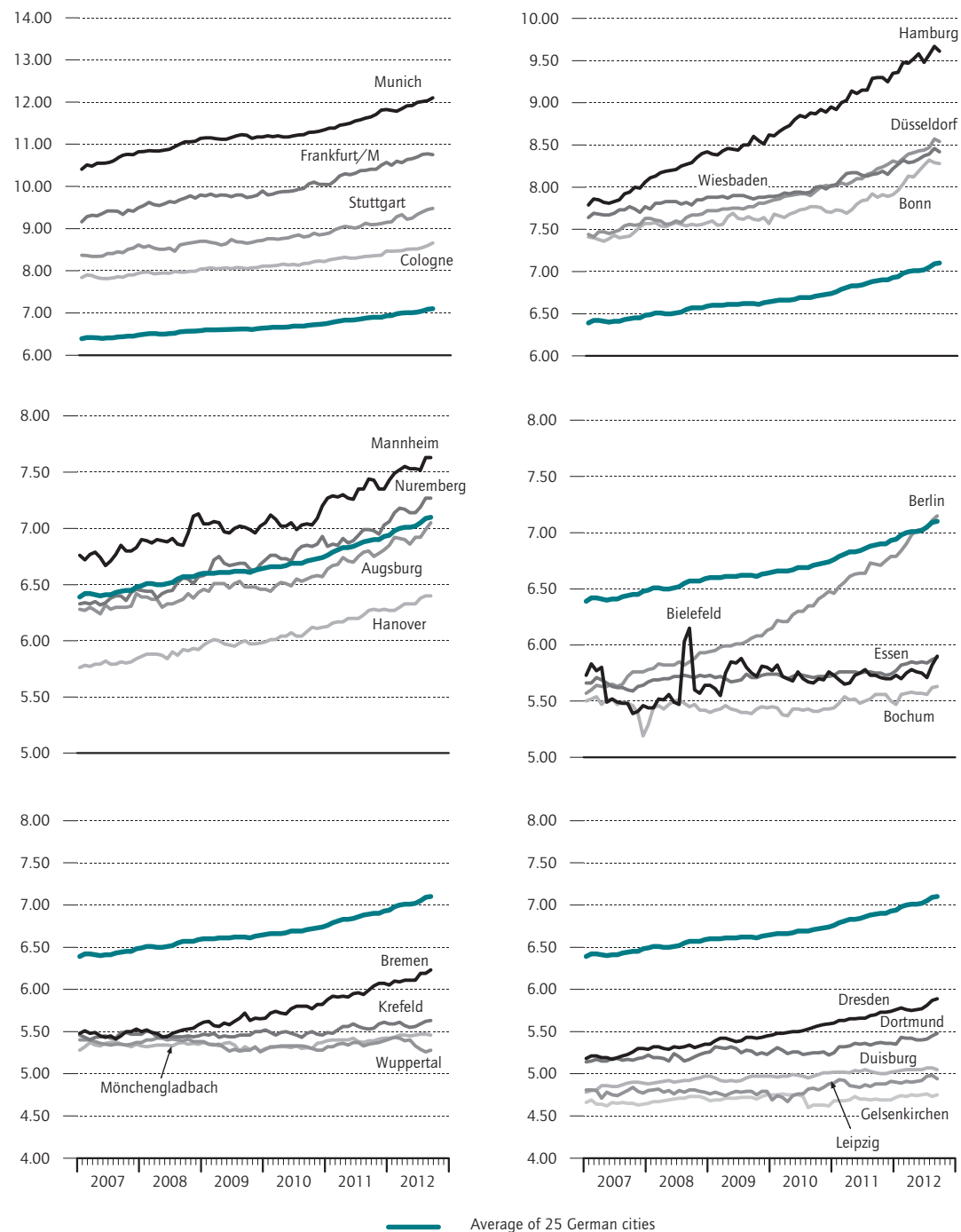
Using a dynamic panel model accounting for spatial dependence, this study estimated the future trajectory of prices and rents for the period from October 2012 through September 2013. A further increase in housing prices is predicted for 19 out of the 25 cities (see Figure 4). In five of these cities (Berlin, Augsburg, Hamburg, Munich, and Nuremberg), the increase will probably exceed ten percent. Prices will also rise dramatically in Dresden, with predicted growth of almost ten percent. The situation in Leipzig is different: prices of flats for sale there are only likely to go up slightly. Prices in cities of the Ruhr area will remain relatively constant. Essen, Bochum, and Krefeld are at the lower end of the scale, while a slight increase is possible in Gelsenkirchen, Duisburg, and Mönchengladbach. In Wiesbaden there has been a significant hike in prices since the beginning of 2012, this trend is expected to continue in the near future.

According to the authors' estimates, rents for flats will increase in virtually all the cities under investigation (see Figure 5), with the sole exception of Wuppertal. However, the growth might slow down in most cities.

Figure 2

Rents for Flats in German Cities

In euros per square meter and month¹



¹ Net rent excluding heating.
Source: calculations by DIW Berlin.

The rent level is significantly above average in the Rhineland, the Rhine-Main area, and in the cities of Hamburg and Munich.

Table 2

Level and Change of Prices and Rents for Flats

	Population in 2009 in 1,000 persons	Price level in September 2012	Change from January 2007 to September 2012 in percent		Ratio between the most expensive and the least expensive zip code area	Price-to-rent ratio in years
			Total	Annual average		
Flats for sale						
Munich	1 320	3 755	36.7	5.6	2.7	25.4
Hamburg	1 778	2 844	49.9	7.3	11.2	24.6
Frankfurt am Main	668	2 779	28.1	4.4	4.2	21.2
Stuttgart	601	2 322	11.3	1.9	4.4	20.4
Berlin	3 435	2 241	72.5	9.9	4.7	25.6
Düsseldorf	585	2 089	25.9	4.1	4.3	20.0
Wiesbaden	277	2 032	18.5	3.0	2.5	20.1
Cologne	995	2 012	14.4	2.4	5.6	18.9
Nuremberg	503	1 877	28.4	4.4	5.7	20.8
Mannheim	312	1 815	21.9	3.5	2.3	19.4
Augsburg	263	1 814	26.4	4.2	2.0	20.7
Bonn	319	1 687	12.7	2.1	2.3	16.7
Dresden	513	1 686	24.3	3.9	2.1	23.5
Bielefeld	323	1 369	13.3	2.2	3.4	19.3
Bochum	377	1 246	-10.0	-1.8	2.8	18.4
Hanover	523	1 242	4.4	0.7	2.7	16.1
Leipzig	517	1 223	-1.5	-0.3	2.3	20.1
Bremen	547	1 122	7.9	1.3	3.5	14.9
Dortmund	582	1 113	-5.6	-1.0	3.1	16.9
Essen	578	1 092	-4.0	-0.7	3.8	15.4
Krefeld	236	1 067	-8.5	-1.5	4.9	15.8
Mönchengladbach	258	1 043	-4.7	-0.8	2.6	15.9
Wuppertal	352	892	-13.8	-2.5	3.7	14.0
Duisburg	493	866	-11.3	-2.1	6.2	14.3
Gelsenkirchen	261	748	-20.1	-3.8	5.3	13.0
Total for all 25 cities	16 615	1 679	12.7	1.9	3.9	19.6
Flats for rent						
Munich	1 320	12.32	15.9	2.6	2.0	
Frankfurt am Main	668	10.94	17.1	2.8	2.6	
Hamburg	1 778	9.62	23.3	3.7	2.5	
Stuttgart	601	9.47	13.3	2.2	2.1	
Cologne	995	8.89	10.2	1.7	2.4	
Düsseldorf	585	8.72	14.4	2.4	1.9	
Wiesbaden	277	8.43	10.3	1.7	2.4	
Bonn	319	8.41	11.6	1.9	1.7	
Mannheim	312	7.80	12.6	2.1	1.8	
Nuremberg	503	7.51	14.3	2.4	1.8	
Berlin	3 435	7.30	27.6	4.3	2.1	
Augsburg	263	7.30	11.8	2.0	1.4	
Hanover	523	6.41	11.1	1.8	1.6	
Bremen	547	6.29	13.5	2.2	2.0	
Dresden	513	5.98	13.3	2.2	1.8	
Essen	578	5.92	3.9	0.7	2.0	
Bielefeld	323	5.91	2.9	0.5	1.9	
Bochum	377	5.65	2.2	0.4	1.9	
Krefeld	236	5.62	3.2	0.5	1.7	
Dortmund	582	5.48	6.6	1.1	1.7	
Mönchengladbach	258	5.47	3.4	0.6	1.5	
Wuppertal	352	5.32	-2.2	-0.4	1.7	
Leipzig	517	5.06	2.7	0.5	1.7	
Duisburg	493	5.06	5.5	0.9	1.9	
Gelsenkirchen	261	4.80	2.0	0.3	1.4	
Total for all 25 cities	16 615	7.20	10.0	1.6	1.9	

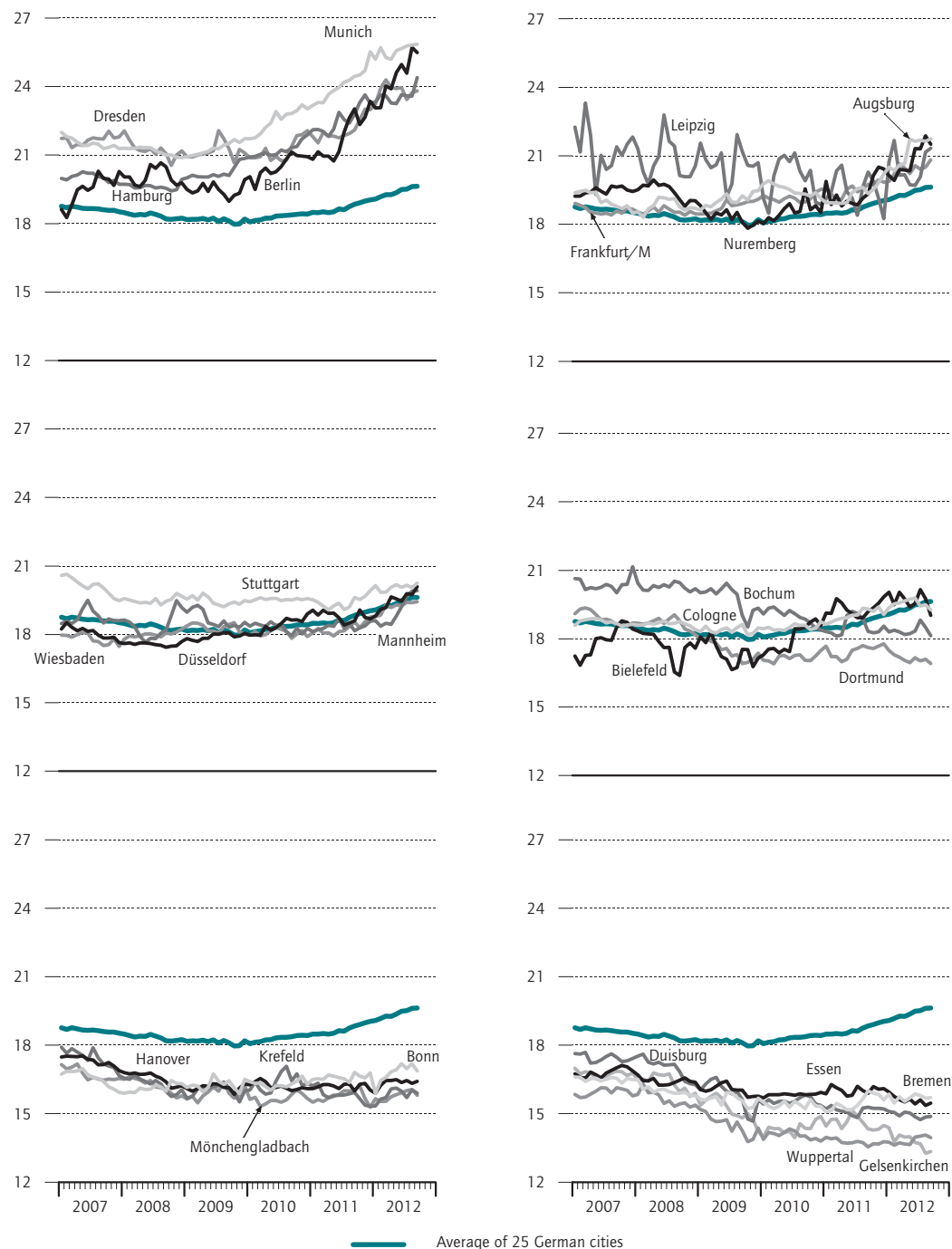
Source: calculations by DIW Berlin.

Munich is the city with the highest property prices and rents, while it is least expensive to live in the Ruhr area.

Figure 3

Price-to-Rent Ratio

In years



Source: calculations by DIW Berlin.

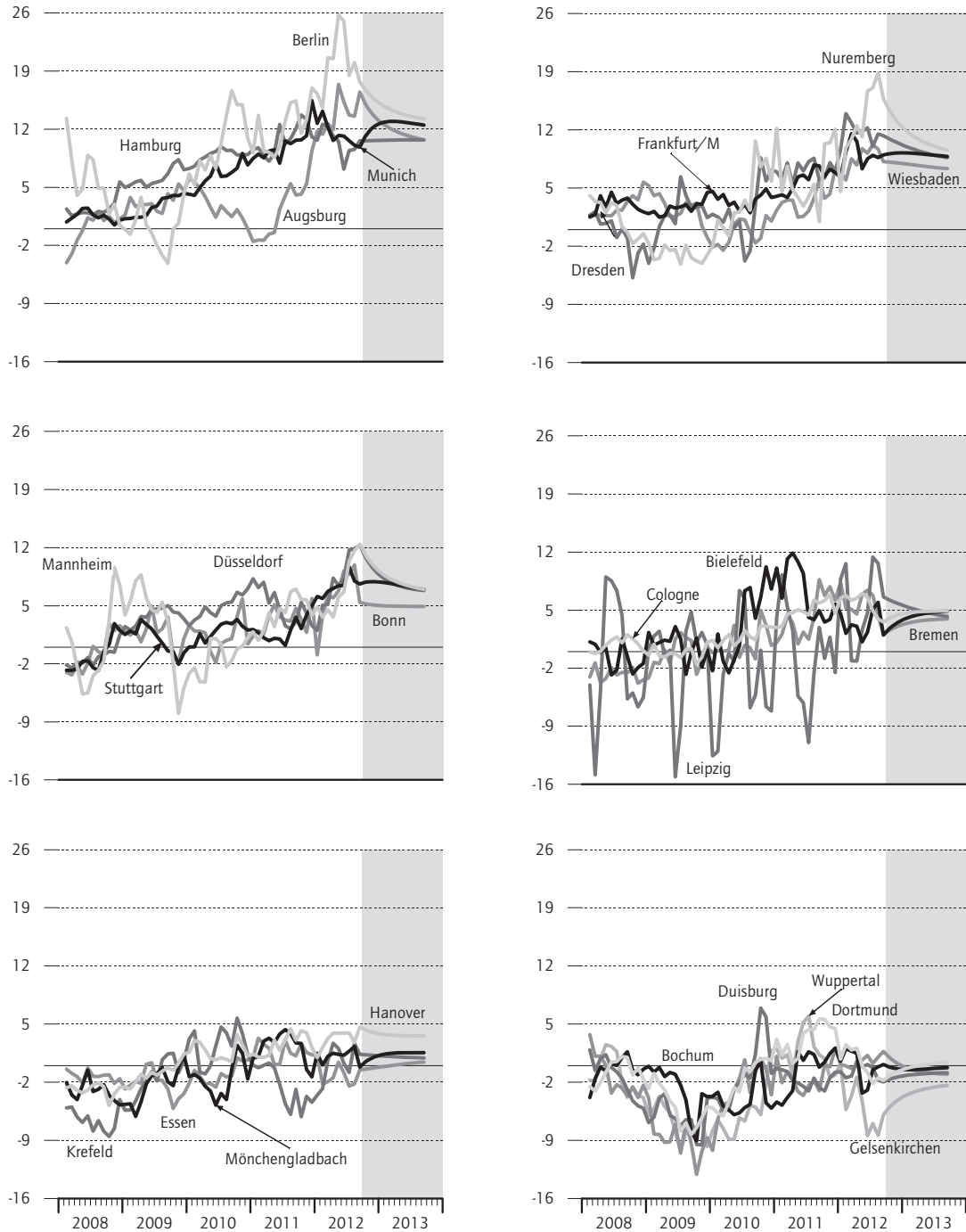
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The period of time until landlords have recuperated the prices they paid for their flats by letting them out is increasing to over 20 years in some cities.

Figure 4

Forecasts of Prices for Flats

Change compared to the previous year, in percent



Source: calculations by DIW Berlin.

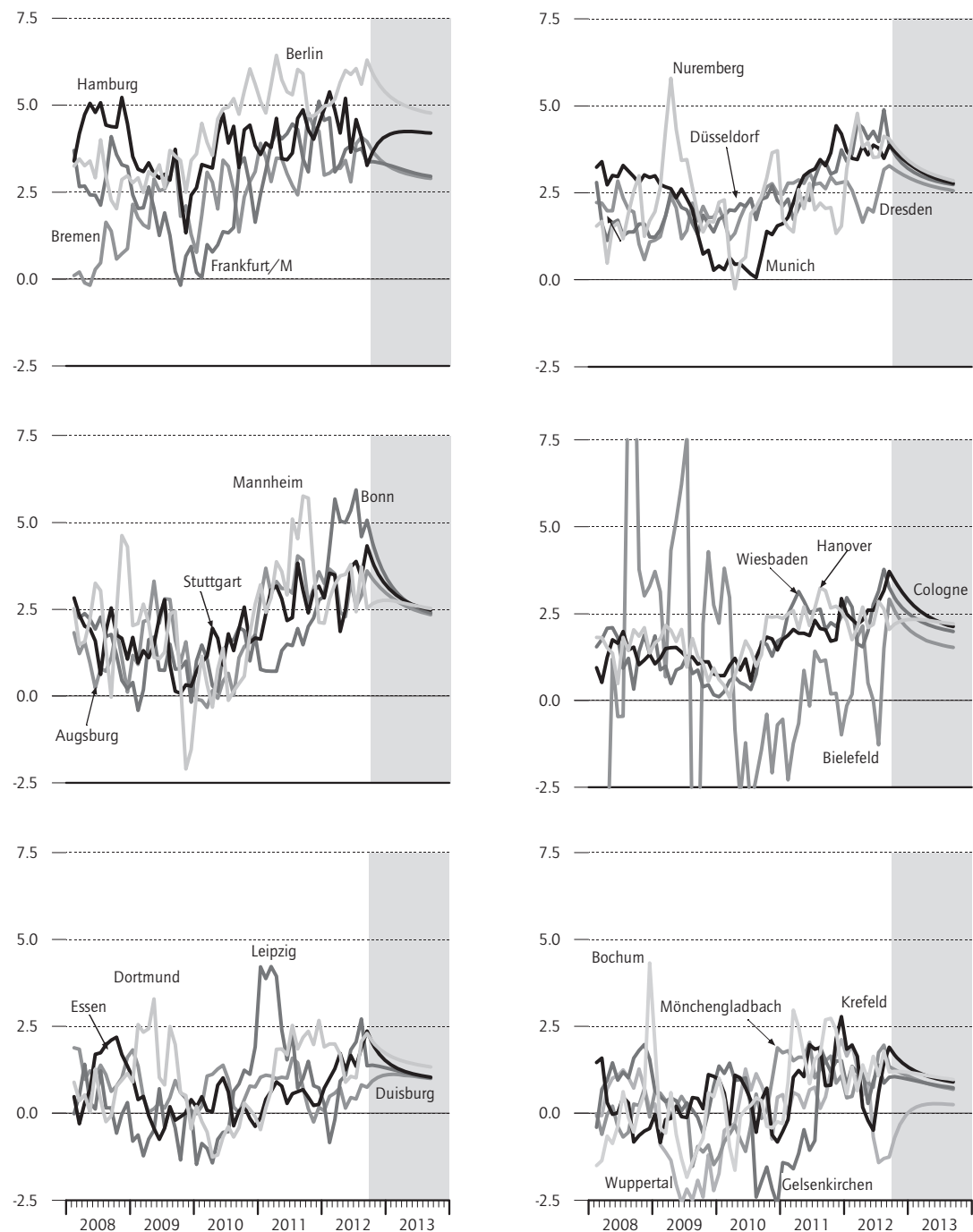
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The price increase is going to slow down in many cities.

Figure 5

Forecasts of Rents for Flats

Change compared to the previous year, in percent



Source: calculations by DIW Berlin.

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Berlin and Hamburg have the highest growth rates, while the Ruhr area remains at the lower end of the scale.

On average, the prices for flats should grow twice as fast as the rents, although the situation varies substantially from city to city. In the Ruhr area, where, for instance, property prices are expected to fall in Bochum, Dortmund, Duisburg, and Essen, rents will either stagnate or rise. The largest absolute differences between the growth rates of prices and those of rents are expected for Augsburg, Munich, and Berlin. Price increases in these cities do not seem to be driven by proportional increases in rents, but by the expectations of future price increases. This can be regarded as a sign of strong speculation in these regional markets, when the prices drift apart from the levels that are supported by the fundamental factors. However, in order to be able to talk about ensuing speculative bubbles in certain German cities, the trends of the real-estate market must be examined in more detail.

Conclusion

Prices for flats will continue to rise in most German cities in 2013. Rents for flats are likely to increase in virtually all cities. In some cities, property prices are increasing faster than rents, which may be the result of speculative tendencies. Although identification of the causes of the price growth acceleration is beyond the scope of the present study, the sharp increases suggest that the reason may well be the expectations to see even higher prices in the future rather than expectations of higher rental incomes. An obvious explanation can be the current expansionary monetary policy of the European Central Bank, which translates into an increase in the amount of money available and low interest rates for financing the purchases of real estate. Uncertainty about further developments in the euro area is also favorable to a general move towards tangible assets. However, the monetary policy is only the catalyst for the increase in property prices. One important factor is the growing housing shortage in many big cities, some of which are experiencing a large-scale migration at the background of the construction of new housing that has stagnated over the past few decades. The housing shortage is not reflected as much in rents as in property prices, since rent increases are restricted by law.

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