



Outlook for the German residential property market 2021 and beyond

March 24, 2021

House price cycle could end in 2024

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Original in German: March 8, 2021

For years we have predicted, often against prevailing opinion, that the price cycle would continue. In April 2020, during the coronavirus crisis, we stated that the cycle was merely taking a pause and had not come to an end. The cycle is likely to remain intact in 2021 thanks to the low interest rate environment, fundamental supply shortage and current undervaluation.

However, our analysis suggests that the nationwide price cycle will come to an end this decade. Despite all the uncertainty, we believe the cycle is likely to end in 2024.

The fundamental supply shortage should ease off in the coming years. The lower level of immigration during the pandemic is also a contributing factor here. Any remaining undervaluations due to the low interest rate environment will be increasingly eliminated if price momentum remains high. This increases the risk that interest rate hikes will trigger a wave of selling. But even without an interest rate shock, German residential property is becoming less attractive, at least compared to other residential property markets.

If the cycle does in fact end in 2024, we expect nominal house prices to decline for a short period of time based on comparable historical data. There could be a cumulative decline of 5% over three years if there are no further negative effects, such as those caused by an economic and financial crisis.

If house prices rise again at the historical average of approximately 2.5% per year following the correction phase, we could see an increase of around 24% over the decade, despite the interim price dip. In addition, rental yield is rising again to around 4% due to the price decline, which should be attractive to many institutional investors. In this scenario, there will be no massive upheavals and German residential property should remain a significant earnings component in many portfolios.

This outlook also includes a look at the eleven German metropolitan regions. According to our calculations and estimates, the cycles in Bremen and Hamburg will end before 2024, as the fundamental supply shortage there should be eliminated earlier.

We expect particularly long-running cycles in Berlin and Leipzig. In our view, Berlin is still on its way to becoming a global metropolitan hub, while Leipzig could see a particularly strong regional influx due to the abandonment of villages and rural districts in the metropolitan region.



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A. Baseline scenario: Coronavirus crisis will be overcome

The positive scenario described here could be called into question as a result of the following developments:

1

- Vaccine not available in sufficient quantity.
- Several vaccine doses needed for full protection (depending on vaccine).
- Vaccinations lead to severe and/or frequent side effects.
- Effect of vaccinations limited to a few months. Regular vaccinations necessary.
- Vaccination centres overloaded.
- Mutations require new vaccine.

Source: Deutsche Bank Research

This outlook for the German residential property market assumes that the coronavirus crisis will gradually subside over the course of the year. However, the current increase in infection numbers and the renewed rise in the number of occupied ICU beds may postpone further relaxations and may even lead to stricter rules. So the situation might get worse before it gets better. With the onset of spring and higher temperatures, the winter wave should end as it did last year. Since the proportion of vaccinated people is likely to have risen considerably by spring, at least among the risk groups, the number of patients suffering a severe progression could fall sharply over the six-month summer period. In the summer of 2020, the low point was well below 300 patients with severe progressions. If vaccinations continue at an increased pace throughout the year, we can expect to see only temporary and regionally limited outbreaks in the winter of 2021/22. Hospitals being stretched to their limits would likely become isolated instances. In this baseline scenario, the impact on the economy will visibly fade and, at least for the non-risk groups, everyday life will return to normal.

Sanity check of housing demand amounting to 350,000 apartments per year

2

- Average 1990-2019: 323,900 apartments completed per year.
- Average ratio of completions to housing stock 1991-2019 = 0.86%. Multiplied by current number of apartments, namely 42.5 million (source: bulwiengesa) = 366,100 apartments per year.
- Assumption: An apartment is available for an average of 100 years. Consequently, 1% of newly completed apartments per year are needed. Housing stock of 42.5 million implies a construction demand of 425,300 apartments.
- Given the data available, there is virtually no solid basis to decompose the demand into demographic demand, demand due to immigration, replacement demand and pent-up demand, in particular as these differing types of demand regularly overlap and a high level of demand is likely to increase the useful life of the stock. In addition, information on housing quality is scarce.

Source: Deutsche Bank Research

Supply shortage to remain in 2021 despite coronavirus

Based on our assumptions regarding the coronavirus crisis, we expect a strong economic recovery from the second quarter onwards. After the GDP slump of 4.9% in 2020, we forecast a strong increase of 4.0% for 2021. The fundamental environment in the German housing market, especially the supply shortage, is likely to remain for several years. According to the Federal Statistical Office, construction of approximately 293,000 residential units was completed in 2019. Many construction indicators plummeted at the beginning of the pandemic. They subsequently recovered rapidly, however. The latest available data points even indicate a slight year-on-year increase in new orders and industrial production in the construction sector. The construction sector was therefore a key driver of economic growth, especially compared to manufacturing and many service sectors. As such, the number of residential units completed in the coronavirus year 2020 could possibly even be slightly higher. We anticipate an increase of 295,000 residential units (expectation in April 2020: 260,000).¹

In 2021 and the following years, the number of completed residential units is likely to rise only gradually to over 300,000 due to the numerous structural inhibiting factors. In our opinion, structural demand in Germany amounts to more than 350,000 residential units² per year. Housing demand at this level is also implied by around 360,000 residential building permits issued in 2020, which is also in line with the yearly average from 2016 to 2020. In view of the severe economic crisis, the high number of building permits issued in 2020 is a positive surprise. Apparently, the positive demand drivers such as the flight into tangible assets and security, fear of inflation, additional demand due to working from home and decline in demand due to the numerous job and overall existential fears more or less neutralised one another. As a result of the high demand and scarce supply, the construction backlog, i.e. the difference between approved but not completed residential units, increased again in 2020. According to the Federal Statistical Office, the construction backlog more than doubled from 334,000 to 740,000 between the years 2010 and 2019. The reduction of this construction backlog alone is likely to take several years. Since

¹ Published in May/June 2021.

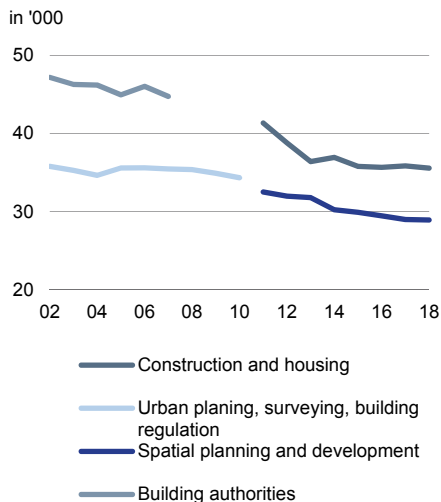
² Federal Ministry of the Interior, Building and Community: 350,000, Cologne Institute for Economic Research: 342,000.



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Staff in the public service of municipals for construction and housing

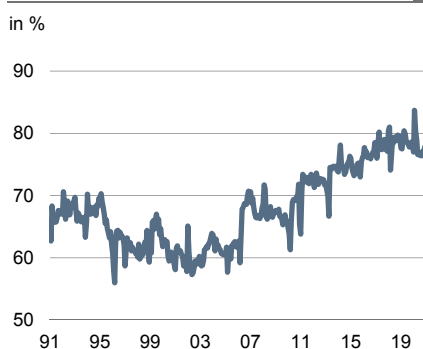
3



Source: Federal Statistical Office

1991-2020 Capacity utilisation in the construction industry

4



Sources: ifo, Deutsche Bank Research

1991-2020 ifo: Construction survey

5



Sources: ifo, Deutsche Bank Research

not every application is granted a permit, overall housing demand is likely to be even greater than the construction backlog implies. Although demand that remains unmet for years may only be partially relevant to the market in the future, we estimate that, aggregated over the entire cycle since 2009, more than one million additional residential units would have had to be built to meet demand. In view of this, we maintain our expectation that the current cycle will continue for some time. From a fundamental perspective, rents and prices should continue to rise. Even with a slowdown in housing demand, the reduction in the building backlog and the previously unsatisfied demand will still support the market. The high price dynamics will only come to an end quickly when annual completions exceed housing demand. As we show below, there are significant regional differences.

Coronavirus has hardly reduced the supply shortage

The lack of building land remains a major obstacle to the construction of new housing, something that is particularly noticeable in urban areas. The Institute for Federal Real Estate could sell 5,000 properties in the years to come, but we consider the effects of this on the housing market to be limited, especially since the development of undeveloped properties into ready-to-occupy housing is likely to take several years: lengthy planning and approval procedures have been slowing things down for years. Digitalisation projects envisaged in connection with the housing offensive are likely to fall short of the excessive promises, like so many public-sector digitalisation projects. This is probably at least partly due to the fact that building authorities are often short-staffed. Nationwide, the number of staff positions in the public service of the municipalities for the building and housing sector and in building administration has decreased by about 10% since the year 2011. Many investors complain of the building authorities' lengthy application processes. Once the "hurdle" of the public sector has been cleared, the next obstacle to faster completion of new housing is the still high degree of capacity utilisation and, above all, the lack of skilled workers in the construction companies carrying out the work. The coronavirus crisis hardly reduced capacity utilisation in the main construction sector: in fact, the reduction was similar in magnitude to weather-related seasonal fluctuations. According to the Federal Statistical Office, the number of employees in the primary construction and finishing trades together increased by 30% from 2009 to 2019, but the order backlog in primary construction trade almost quadrupled. It continued to grow in 2020, albeit only by a few percentage points. According to ifo surveys, the share of companies complaining of a shortage of labour remains at a high level. However, hygiene and distancing rules have arguably reduced the demand for labour somewhat in 2020. Before the coronavirus crisis, for example, around 14% of the companies surveyed complained of a shortage of labour. In the course of 2020, this figure was very volatile. It first rose to over 18% in March, then fell successively to 6.8% by October before increasing again to almost 11% by December. Despite this high volatility, the level remained relatively high as compared to the last 30 years (1991-2020 median: 2.4%). As we see it, the general labour shortage in construction will persist over the coming years. As the baby boomers increasingly reach retirement age, we can even expect it to worsen. Structural bottlenecks will therefore continue to weigh on new construction activity. Given this situation, the rising construction costs seen in recent years are likely to gain even more momentum.



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2021: Lower negotiated wage growth, reduced short-time work should boost effective wages

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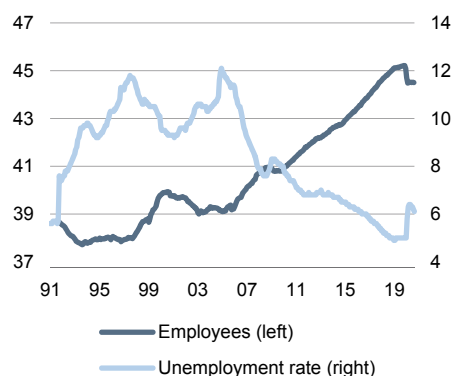


Sources: Federal Statistical Office, Deutsche Bundesbank, Deutsche Bank Research

1992-2020 Labour market

7

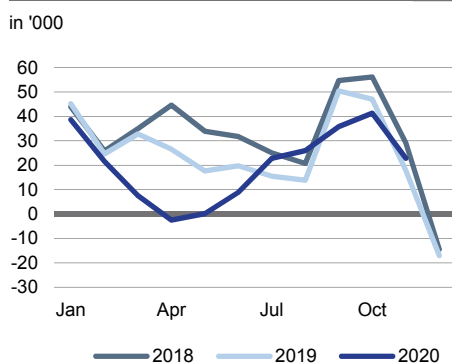
left y-axis: in m
right y-axis: in %



Sources: Federal Employment Agency, Federal Statistical Office

Net Migration per Month

8



2020 data is available until September.

Sources: Deutsche Bank Research, Federal Statistical Office

Labour market to stabilise in 2021. Return to full employment and strong wage growth takes time

Thanks to the extensive fiscal packages and the massive expansion of short-time work, the negative effects of the coronavirus crisis on the labour market have been limited. Although effective wages probably declined slightly, nominal wages increased by around 2% in 2020. This means that average wage increases are only slightly below the historical average (1991-2020: 2.3% per year). By contrast, the striking increase in employment of around four million workers from the financial crisis to the coronavirus crisis came to an end. The number of people in employment fell by more than 700,000 between February and the end of 2020. This mainly affected the self-employed and marginally employed workers who cannot apply for short-time work. By contrast, the number of employees subject to social security contributions remained constant year-on-year at 33.5 million. The unemployment rate increased in 2020 from 5% in February to 6.4% in the summer. For 2021, based on our baseline scenario and GDP growth of 4.0%, we expect a slight increase in the number of employed persons by about 80,000, while the pre-crisis level is not likely to be reached before mid-2022. The unemployment rate is expected to remain at around 6% in 2021 and improve only very slowly. As such, short-time work will still be an important instrument for stabilising the labour market in 2021. Wage settlements in 2021 are expected to result in an average increase of around 1.5%. Under the impact of the coronavirus crisis and in view of far-reaching changes, securing jobs is likely to be a high priority. By 2022, the labour market should have overcome the coronavirus crisis and structural factors should dominate, the result then being that the increasing shortage of skilled workers due to demographic developments and the social climate indicate a high labour market demand, a tendency towards full employment and relatively strong wage increases.

Coronavirus is interrupting the immigration boom

Before the coronavirus crisis, immigration and housing demand were guaranteed by the booming labour market, the high income gap relative to the migrants' countries of origin and a fundamentally high standard of living. From 2016 to 2019, annual net immigration reached around +400,000. In 2020, on the other hand, immigration plummeted and is expected to have stood at roughly 230,000. This is the lowest level since 2010. The slump was particularly noticeable during and after the first lockdown from March to June 2020. In particular, the closure of borders with neighbouring countries blocked the influx. In the month of April, there was even a net outflow. The increase in net immigration in the second half of the year, which was on par with previous years, is remarkable. Mainly due to the decrease in immigration, the number of inhabitants in 2020 was almost stable at 83.2 million: the coronavirus crisis may have made Germany even more attractive for immigrants. In the first wave of infections in spring 2020, Germany managed the crisis very well compared to many other countries. There was also much less of an economic strain than in many other countries. In addition, the Skilled Workers Immigration Act was passed on 1 March 2020. This has the potential to boost non-European immigration. In particular, the abolition of the proof of precedence could trigger a further surge in immigration. A steady increase in immigration from India has already been observed in recent years. For Berlin, India has been the most important country of origin since 2018. For Germany as a whole, India ranked third in 2019 behind Romania and Syria. Due to these developments, we base our population forecasts on the projections of the Federal Statistical Office with high net immigration of 311,000 per year on average. As a result, the population may rise to over 84 million by the early 2030s with only slow declines thereafter.



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2019: Top 20 countries
Net migration in '000

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2019

1	Romania	46.2
2	Syria	31.3
3	India	21.7
4	Bulgaria	21.2
5	Turkey	18.4
6	Croatia	17.9
7	Kosovo	15.7
8	Bosnia and Herzegovina	14.9
9	Iran	11.0
10	Albania	10.8
11	North Macedonia	9.7
12	Serbia (non-Kosovo) (from 17.02.2008)	9.1
13	Italy	8.4
14	Iraq	8.3
15	Russia	8.2
16	China	6.9
17	Ukraine	6.8
18	Afghanistan	5.9
19	Vietnam	5.5
20	Nigeria	5.1

Sources: Federal Statistical Office, Deutsche Bank Research

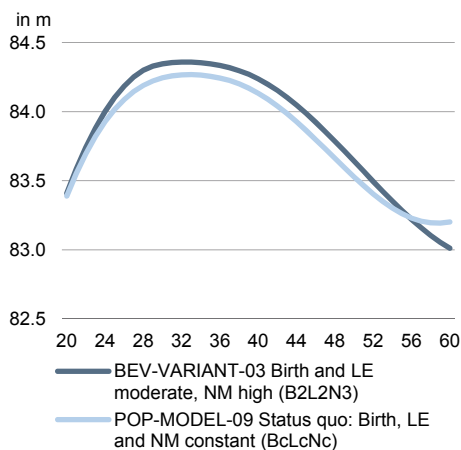
Other demand drivers: Trend towards single households, more living space per capita, overcrowding and quality deficiencies

In addition to the labour market and immigration, the demand for housing is increasing due to the higher living space per capita. Due to higher levels of income and wealth, as well as the trend towards single households, living space per person has increased almost steadily in recent years. According to the Federal Statistical Office, living space per capita increased from 42.5 square metres in 2009 to almost 47 square metres in 2018. This average increase does not reflect the reality of life for many people, however. The coronavirus crisis has in particular shed light on the limited space in which families live. According to the Federal Statistical Office, 6.4 million people lived in overcrowded residential units in 2019. In towns and cities in particular, the rate has grown almost steadily over the last decade. In 2019, almost 13% of residents lived in overcrowded housing. Despite trend improvements, there are still many residential units with fundamental quality deficiencies as well. For example, in 2019 residents reported that 4% of residential units were too dark, with 12% reporting dampness or rot. These deficiencies show the potentially high demand for new and higher-quality housing.

With the return to full employment and an improved income situation, the number of households and residential units in Germany should continue to increase in the coming years. It had already increased by 3% from 2008 to 2018, with the number of single-person households even growing by a solid 6%. According to calculations by the Federal Statistical Office, the number of single-person households will increase by at least another 3% by 2025 and by a minimum of 5% by 2030.

Germany: Official population
projections

10



POP = Population off. projection, LE=Life expectancy, NM = net migration. B2L2N3 = Birth version 2, Life expectancy version 2, Net migration version 3. c=constant.

Sources: Deutsche Bank Research, Federal Statistical Office

Definition: Considerations

11

Accommodation is considered overcrowded if at least one of the following rooms is not available:

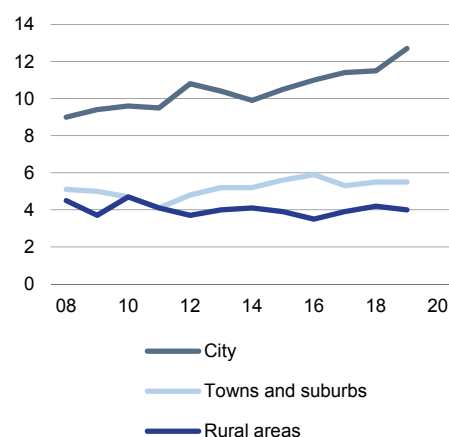
- one communal room
- one room per couple in the household
- one room per additional person aged 18 and over
- one room for 2 children under the age of 12
- one room for 2 children of the same sex aged between 12 and 17
- one room per child of different sexes aged between 12 and 17.

Source: Federal Statistical Office

2008-2019 Overcrowding rate

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Share of the population in %

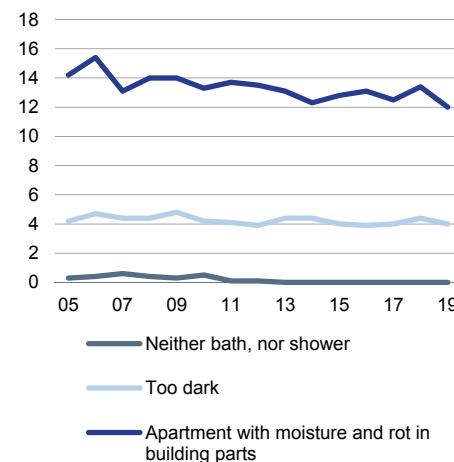


Source: Federal Statistical Office

Quality defects in the living room

13

Share of the population in %



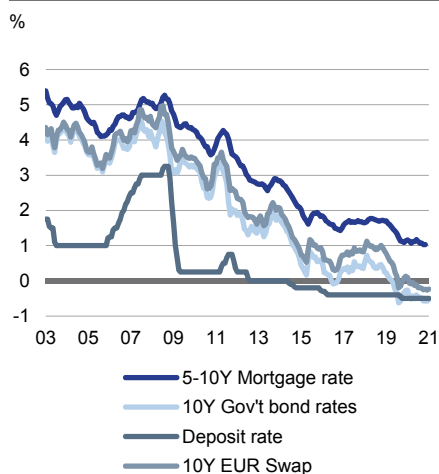
Source: Eurostat



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Money and capital market:
Interest rates

14



Sources: ECB, Deutsche Bank Research

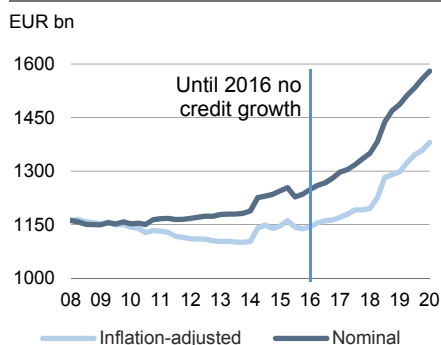
Mortgage rates to develop laterally until mid-2022

The twelve-year house price cycle from 2009 to 2020 can be divided into two phases in terms of lending. From 2009 to 2016, 5-10 year mortgage rates (ECB benchmark) fell, but new lending increased only slowly. At the same time, the annual average repayment rate rose from 1.5% in 2009 to 3.2% at its peak in 2016. Over this period, new lending business and repayments almost balanced each other out. As such, the volume of credit hardly increased up until 2016, which is why the cycle could also be called a creditless cycle up until that point. In the second phase, interest rates fell further, from around 2% to almost 1%. This further boosted new lending business. The repayment rate fell to 2.8% in 2017 and it has been running almost laterally since then. As a result of both developments, the loan volume expanded by 25% from 2016 to 2020 to stand at EUR 1,580 billion nationwide. Even in the coronavirus year 2020, the loan volume grew by around 6% as compared to the previous year. Average loan volumes for property purchases have also increased massively over the entire cycle since 2009. According to financial service provider Dr. Klein, the individual loan amount increased from around EUR 150,000 to EUR 300,000.

The low interest rate environment, lateral or even slightly declining repayment rates, the trend towards a significant expansion of the loan volume and even higher individual loan amounts are likely to continue in the years to come. We expect ECB interest rates (main refinancing rate) to remain constant until the end of 2023 (at 0.0%, deposit facility: -0.5%). Strong movements are also likely to remain the exception at the long end of the interest curve. Government debt, massively increased by the coronavirus crisis, has reached levels that threaten financial stability without ECB intervention in some states. At its December 2020 meeting, the ECB extended net bond purchases by nine months until March 2022. The subsequent reinvestment phase – during which the ECB keeps the volume of bonds constant and replaces maturing bonds – was also extended until the end of 2023. The ECB's inflation outlook has been muted for years. We also currently forecast that inflation in the eurozone will be well below 2% by 2025, although there could temporarily be higher inflation rates in some countries. In Germany, for example, inflation could rise to over 3% at the end of the year, but then fall back to below 2%.³

Mortgage loans

15

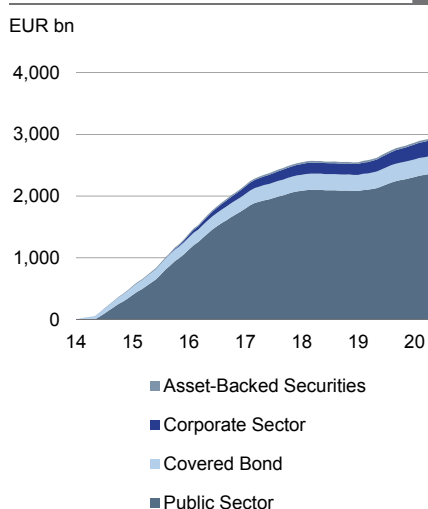


Sources: Deutsche Bundesbank, Deutsche Bank Research

In coronavirus year 2020, 5-10 year mortgage rates fell from 1.16% in January to nearly 1% at year-end 2020. We expect the low interest rate level to continue. The ECB has also massively depressed risk premiums due to the coronavirus crisis, which is probably why banks will not start pricing in higher risk premiums in this market environment. This is likely to be especially true for the many regional banks, for which the housing market and mortgage lending may have become even more important due to the severe economic crisis. In view of the impending wave of insolvencies, this is not likely to change until 2022. As such, we expect 5-10 year mortgage rates to run sideways at least until mid-2022.

ECB Asset purchases

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Sources: Deutsche Bank Research, Haver Analytics LP

What does the German election year 2021 have in store? More and stricter rules, more calls for affordable housing, with limited success

The debate concerning further regulatory tightening is likely to frequently make the headlines again in 2021. Almost all parties are likely to promise more and affordable housing in the German federal election campaign and hold out the prospect of corresponding election payoffs. The CDU's announcement at the last federal elections that it wanted to build 1.5 million residential units in the

³ Becker, Sebastian (2021). Inflation: Now expecting 2% for 2021! In: Focus Germany. Deutsche Bank Research, 17 February 2021.



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current legislative period⁴ is also likely to be repeated. The fact that the target will be clearly missed in the current legislative period – probably by an amount of considerably more than 200,000 units – is unlikely to be noticed. As things stand today, *Baukindergeld* (the government grant scheme to support families building homes) will expire on 31 March 2021, which will potentially have a slight dampening effect on prices in the lower and middle segments of the housing market. On 31 December 2021, the special depreciation allowances for investments in rental housing will end and in turn, could increase the supply shortage in the future. However, the possibility of an extension does exist here. In addition, a decision is pending on the extent to which the Berlin rent cap and the Bavarian rent freeze initiative are constitutional. These judgements are likely to have far-reaching consequences for housing policy, which is increasingly socialistic. If Berlin's rent cap is constitutional, the emerging tightening of the supply shortage in Berlin's housing market is likely to manifest itself. If, on the other hand, the rent cap as well as the Bavarian rent freeze initiative are unconstitutional, 2021 would also have the potential to usher in the end of socialist tendencies in housing policy. Regardless of this decision, the increasingly strict regulatory framework and the many well-intentioned initiatives – including the housing offensive – are likely to dampen the core problem of “scarce housing” at best, but not eliminate it, and at worst exacerbate it.

⁴ From the CDU policy programme of 2017-2021: “We want 1.5 million new dwellings to be built in Germany from 2017–2021 in the coming election period – an increase of 50 percent as compared to today.”



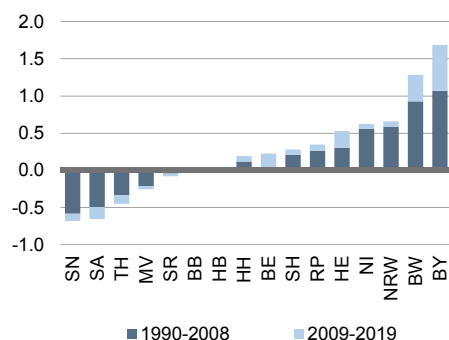
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B. Historical internal migration from east to southern Germany over the last 30 years

1990-2019: Inhabitants in 16 federal states

17

Change in million

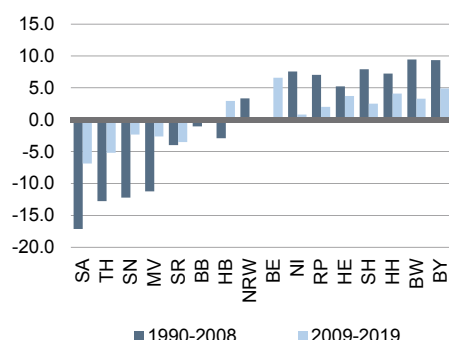


Sources: bulwiengesa, Deutsche Bank Research

1990-2019: Inhabitants in 16 federal states

18

change in %



Sources: bulwiengesa, Deutsche Bank Research

Non-metropolitan region: 44 of the 126 cities lie outside a metropolitan region

19

Aachen, Albstadt, Bielefeld, Dresden, Düren, Eisenach, Erfurt, Flensburg, Freiburg (Breisgau), Friedrichshafen, Fulda, Görlitz, Greifswald, Gütersloh, Kaiserslautern, Karlsruhe, Kassel, Kempten (Allgäu), Kiel, Koblenz, Konstanz, Lüneburg, Magdeburg, Marburg-Biedenkopf, Minden, Münster, Offenburg, Osnabrück, Paderborn, Passau, Pforzheim, Ravensburg, Regensburg, Rostock, Saarbrücken, Schweinfurt, Siegen, Stralsund, Suhl, Trier, Ulm, Villingen-Schwenningen, Weimar, Würzburg.

Source: Deutsche Bank Research

The population structure as well as the nationwide population density have been shifting for decades. This is mainly due to reunification and demographic factors. Natural population growth has been negative since the 1970s, i.e. there have been more deaths than births every year. This means that population growth was due to positive immigration. In the past decade in particular, there was a powerful surge in immigration, even without the wave of migration in 2015/16. All three factors – reunification, negative natural population growth and immigration – have also shifted regional population densities and therefore housing demand. The number of inhabitants in the economically strong regions has seen significant growth in the last 30 years thanks to the large number of attractive, high-quality available jobs. This is especially true of the southern German region. The population of Bavaria and Baden-Württemberg increased by about one million from 1990 to 2009 and by another half a million from 2009 to 2019. The number of inhabitants increased in most of the other west German states in the last 30 years as well. By contrast, the population has declined in the east German states in particular, with the exception of Brandenburg. In Thuringia, Saxony and Mecklenburg-Western Pomerania, the number of inhabitants has shrunk by around 15% since reunification. The state of Saxony-Anhalt has even recorded a drop of 24%. A nationwide comparison of population growth over the period 1990 to 2009 with the period 2009 to 2019 indicates a high correlation. Almost all federal states show the same trends in both periods. Exceptions here are the city states of Bremen and Berlin, and also Brandenburg. In these three federal states, a decline in population was followed by an influx. Berlin's high growth of 6.6% from 2009 to 2019 also extends to Brandenburg. There was particularly high growth in the regions surrounding Berlin, while the number of inhabitants in other regions of Brandenburg tended to fall.

Germany's eleven metropolitan regions and their cities

20

Metropolitan Region	Centre (=most costly office rents)	Cities and towns of the Metropolitan Region
Berlin/Brandenburg	Berlin	Brandenburg an der Havel, Cottbus, Frankfurt (Oder), Potsdam
Northwest	Bremen	Bremerhaven, Delmenhorst, Oldenburg, Wilhelmshaven
Rhine-Ruhr	Dusseldorf/Cologne	Bergisch-Gladbach, Bochum, Bonn, Bottrop, Dortmund, Duisburg, Essen, Gelsenkirchen, Hagen, Hamm, Herne, Krefeld, Leverkusen, Mönchengladbach, Mülheim an der Ruhr, Neuss, Oberhausen, Recklinghausen, Remscheid, Solingen, Witten, Wuppertal
Rhine-Main	Frankfurt	Aschaffenburg, Darmstadt, Gießen, Hanau, Mainz, Offenbach am Main, Wiesbaden
Hamburg	Hamburg	Lübeck, Lüneburg, Neumünster, Schwerin, Norderstedt, Wismar
HBGW	Hanover	Brunswick, Celle, Göttingen, Hildesheim, Salzgitter, Wolfsburg
Rhine-Neckar	Heidelberg	Mannheim, Ludwigshafen am Rhein, Neustadt an der Weinstraße, Worms
Central Germany	Leipzig	Chemnitz, Dessau-Roßlau, Gera, Halle (Saale), Jena, Zwickau
Munich	Munich	Augsburg, Ingolstadt, Kaufbeuren, Landshtut, Rosenheim
Nuremberg	Nuremberg	Bamberg, Bayreuth, Coburg, Erlangen, Fürth, Hof (Saale), Weiden i.d.OPf.
Stuttgart	Stuttgart	Esslingen am Neckar, Göppingen, Heilbronn, Ludwigsburg, Reutlingen, Schwäbisch-Gmünd, Sindelfingen, Tübingen

Note: HBGW = Hanover-Brunswick-Göttingen-Wolfsburg

Source: Deutsche Bank Research



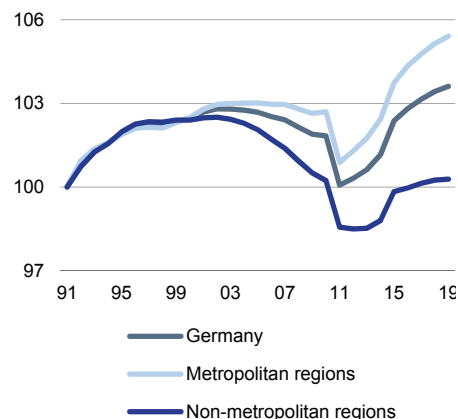
Outlook for the German residential property market 2021 and beyond

1990-2020: Number of inhabitants in the eleven metropolitan regions increased by more than 3 million

1991-2019 Inhabitants: Metropolitan regions vs. non-metropolitan regions

21

1991=100

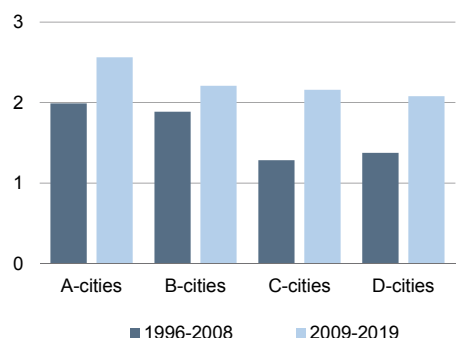


Sources: bulwiengesa, Deutsche Bank Research

126 cities: Commuters in and out

22

Growth in % per annum



Sources: bulwiengesa, Deutsche Bank Research

Developments at the state level are also reflected in the eleven metropolitan regions. This was where most domestic migration and immigration from abroad occurred. Around 55 million people live in these regions today, 2.8 million more than in 1991, while in the non-metropolitan regions the population in 2019 stood at the same level as in 1991. According to our calculations, 75% of the net immigration of around 3.3 million people since 2009 has been to the metropolitan regions: this is probably due to the very good labour market opportunities they offer. In our view, immigration in the last decade has influenced people's decisions as to whether to live in the centres or on the outskirts of a metropolitan region. To summarise very briefly, the development in the eight west German metropolitan regions (Charts 24 to 31) can be described as follows.

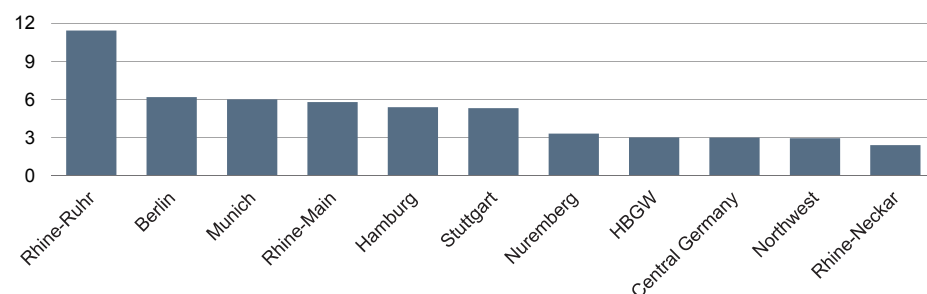
Up until the financial crisis, the preferred lifestyle was to separate home and work. Many households lived in the metropolitan region and worked in the city. As a result, the population of the eleven metropolitan regions increased by 1.3 million by 2009 and by a further 1.5 million from 2009 to 2019. What is more, growth in the region was greater than in the city itself. Since the German economy overcame the financial crisis relatively quickly, the German labour market attracted mainly Eastern and Southern Europeans. The subsequent surge in immigration greatly increased the number of people commuting in and out of the cities. In many places, local and road public transport reached its capacity limits. As a result, commuting times increased at the expense of quality of life. Consequently, cities became more attractive as places to live relative to their respective metropolitan regions. Together with domestic immigration and immigration from abroad, this led to an increase in the numbers of inhabitants. These developments are what laid the foundation for the scarcity of housing and the current house price cycle.

The other metropolitan regions of Berlin, Central Germany and Rhine-Ruhr are undergoing a fundamental transformation process. Up until the financial crisis, the number of inhabitants in these cities and metropolitan regions hardly increased (Charts 33 to 35). In the metropolitan region of Central Germany, the number of inhabitants even shrank by 15% from reunification to the financial crisis. At the start of the current cycle in 2009, the number of inhabitants in the cities picked up again, while developments in the regions varied greatly. Berlin's surrounding communities benefited from a boom in the capital and we continue to expect a super-cycle in the Berlin economy with only a pause in the Berlin house price cycle due to the rent cap. In the Ruhr region and in Central Germany, immigration has at least prevented a decline in the number of inhabitants since 2009.

2019 Germany's 11 metropolitan regions: Population

23

in m

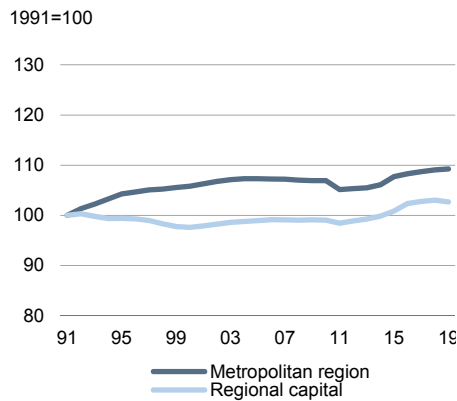


Sources: bulwiengesa, Deutsche Bank Research



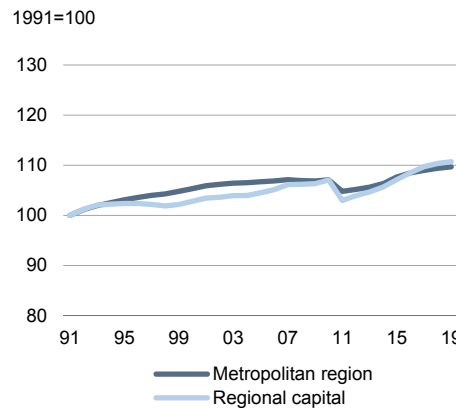
Outlook for the German residential property market 2021 and beyond

Bremen 24



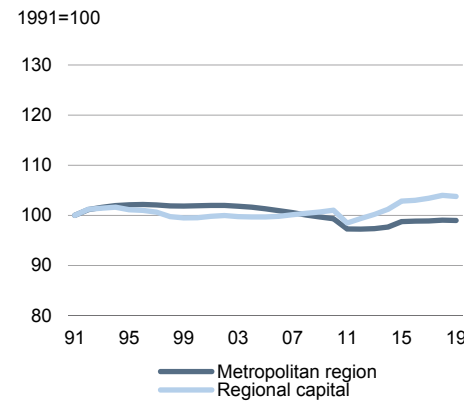
Sources: bulwiengesa, Deutsche Bank Research

Hamburg 25



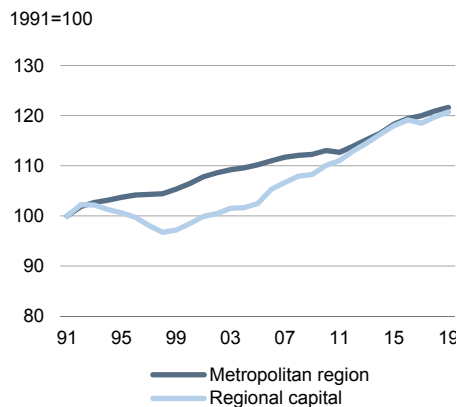
Sources: bulwiengesa, Deutsche Bank Research

Hanover 26



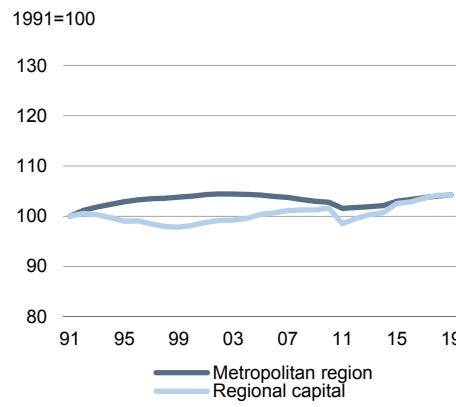
Sources: bulwiengesa, Deutsche Bank Research

Munich 27



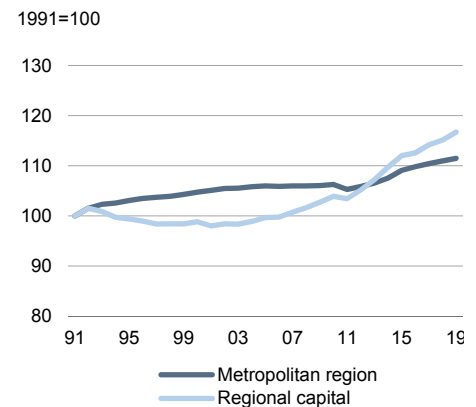
Sources: bulwiengesa, Deutsche Bank Research

Nuremberg 28



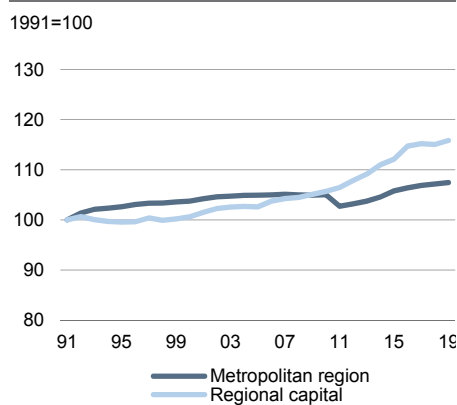
Sources: bulwiengesa, Deutsche Bank Research

Rhine-Main 29



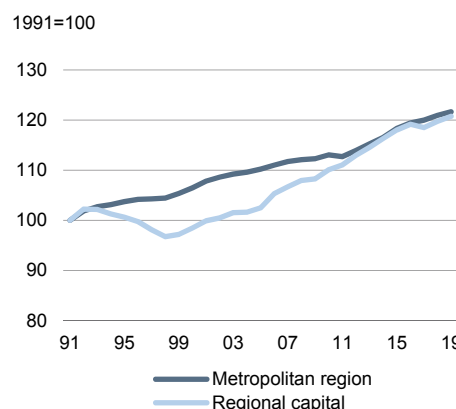
Sources: bulwiengesa, Deutsche Bank Research

Rhine-Neckar 30



Sources: bulwiengesa, Deutsche Bank Research

Stuttgart 31



Sources: bulwiengesa, Deutsche Bank Research

1991-2019 Population development in Germany's eleven metropolitan regions: Metropolis vs. region

32

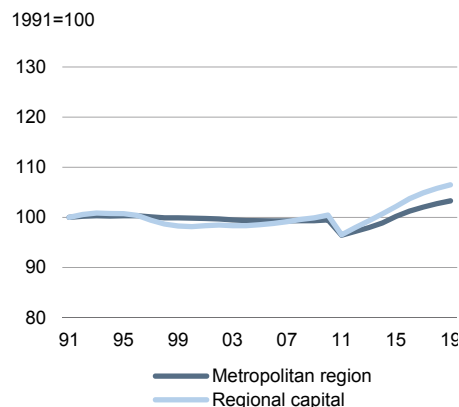
Charts 24-31: Eight western German metropolitan regions. Charts 32-34: Metropolitan regions undergoing fundamental change.

Source: Deutsche Bank Research



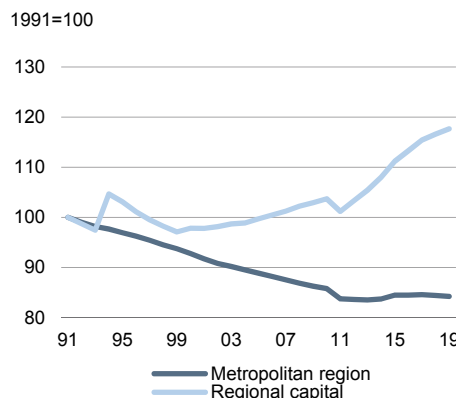
Outlook for the German residential property market 2021 and beyond

Berlin 33



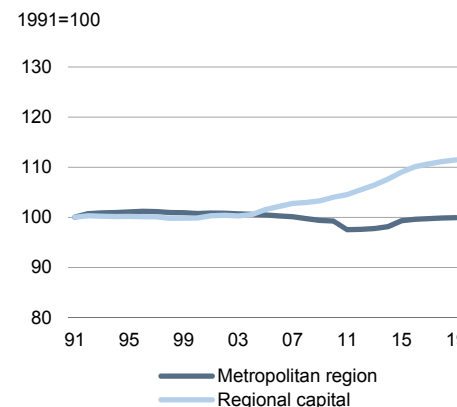
Sources: bulwiengesa, Deutsche Bank Research

Leipzig 34



Sources: bulwiengesa, Deutsche Bank Research

Rhine-Ruhr 35



Sources: bulwiengesa, Deutsche Bank Research

Population growth in more than 400 counties:
High path dependency

36

		1991-2008	
		Positive	Negative
2011-2019	Positive	200	38
	Negative	61	106

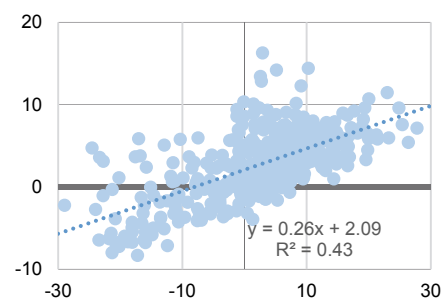
Note: Census in 2011 led to a significant correction of the population figures in many counties. Therefore, the first two years of the current house price cycle are not taken into account.

Sources: bulwiengesa, Deutsche Bank Research

Inhabitants 1991-2008 vs.
2011-2019 in more than 400 counties

37

y-axis: 2011-2019 Growth in %
x-axis: 1991-2008 Growth in %



Sources: bulwiengesa, Deutsche Bank Research

Around 15 million people live in regions with shrinking populations

Both non-metropolitan and metropolitan regions have districts with poor infrastructure. Identifying these areas helps understand internal migration, which is often very widespread. This is particularly important in view of the demographic challenges the country faces. In Germany, there are currently around 400 districts (*Landkreise*)⁵ and independent towns/cities, all of which all referred to in the following as “districts”. Of these, 235 are located inside metropolitan regions and the remaining 170 outside. Based on the period 2011 to 2019, there are 49 districts in the metropolitan regions with declining populations. In 2011, 7.0 million people lived in these regions; in 2019 only 6.8 million. 58 districts outside of metropolitan regions fell into this category, with 8.9 million inhabitants in 2011 and 8.6 million in 2019. Despite the generally high standard of living, Germany's good economic strength and strong immigration in recent years, almost half a million people moved away from these more than 100 districts between 2011 and 2019. These regions are located not just in east Germany but in west Germany, as well.

There is a high degree of path dependency. If a district shrank between 1991 and 2009, the decline in population continued in 74% of these districts until 2019. Where there is a lack of good quality jobs, young adults and families move away. Consequently, the number of births typically decreases and the proportion of older people increases. Economic momentum tends to decline. These regions are also risky for investors and house builders alike, as there are often high vacancy rates and falling prices for residential property. Without the immigration boom in the last ten years, the number of districts with declining populations would have been significantly higher. In 2009, for example, the number of inhabitants shrank in 300 districts, while in 2015, the year of the influx of refugees, this applied to only 29 districts. From 2016 onwards, there was once again an increasing number of districts with a declining population. In 2019, the population decreased in about 150 of the more than 400 districts. Although in some of these districts immigration prevented an even greater decline in the number of inhabitants, the influx was mainly into the prosperous regions.

⁵ There are currently 401 districts and independent towns/cities in Germany. However, our database is still based on 405 districts and independent towns/cities.



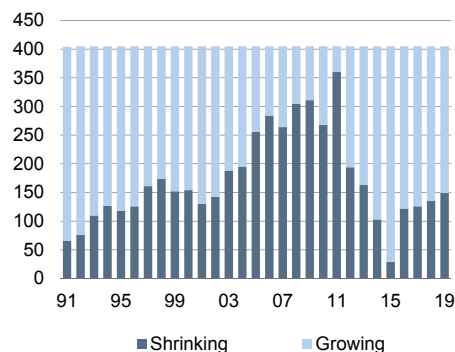
Outlook for the German residential property market 2021 and beyond

2011-2020: Sharp rent and price increases both inside and outside the metropolitan regions

Counties: Inhabitants

38

No. of counties in Germany

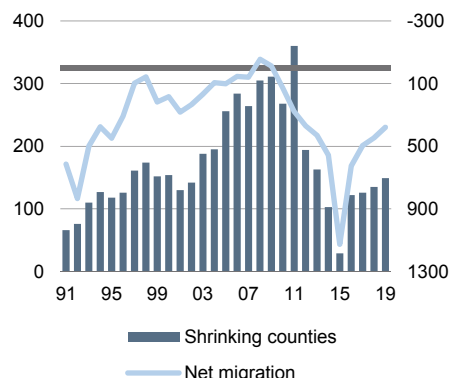


Sources: bulwiengesa, Deutsche Bank Research

1991-2019 Net migration and inhabitants in counties

39

left y-axis: No. of shrinking counties
right y-axis: Migration in '000, inverse



Sources: bulwiengesa, Deutsche Bank Research

The price and rent developments since 2011 have varied greatly in the metropolitan regions. Over the last ten years, populations in the metropolitan regions of Munich, Nuremberg and Stuttgart have seen robust growth, both in the cities themselves and in their surrounding regions. In these regions, rents (re-letting) saw a particularly sharp increase from 2009 to 2020 at a rate of 60% to 70%, also relative to the other regions. Apartment and house prices also rose at an above-average rate in the southern German cities over this period. In Nuremberg and Stuttgart, apartment prices increased by 110% and prices for detached houses by some 60%. As is so often the case, Munich clearly outperformed all other regions with an increase of 140% in apartment prices and almost 100% in house prices. Similar to the southern German metropolitan regions, Berlin, Rhine-Main and Rhine-Neckar also saw significant population growth. Here however, price and rent dynamics are lagging behind. Rents increased by around 50%, apartment prices by some 90% and prices for detached houses by approximately 60%.

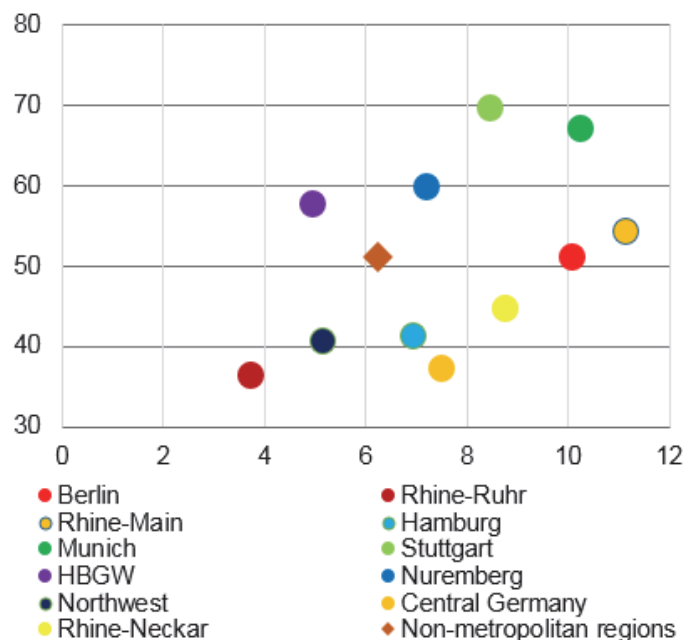
Among the metropolitan regions in the north, Bremen, Hamburg and Hanover-Brunswick-Göttingen-Wolfsburg (HBGW), Hanover has the highest rental and price growth, at 60% and 100% respectively. This is particularly remarkable in view of the lower level of population growth as compared to the Hanseatic cities. One explanation is the major rent and price increases in Wolfsburg, the headquarters of the Volkswagen Group, which also exceed average development in the A cities. This is probably true throughout the entire region. Below-average price and rent developments were recorded in Leipzig and also in the Rhine-Ruhr metropolitan region in particular. In both regions, rents increased by roughly 35%. Apartment and house prices in Leipzig increased by almost 70%. In the Rhine-Ruhr region, on the other hand, apartment prices rose by 55% and house prices by almost 40%. The average rent and price development outside the metropolitan regions (44 cities) was in the middle range with a 50% increase in rents, an 80% increase in apartment prices and a 60% increase in house prices. The initial rental yields for apartments and multi-family houses not including transaction costs, maintenance costs taxes or financing have fallen almost steadily over the cycle. Here, too, there is considerable discrepancy across the metropolitan regions. In the economically strong southern regions, for example, rental yields tend to be below 4% per year on average, while in the regions with weaker infrastructure, yields of over 5% were in fact achieved in some cases.



2011-2020 Metropolitan regions: Inhabitants vs. rents

40

y-axis: Re-letting in %
x-axis: Inhabitants growth in %

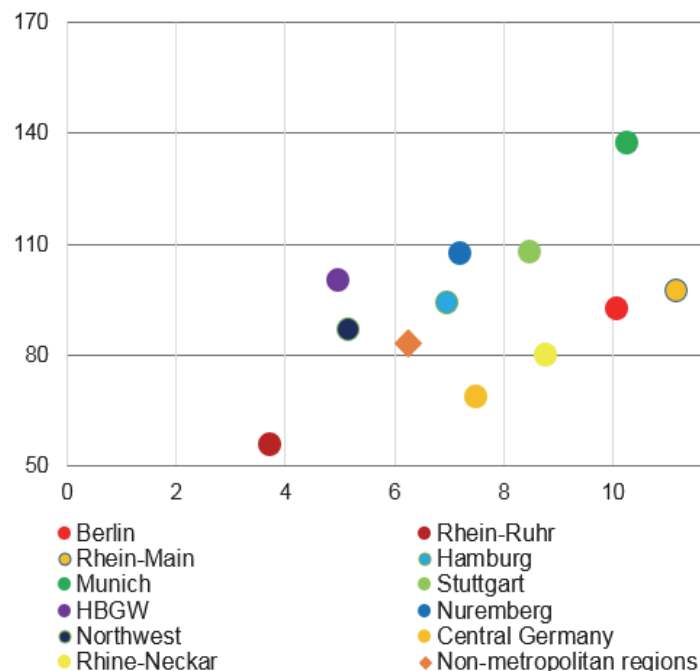


Sources: bulwiengesa, Deutsche Bank Research

2011-2020 Metropolitan regions: Inhabitants vs. apartment prices

41

y-axis: Apartment prices of existing build. in %
x-axis: Inhabitants growth in %

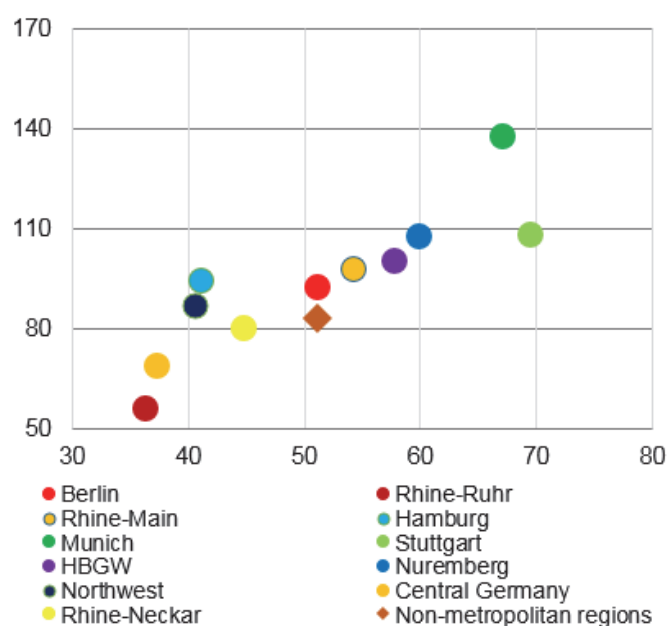


Sources: bulwiengesa, Deutsche Bank Research

2011-2020 Metropolitan regions: Apartment prices vs. rents

42

y-axis: Apartment prices of existing build. in %
x-axis: Re-letting in %

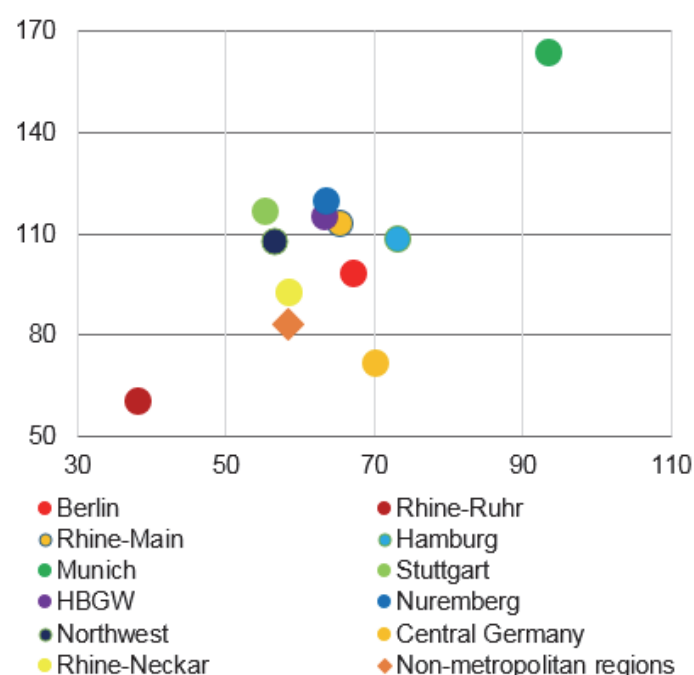


Sources: bulwiengesa, Deutsche Bank Research

2011-2020 Metropolitan regions: Apartment vs. house prices

43

y-axis: Apartment prices of existing build. in %
x-axis: Housing prices, single-family in %



Sources: bulwiengesa, Deutsche Bank Research

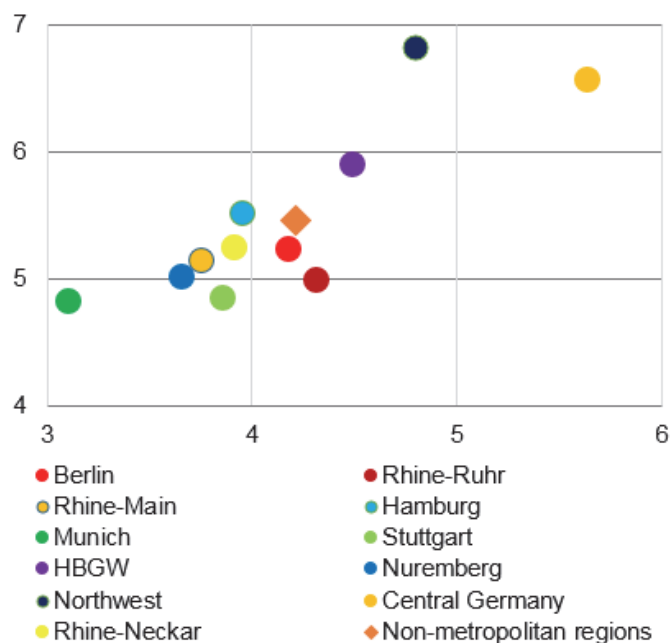


Outlook for the German residential property market 2021 and beyond

2009 vs 2020 Metropolitan regions: Initial rental yields of existing buildings

44

y-axis: Rental yield in 2009 in % p.a.
x-axis: Rental yield in 2020 in % p.a.

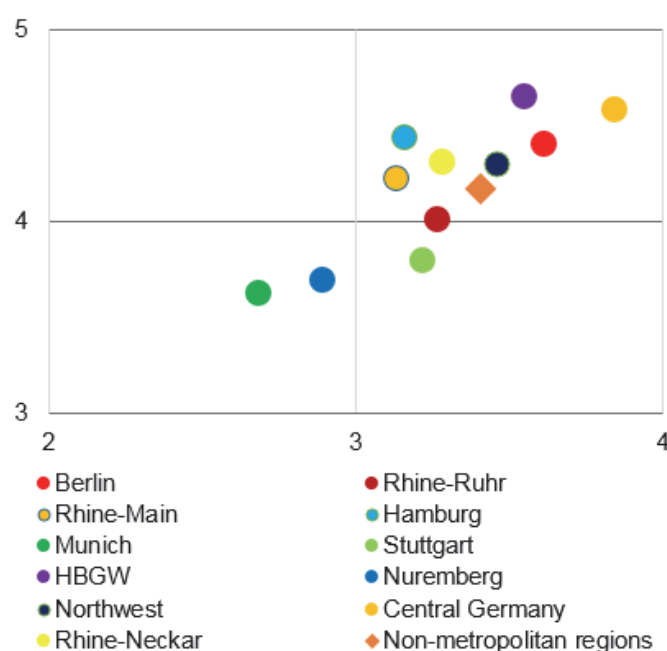


Sources: bulwiengesa, Deutsche Bank Research

2009 vs 2020 Metropolitan regions: Initial rental yields of new buildings

45

y-axis: Rental yield in 2009 in % p.a.
x-axis: Rental yield in 2020 in % p.a.

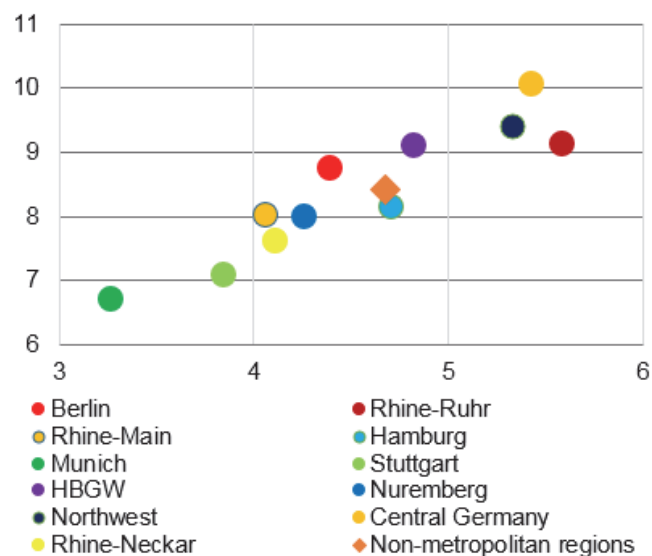


Sources: bulwiengesa, Deutsche Bank Research

2009 vs 2020 Metropolitan regions: Initial rental yields of multi-family houses

46

y-axis: Rental yield in 2009 in % p.a.
x-axis: Rental yield in 2020 in % p.a.

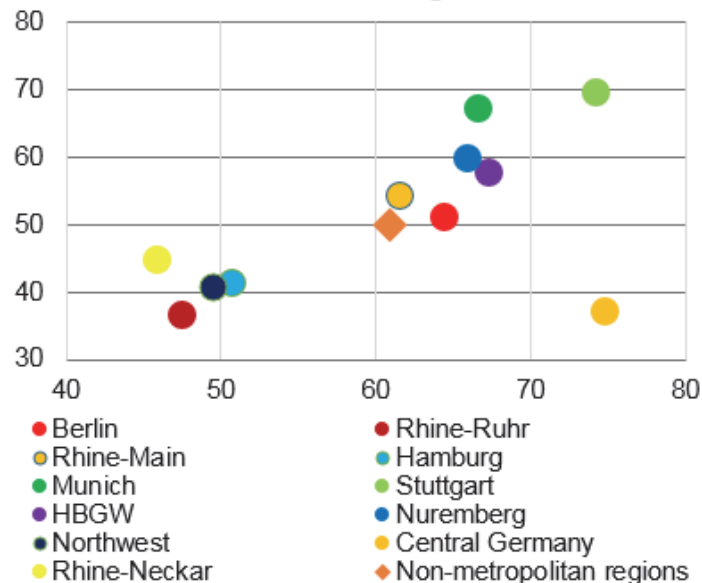


Sources: bulwiengesa, Deutsche Bank Research

2009 vs 2020 Metropolitan regions: Re-letting vs. rents for new apartments

47

y-axis: Re-letting in %
x-axis: Rents for new buildings in %



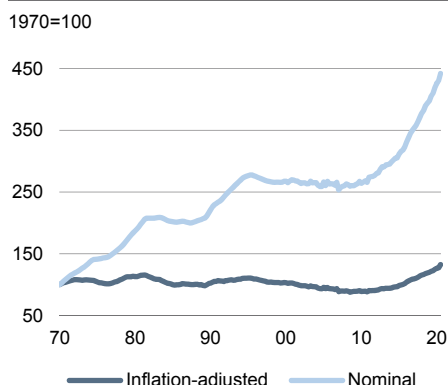
Sources: bulwiengesa, Deutsche Bank Research



Outlook for the German residential property market 2021 and beyond

1970-2020 House price index in Germany

48

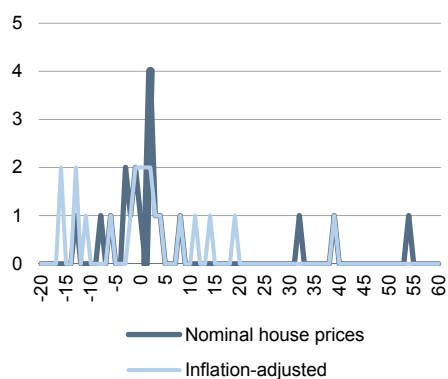


Sources: Deutsche Bank Research, OECD

1970-2020 Germany: House price cycles

49

y-axis: No. of cycles
x-axis: Duration of cycles in quarters



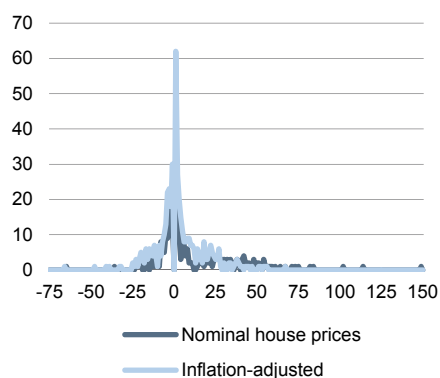
x-axis: +=boom, -=bust

Sources: Deutsche Bank Research, OECD

1960-2020 OECD: House price cycles of 41 countries

50

y-axis: No. of cycles
x-axis: Duration of cycle in quarters



x-axis: +=boom, -=bust

Sources: Deutsche Bank Research, OECD

C. The cycle should end this decade

Numerous factors influence the housing market. We discuss the following points to address the question of when the current house price cycle will end.

1. Historical categorisation of the length of house price cycles
2. International comparison of absolute house and apartment prices
3. International comparison of relative house and apartment prices
4. The fundamental supply shortage in Germany
5. Regional differences in fundamental supply shortages
6. Internal migration due to the abandonment of rural districts and villages
7. Low interest rates drive institutional investors into property
8. Are three waves of regulation by 2030 one too many?

1. Historical comparison: Current cycle joins 20 longest house price cycles from 1960 to 2020

OECD history of particularly long house price cycles (inflation-adjusted price indices)

51

Rank	Start	End	Country	Quarters	Real prices
1	1992	2008	Netherlands	67	266%
2	1993	2008	Norway	58	283%
3	1960	1974	Japan	56	358%
4	1993	2007	Denmark	55	189%
5	1993	2007	USA	54	62%
6	1978	1991	Japan	52	80%
7	1993	2007	Ireland	51	236%
8	1996	2008	Sweden	47	127%
9	1996	2007	UK	45	177%
10	1996	2008	Euro area	44	40%
11	2008	2019	Canada	43	62%
12	2009	2020	Luxembourg	43	71%
13	2010	2020	Estonia	41	64%
14	1997	2007	Spain	40	133%
15	2010	2020	Germany	39	50%
16	1998	2008	France	39	113%
17	1999	2008	Canada	38	70%
18	2008	2017	Israel	38	93%
19	1998	2008	Italy	38	59%
20	2011	2020	Columbia	36	48%

Source: Deutsche Bank Research

Although house price cycles do not typically die of old age, historical knowledge is always helpful in assessing the present and future. OECD house price data are helpful in assessing the current German cycle. The database contains quarterly data for 41 countries from 1960 to 2020, with time series for many countries starting in 1970 or later. We use a simple methodology to calculate cycle length. An upswing cycle continues if the new quarterly value is above the previous one or above the average of the last five quarters. This latter rule prevents short-term fluctuations from interrupting the cycle. The downturn cycle is defined in a similar way. The database contains both nominal and inflation-adjusted price indices. According to this approach, the current cycle for both price indices has now lasted 39 quarters. Adjusted for inflation, this is the longest German price cycle out of eight upswing cycles identified since the year

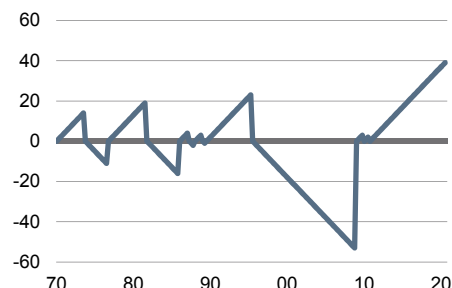


Outlook for the German residential property market 2021 and beyond

1970-2020 Germany: Inflation-adjusted boom and bust cycles

52

No. of quarters
+ = boom, - = bust cycle



Sources: Deutsche Bank Research, OECD

1970. There have been more than 100 upswings across all countries. In nominal prices, the German cycle lasted 54 quarters from 1970 to 1983. This is where the high inflation rates of the 1970s come into play. Adjusted for inflation, the cycle broke after only a few years and reversed into a downturn in the mid-1970s. In the international context, the German cycle is only one of many lengthy upswings. With an inflation-adjusted price increase of 50%, the current cycle is also rather below average (mean over top 20: 129%).⁶

2. International comparison of absolute house and apartment prices

Germany's housing prices have risen sharply over the last few years. As we saw above, they have more than doubled in some regions. A comparison of prices per square metre in European and global cities shows that, despite these price increases, German cities are valued at normal levels at first glance. For example, Germany's most expensive city, Munich, is the third most expensive city in Europe, with prices per square metre outside the city centre of around EUR 8,400, and ranks fourth globally after Hong Kong, Paris and Geneva. The second most expensive German city, Frankfurt am Main, ranks 14 in Europe and 39 globally. Hamburg, Stuttgart, Cologne, Nuremberg, Erlangen, Berlin, Dusseldorf, Hanover, Heidelberg and Karlsruhe stand at around EUR 4,000 per square metre, which has them ranking between 23 and 43 within Europe. Globally, they are ranked 51 to 82. German prices have thus risen to international levels, making up for the initial undervaluation at the beginning of the cycle. At both European and global levels, however, they are by no means out of the ordinary.

3. International comparison of relative house and apartment prices

Various sources are available for a relative comparison of house and apartment prices. First, we put the prices for a 75-m² apartment outside the city centre from Numbeo in relation to the income per capita of the corresponding region in which the city is located. Eurostat provides income per capita at NUTS2 level. This categorisation divides Germany into 38 regions, which roughly correspond to administrative districts⁷ (*Regierungsbezirk*) in terms of size. Munich, measured by income in the Upper Bavarian region, remains the most expensive German city in this ranking. In Munich, people have to spend approximately 25 disposable annual incomes to buy a 75-m² apartment. Only in Paris and Luxembourg are the price-income ratios even higher, above 30. Frankfurt is located in the Darmstadt borough and the ratio is around 18, which puts it in 9th place in Europe. Berlin ranks 23 with a ratio of around 15. Most other German cities are in the middle of the range, but some are also in the lower ranks of the 69 cities analysed. For example, as with absolute prices before, Dresden and Leipzig are ranked 64 and 67 respectively, with a price-income ratio of around 10. By and large, the absolute and relative rankings are similar.

⁶ Cf. Lechler, Marie; Möbert, Jochen; Peters, Heiko (2014). Deutschlands Hauspreise aus internationaler und historischer Perspektive. Wirtschaftsdienst, 94th vol., pp. 6-78.

⁷ On average an administrative district contains roughly 10 districts.

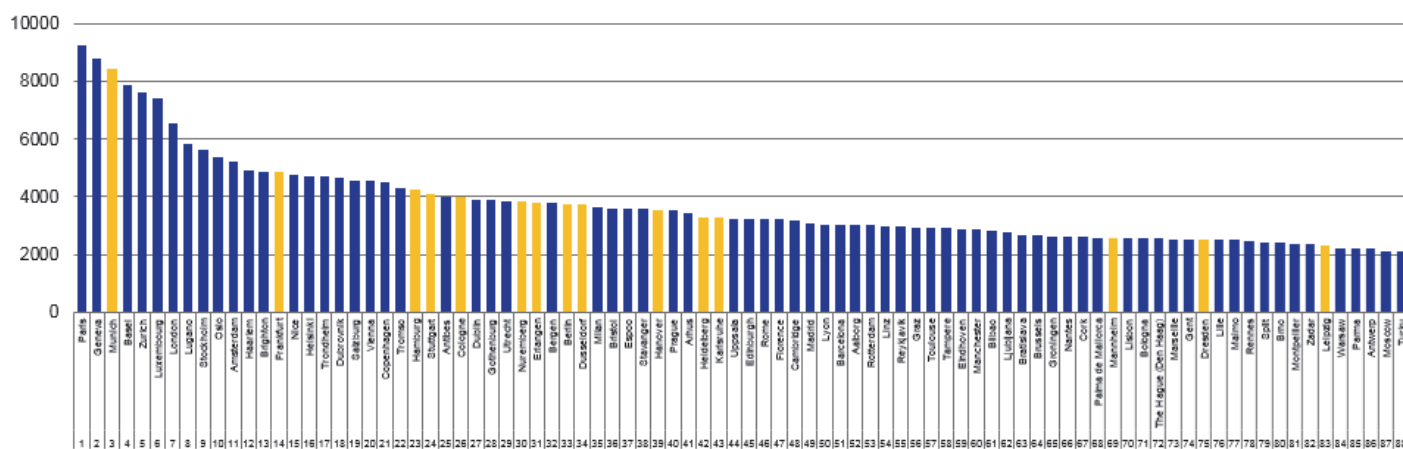


Outlook for the German residential property market 2021 and beyond

Top 88 Europe: Apartment prices outside the city centre above EUR 2000

53

EUR/sqm



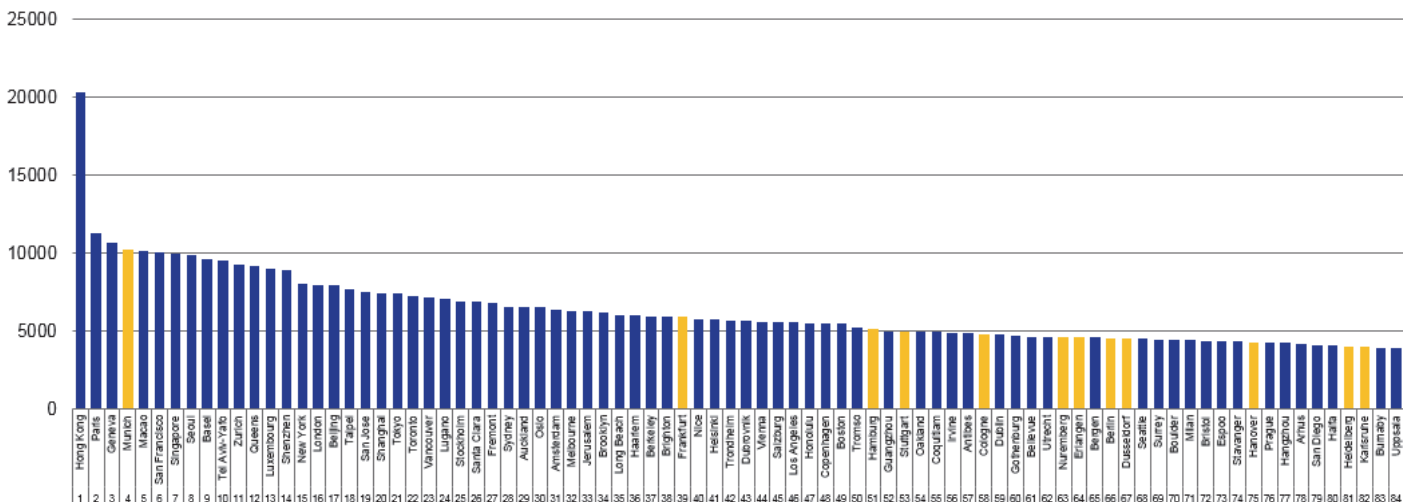
Download from numbeo.com as of January 22, 2021

Sources: Numbeo Doo, Deutsche Bank Research

Top 85 Global: Apartment prices outside the city centre

54

EUR/sqm



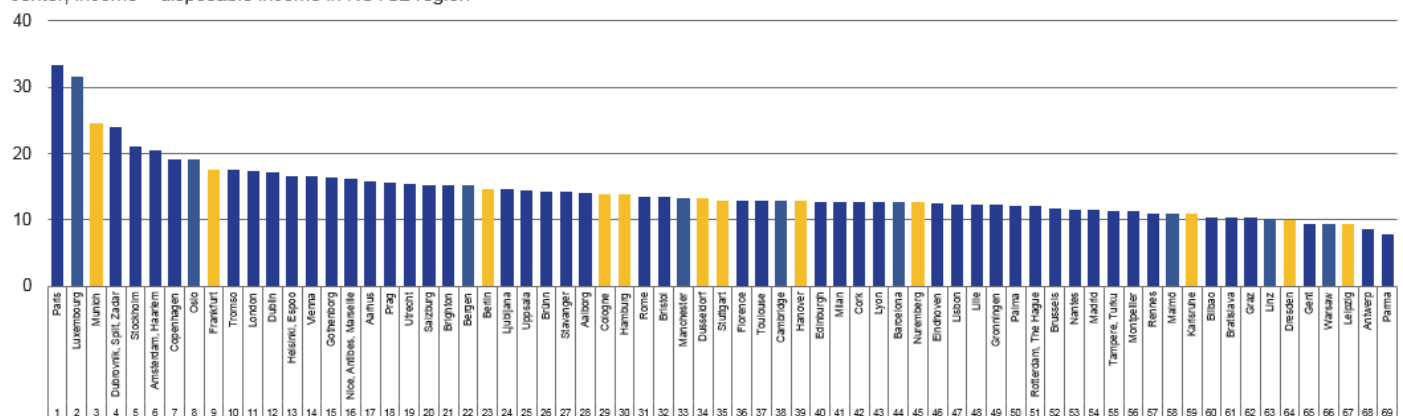
Download from numbeo.com as of January 22, 2021

Sources: Numbeo Doo, Deutsche Bank Research

Europe: Price-to-Income ratio of 69 cities

55

Multiple of regional annual income, dimensionless, price = 75-qm-apartment outside of the city center, income = disposable income in NUTS2 region



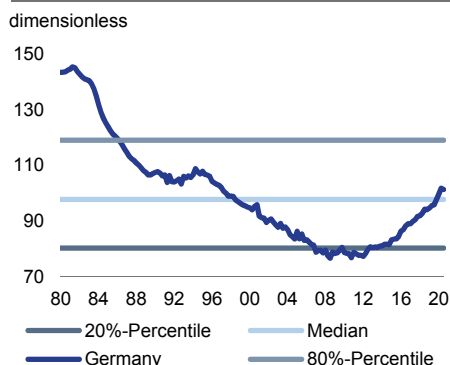
Sources: Deutsche Bank Research, Numbeo Doo, Eurostat



Outlook for the German residential property market 2021 and beyond

1980-2030 Price-to-income percentiles
based on OECD countries

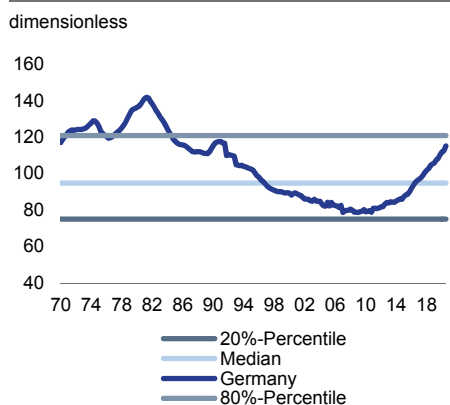
56



Sources: Deutsche Bank Research, OECD

1970-2030 Price-to-rent Percentiles
based on OECD countries

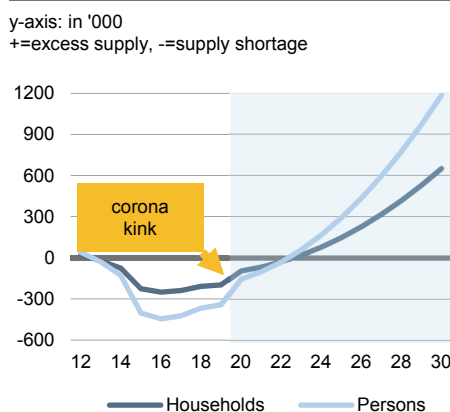
57



Sources: Deutsche Bank Research, OECD

126 cities: Comparison of supply and
demand

58



Sources: bulwiengesa, Deutsche Bank Research

In the following, we compare Germany's price-to-income ratio with that of 21 other OECD countries from 1980 to 2020. Germany's affordability indicator calculated in this way is currently slightly above the long-term average, which is scaled to 100. This level, which is perceived subjectively as rather low, is mainly due to the high relative valuation at the beginning of the 1980s. One important question is whether the end of the cycle is more likely at higher index values. To answer this question, we analyse whether a high index level today implies a lower level in three years. The four charts on the next page show that high index levels, especially those above the 80% percentile, are often subsequently accompanied by sharp price declines. For the more than 20 countries and 60 years, the 80% percentile index value is 119.0. We use this value as a point of reference to estimate the length of the German cycle. Over the entire cycle, the index value has increased by 2.6 points per year in Germany. This corresponds to average house price growth of 5.1% and wage growth of 2.4%. At this rate, Germany would reach the historically unique 80% percentile in 2026. Applying the same methodology to the ratio of prices to rents, the German index value is currently 115.1 and therefore significantly above the long-term average of 100. The 80% percentile seems to be a good rule of thumb for this affordability index as well. Based on the growth over the last ten years of 3.7 points per year, the 80% percentile of all countries of 121.7 points would already be reached in 2022.

4. The fundamental supply shortage in Germany

So far, we have analysed absolute and relative prices. Now we turn to a comparison of housing supply and demand in 126 towns and cities. Our analysis is based on a simple methodology and a number of assumptions (see Chart 63 for details). The main assumptions are a further high net immigration of more than 300,000 people per year, taking the total population to more than 84 million at its peak in 2033. The number of inhabitants in the 126 cities also increases from the current 30.1 million to 31.2 million. Based on developments over the past ten years, we have assumed that the number of inhabitants in towns and cities will increase more than in Germany as a whole. In our analysis, we take into account the trend towards single households – or the decline in the average number of persons per household – and extrapolate this trend over the next ten years. We do not take into account living space per person. The long-standing trend towards more living space per person has been in decline in the 126 towns and cities for years. What is more, even higher prices are to be expected in the coming years. Accordingly, living space per person is not expected to increase any further.



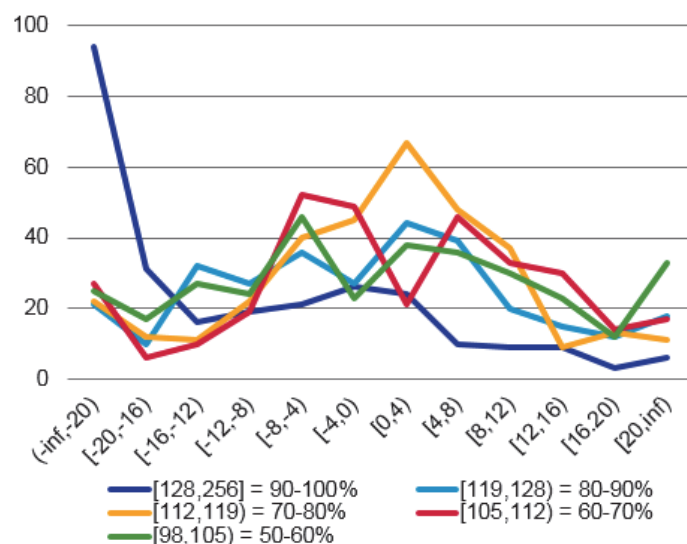
Outlook for the German residential property market 2021 and beyond

Percentiles of Price-to-income indices 1960-2020 of 22 countries

59

y-axis: No. of observations

x-axis: Delta in index points in three years



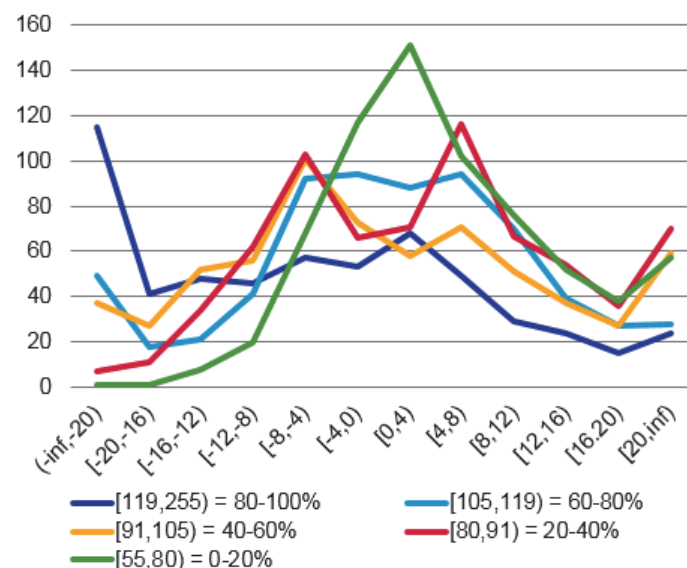
Sources: Deutsche Bank Research, Haver Analytics LP

Quintiles of Price-to-income indices 1960-2020 of 22 countries

60

y-axis: No. of observations

x-axis: Delta in index points in three years



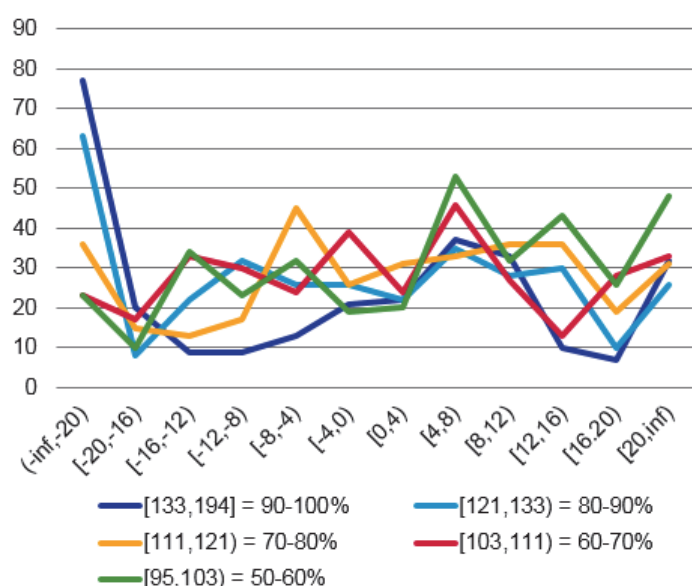
Sources: Deutsche Bank Research, Haver Analytics LP

Percentile of Price-to-rent indices 1970-2020 of 22 countries

61

y-axis: No. of observations

x-axis: Delta in index points in three years



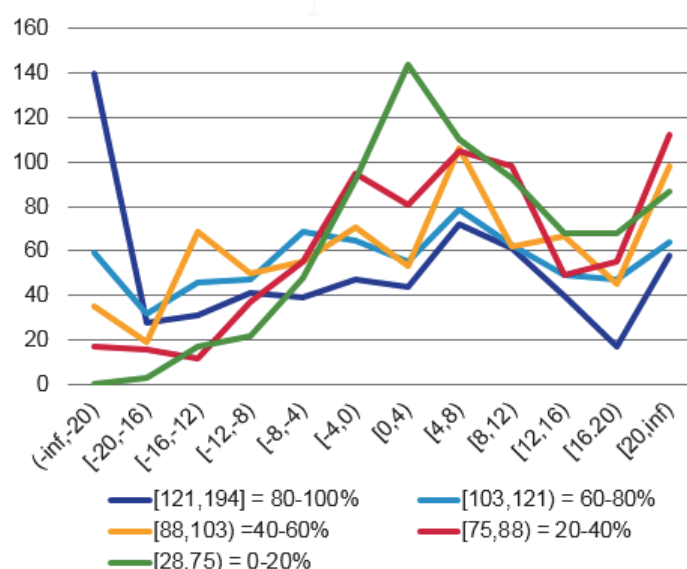
Sources: Deutsche Bank Research, Haver Analytics LP

Quintiles of Price-to-rent indices 1970-2020 of 22 countries

62

y-axis: No. of observations

x-axis: Delta in index points in three years



Sources: Deutsche Bank Research, Haver Analytics LP



Outlook for the German residential property market 2021 and beyond

Simple methodology to answer the question: When will the current cycle end? Fundamental analysis for 126 towns and cities with more than 30 million inhabitants

63

Aim: Calculation of the supply shortage

Assumption: Supply and demand balanced in 2011. Why 2011? In our view, the cycle began at the end of the financial crisis in 2009. However, due to the massive correction of population figures as a result of the census, a comparison does not make sense until 2011.

Operationalisation: Annual comparison of cumulative supply and cumulative demand per person from 2011 to 2030.

Calculation of cumulative demand

- Population and household size in 2020 remain unchanged from the previous year.
- Absolute average annual population growth of 2018 and 2019 = population growth in 2021.
- From 2022 onwards, successive constant decline in absolute population growth by 5% per year based on 2021. Consequence: In 2030, population growth is half as large as in 2021. Why 5%? Basis: population projection G2L2W3 (see above) for Germany implies that the population in 126 towns and cities will increase from 30.1 million in 2019 to 31.0 million in 2030. Proportional distribution over 126 cities results in 5% decrease.
- The increased number of inhabitants are added up from 2011 to the respective year.

Calculation of cumulative supply

- Number of completed residential units in 2020 remains unchanged from previous year.
- Determine the average annual increase in completed units from 2016 to 2019 (in rare cases negative, then zero). From 2021, the number of units completed per year increases by the amount previously determined.
- Extrapolation of the average annual decrease in persons per household of the period 2011-2019 transferred to the period 2021-2030.
- For each year: multiply the number of completed units by the average number of persons per household in each town/city.
- From 2011 to the respective year, add up the number of people who can move into new housing.

Cumulative supply minus cumulative demand = Annual housing need/surplus in number of persons

Negative result = Supply shortage

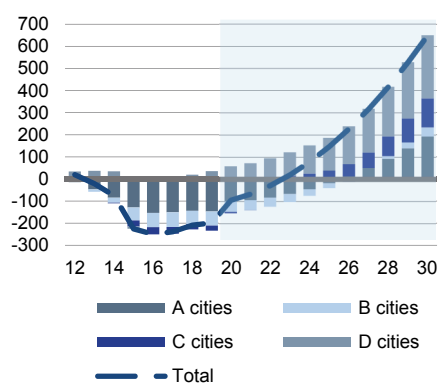
Positive result = Supply surplus

Source: Deutsche Bank Research

2012-2030: Comparison of supply and demand

64

y-axis: No. of dwellings in '000
+=excess supply, -=supply shortage



Sources: bulwiengesa, Deutsche Bank Research

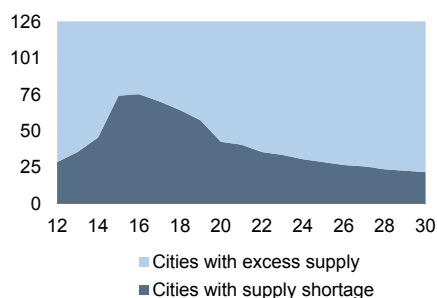
The aggregated fundamental supply shortage in our 126 cities to end in 2023

Based on this simple methodology, the supply shortage increased over the cycle and peaked in 2016. At that time, there was a shortage of around 250,000 residential units for almost 450,000 people in our 126 towns and cities. Since then, the supply shortage has eased and stood at just under 200,000 units in 2019. The data for 2020 is not yet fully available. This is where our projection begins. According to this, the supply shortage fell to approximately 94,000 residential units in 2020 due to below-average immigration. If immigration rises again to over 300,000 in 2021 and 2022, the supply shortage will continue to decrease. Aggregated across our 126 towns and cities, the supply shortage would be eliminated in 2023. From 2023 onwards, the supply surplus increases steadily according to our projection, with cumulative supply increasingly exceeding cumulative demand.

2012-2030: Comparison of supply and demand

65

No. of cities



Sources: bulwiengesa, Deutsche Bank Research

5. Regional differences in fundamental supply shortages

Although the fundamental nationwide supply shortage ends in 2023 according to our projection, regional differences still have an important role to play. Our projections indicate clear differences between large and small municipalities, for example. The supply shortage in Class A and Class B towns/cities will continue into 2025 and 2027. Since, in our view, the cities will presumably remain the hub of economic and social life in Germany even after coronavirus, the cycle could therefore still last beyond the year 2024. In the Class C municipalities, on the



Outlook for the German residential property market 2021 and beyond

Comparison of our supply shortage calculated here with a construction surplus and a shortage of 1 million units

66

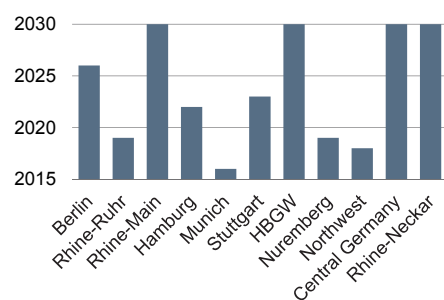
- In Part A, the outlook for 2021, we mentioned the Federal Statistical Office's construction surplus of 740,000 units and our estimate of a shortfall of more than one million units over the entire cycle. Here is a brief analysis in view of the maximum shortage of 250,000 units in 2016 in our projection:
different spatial dimension: Germany vs. 126 towns/cities,
- different number of inhabitants: 83.2 million vs. 30.1 million,
- different time periods: cycle actually started in 2009. Population figures before 2011 very volatile due to census flaw pre-2011. Hence the assumption: Fundamental equilibrium existed in 2011,
- different definitions: (1) "shortage of more than one million units" assumes that there was already a demand for 350,000 units at the beginning of the cycle in 2009. By the same token: if these residential units had been built, there would have been no supply shortage and no price cycle.
- (2) Construction backlog answers the question: what construction work remains in order to turn all building permits into completions. However, not all building permits result in completions. Some lapse, some building projects require more than one building permit. A building permit can also be applied for in order to make it easier to sell a property. The construction backlog can potentially be eliminated successively over the next few years.

Source: Deutsche Bank Research

Metropolitan regions including metropolis: End of the cycle

67

Year according to simple methodology



HBGW=Hanover-Brunswick-Göttingen-Wolfsburg

Sources: bulwiengesa, Deutsche Bank Research

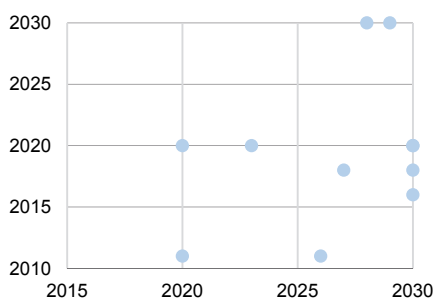
other hand, the fundamental supply shortage ends as early as 2022 and in the Class D municipalities, according to our methodology, there has only been a supply shortage in 2015. In 2019, there was already an aggregated surplus of 35,700 residential units in these 83 towns and cities.

There are also major differences across the eleven German metropolitan regions. The cycles in the cities of Cologne, Hanover, Leipzig and Stuttgart, for example, are unlikely to be over by 2030. In Bremen and Munich, on the other hand, the supply shortage already ended in 2020. While the vacancy rate – which is not taken into account in our simple model – is close to zero in Munich, suggesting the cycle will not end in the near future, the rate in Bremen is historically much higher. This means that the end of the cycle could be near in Bremen. Interestingly, there is only a very weak correlation between the end of the cycle in cities and in metropolitan regions. For example, there are five metropolitan regions where the cycle in the city lasts ten years longer than the cycle in the respective region. The Rhine-Main and Rhine-Neckar regions demonstrate the other extreme: according to our calculations, the cycle will take longer in the metropolitan region here than in the regional capital.

End of cycle in metropolis and metropolitan region

68

y-axis: Year for metropolitan region ex metropolis
x-axis: Year for metropolis



Source: Deutsche Bank Research

Comparison of housing supply and demand in the eleven metropolitan regions

69

Metropolis	End of cycle in year	Metropolitan Region including Metropolis	End of cycle in year	Metropolitan Region excluding Metropolis	End of cycle in year
Berlin	2026	Berlin/Brandenburg	2026	Berlin/Brandenburg	2011
Bremen	2020	Northwest	2018	Northwest	2011
Dusseldorf/Cologne	2030	Rhine-Ruhr	2019	Rhine-Ruhr	2018
Frankfurt	2029	Rhine-Main	2030	Rhine-Main	2030
Hamburg	2023	Hamburg	2022	Hamburg	2020
Hanover	2030	HBGW	2030	HBGW	2020
Heidelberg	2028	Rhine-Neckar	2030	Rhine-Neckar	2030
Leipzig	2030	Central Germany	2030	Central Germany	2016
Munich	2020	Munich	2016	Munich	2020
Nuremberg	2027	Nuremberg	2019	Nuremberg	2018
Stuttgart	2030	Stuttgart	2023	Stuttgart	2020

Note: Dusseldorf and Cologne have very different supply-demand balances. Based on our approach, Cologne exhibits a very large supply shortage and Dusseldorf the shortage is much lower. HBGW = Hanover-Brunswick-Göttingen-Wolfsburg. "2030" implies the fundamental supply shortage still exists in 2030.

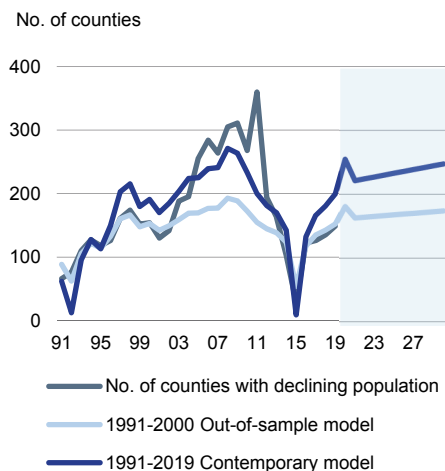
Source: Deutsche Bank Research



Outlook for the German residential property market 2021 and beyond

1991-2030 Counties with a declining population

70



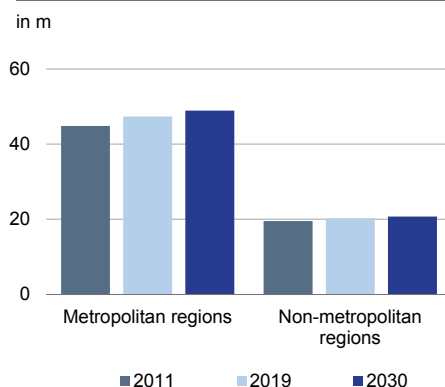
Sources: bulwiengesa, Deutsche Bank Research

6. Domestic migration due to the abandonment of rural districts and villages

The historical internal migration from east to southern Germany and from regions with weak infrastructure to those with strong infrastructure is likely to continue in the coming years. This means that villages and districts would continue to be abandoned. To put this into perspective historically: in 1990, there were 426 districts in Germany (not including independent towns/cities), whereas there are currently only 294. The coronavirus crisis might reinforce this consolidation process. According to our calculations⁸, of the 400 districts, the number of those with declining populations will continue to increase from the current level of around 150 towards 200 in the coming years. As in recent years, about 46% of the districts with shrinking populations are likely to be located in metropolitan regions. In these, the number of inhabitants will decline from 6.8 million in 2019 to 6.5 million in 2030. In the districts with declining populations outside the metropolitan regions, the number of inhabitants will fall over the same period from 8.6 million to 8.2 million. At the same time, the districts with growing populations will see a further increase of almost 2 million people by 2030, of which 1.5 million will be living in the metropolitan regions and almost 0.5 million in regions outside the metropolitan regions (see Charts 71, 72).

Counties with rising population in metropolitan regions and outside

71

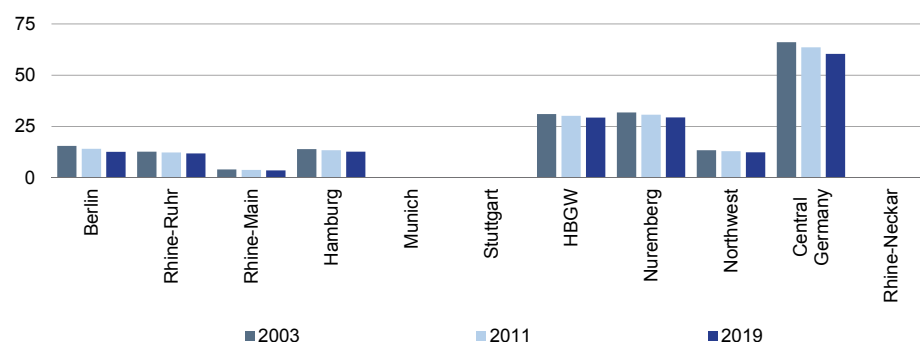


Sources: bulwiengesa, Deutsche Bank Research

Metropolitan regions: Inhabitants in declining counties

72

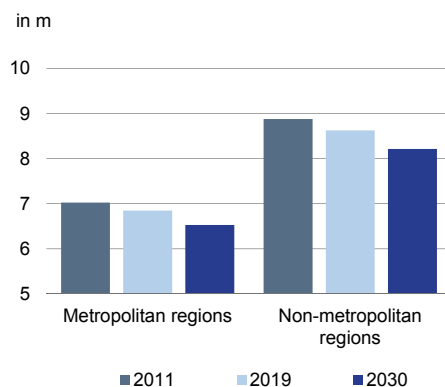
Share in % of all inhabitants in the respective metropolitan region



Sources: bulwiengesa, Deutsche Bank Research

Counties with declining population in metropolitan regions and outside

73



Sources: bulwiengesa, Deutsche Bank Research

In the metropolitan regions, the districts with declining populations are very unevenly distributed. In the metropolitan regions of Munich, Rhine-Neckar and Stuttgart, for example, all districts have grown in recent years. In the Rhine-Main region, too, the proportion of districts with a shrinking population is relatively low as compared to all districts. In 2019, 3.5% of all people lived in such districts. In Berlin-Brandenburg, Rhine-Ruhr, Hamburg and the Northwest, this rate is around 12%, in Hanover-Brunswick-Göttingen-Wolfsburg and Nuremberg it is around 29% and in central Germany, more than 60%. In some regions there is even the threat of an exodus. In 16 districts, for example, about one in six inhabitants is over 75 years old (average across Germany: less than 12%). Their share is likely to increase further, which is likely to complicate the care situation for many elderly citizens. These developments have two opposing effects. On the one hand, the aggregated economic and purchasing power in the respective metropolitan region is decreasing. On the other hand, most of the housing demand could be concentrated in the region's prospering districts and towns/cities. In Leipzig, for example, this could further increase the number of residents and contribute to bottlenecks in the housing market. In the non-

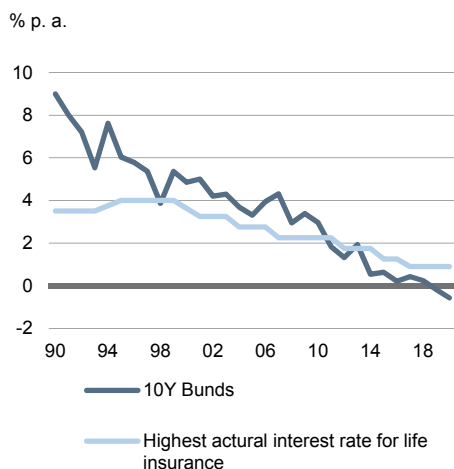
⁸ We assume net immigration of more than 300,000 people per year and include a time variable by which we attempt to reflect the path dependency described above.



Outlook for the German residential property market 2021 and beyond

1990-2020 Interest rate environment of institutional investors

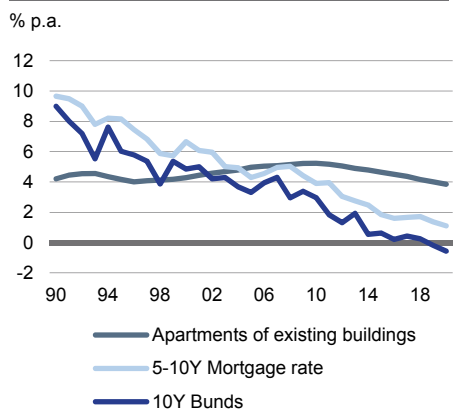
74



Sources: bulwiengesa, Deutsche Bank Research

Initial rental yield and interest rate environment

75



Sources: Bloomberg Finance LP, bulwiengesa, Deutsche Research, Deutsche Bundesbank

metropolitan regions, there are 13 districts where about one in six inhabitants is over 75 years old. There, too, the prospering districts are likely to gain economic and purchasing power in the coming years at the expense of the districts with shrinking populations. This concentration of housing demand in fewer and fewer regions could delay the end of the cycle regionally.

7. Low interest rates drive institutional investors into property

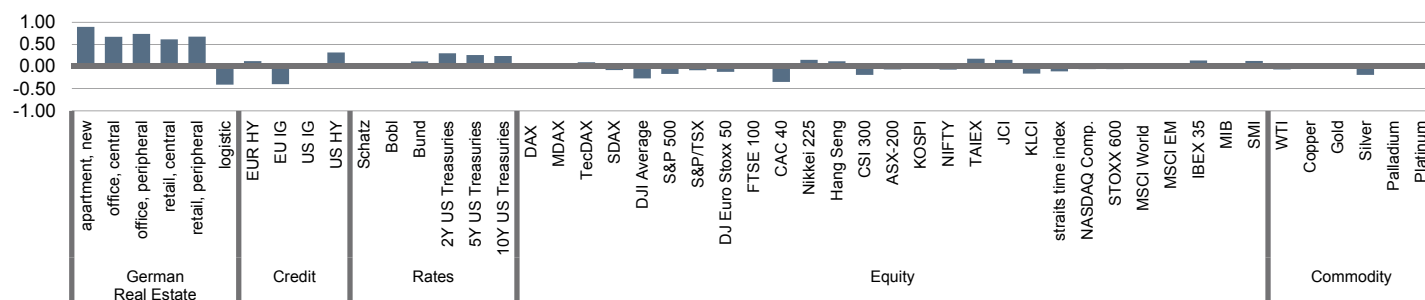
In recent years, we have repeatedly emphasised how significant the low interest rate environment is with regard to house prices. As described above in the interest rate outlook, the coronavirus crisis and the high levels of private and government debt are likely to prolong the low interest rate environment for a few more years. This implies that low-risk capital investments will be in short supply for years to come. In addition, institutional investors have come under considerable pressure since 2014, if not earlier, with the announcement of ECB bond purchases. Since then, the maximum actuarial interest rate for life insurance policies has been almost 100 basis points *above* the Bund yield on average, for instance, and it is currently as much as 150 basis points higher. By comparison: in the 1990s, the average maximum actuarial interest rate was still around 260 basis points *below* the Bund yield. The interest rate environment is also causing problems for pension funds. Bafin, for example, has 36 pension funds “under intensified supervision because they may not be able to fulfil their contractual obligations to their customers on a permanent basis.”⁹ Many investors are therefore likely to regard the initial rental yields of around 4% per year on average in the German housing market as a substitute for bond yields. This undoubtedly also means accepting higher risks than when investing in the historically low-risk bonds. But the incentives to ignore these are increasing. In addition, life insurance companies and pension funds could be tempted and – while still maintaining rule compliance – expand their explicit property quotas beyond the actual regulatory requirements (regulatory arbitrage).

Moreover, investors are attracted not only by rental yields but also by the potentially higher house and apartment prices, so in recent years the average annual total return on investment, excluding transaction costs, maintenance costs, taxes and financing have regularly been double-digits. The low correlation with financial market products is another factor that makes residential property attractive, contributing to the stability of portfolio returns. Often it is not

1991-2019 Correlation: Total yield of apartments of existing apartments with...

76

Based on annual data. All indices converted in euro.



Sources: Bloomberg Finance LP, bulwiengesa, Deutsche Bank Research

⁹ https://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Reden/re_201112_HB-Jahrestagung_EbAV_EDVA.html downloaded on 4 February 2020.

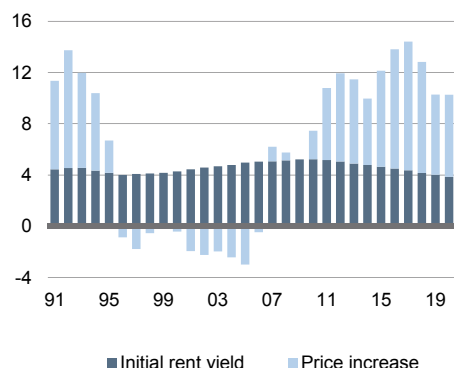


Outlook for the German residential property market 2021 and beyond

Total yield: Apartments, existing buildings

77

in % per annum



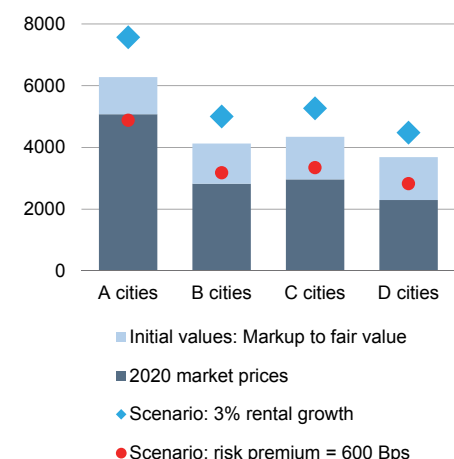
Sources: bulwiengesa, Deutsche Bank Research

possible to directly determine the amount and development of the property share in the portfolios of institutional investors. Many property risks are not held directly but through financial products. However, there is ample anecdotal evidence that institutional investors have expanded their quotas in recent years. The coronavirus crisis is also likely to have made residential property more attractive than commercial property, as at least hotel and retail property and possibly also the office sector have to cope with a slump in demand. This is another reason supporting our expectation for demand for residential property to remain high in the coming years, which will further support the current price cycle. Rents are likely to continue to lag behind, however. On the one hand, wage growth is likely to be moderate until the impact of the coronavirus crisis on employment have been overcome. But even after this, moderate development of household income stands in the way of any significant rent hikes. In addition, regulatory and social headwinds could make rent increases more difficult. Until the end of the cycle, as in the past ten years, residential property prices should therefore always increase more than rents. If interest rates remain low until then, the spread between rental yields and yields on low-risk bonds is likely to have narrowed considerably. In recent years, the initial rental yield has declined by around 13 basis points per year.

Prices and valuations of apartments

78

EUR per square meter



Sources: bulwiengesa, Deutsche Bank Research

Fundamental assessment in 126 cities: How long will residential property be attractive to institutional investors?

Present value model and our assumptions

79

$$\text{Fair value} = \sum_{t=1}^{50} \frac{\text{Rent in 2020} (1 + \text{rent growth})^t}{(1 + \text{Bund yield} + \text{risk premium})^t} - \frac{\text{Sales value in 51 years}}{\text{discounted to today}}$$

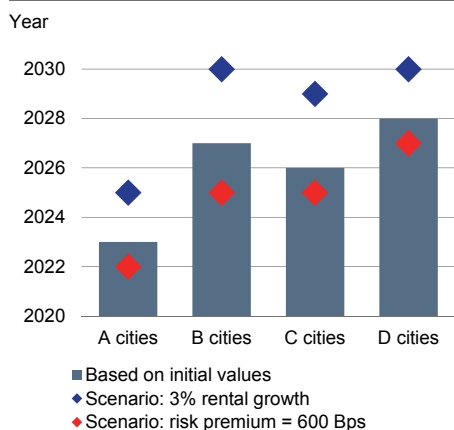
$$\text{Sales value in 51 years} = \text{Purchase price} (1 - \text{depreciation rate})^{51}$$

Initial values: Investment period = 50 years, subsequent sale at residual value, depreciation rate 3% p.a., assumptions for 50 years: Rental growth 2% p.a., Bund yield permanently at -0.57%, risk premium (= rental yield minus Bund yield) = 440 bp.

Source: Deutsche Bank Research

Duration of cycle based on simple net present value model and initial values

80



Sources: bulwiengesa, Deutsche Bank Research

We approach the answer to this question with a series of assumptions and a very simple present value model (see box). This reflects the numerous risks of property investment such as tenant creditworthiness, frequent tenant changes, surprisingly high maintenance expenses, potential liquidity bottlenecks at the time of sale as in spring 2020 and other risks by means of single indicator: a risk premium surcharge on the interest rate level. We assume that this premium can be measured by the spread between 10-year Bund and rental yields for freehold residential units. Currently, the spread is around 440 basis points. Together with the other assumptions, we determine fair values for 126 towns/cities. The result is that in 2020, all German towns and cities were undervalued, on average at more than EUR 1,300 per square metre. The fair values calculated this way depend heavily on the assumptions. For example, an increase in rental growth to 3% per year implies an additional undervaluation of around EUR 1,000 per square metre. By contrast, the fair values roughly correspond to the 2020 prices if, starting from the original values, the risk premium increases from 440 to 600 basis points or the Bund yield from -0.57% to 1%.

We cannot rule out such deviations. However, we have chosen the initial values deliberately. In the wake of the current economic crisis and due to regulatory headwinds, we believe it is reasonable to assume rental growth slightly above the historical inflation rate. In addition, we expect interest rates to remain very low for years to come. The current risk premium of 440 basis points could rise in



Outlook for the German residential property market 2021 and beyond

the wake of a higher wave of insolvencies due to the economic crisis, for instance. However, the average premium is only 360 basis points over the cycle since 2009. Moreover, in the course of further inflows by institutional investors, the premium could weaken and the fair value could be even higher.

Given our assumptions, when will the cycle come to an end?

If we apply the average annual price development from 2009 to 2020 for each town/city to the future, we can identify the times at which market prices will reach the fair value we have calculated. According to this methodology, the per capita-weighted market prices in Germany will be above the fair values in 2025. At this point, the incentives to buy should lessen for many investors and the cycle would come to an end. According to this methodology, the Class A towns/cities reach the end of the cycle in 2023, while the Class B, C and D towns/cities do not do so until 2026 or later. With a rent growth of 3%, the cycle is extended by two to three years, depending on the class of town/city. Assuming an increase in the risk premium to 600 basis points, the length of the cycle is shortened by one or two years. The following table contains an analogous overview for the metropolitan regions.

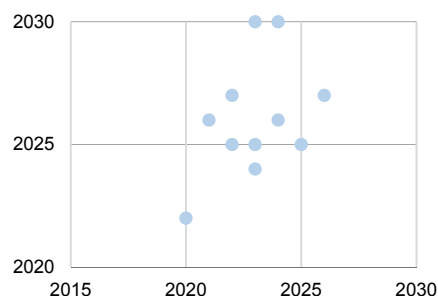
How would a surge in inflation affect valuations?

The present value model also enables an assessment of the effect of potentially higher inflation on the housing market. As a starting point, one can assume that both rents and Bund yields will increase through inflation. The same applies to the discounted sales value at the end of the investment period. Consequently, the fair value would be unchanged and property would offer inflation protection. However, increasingly strict rent regulation is likely to dampen rental growth, which is why higher inflation may not be passed on in full. Bund yields are also unlikely to fully reflect higher inflation, as the ECB would probably adjust its monetary policy rather hesitantly. This is all the more true since higher yields – even if they only reflect inflation compensation – typically increase uncertainty about the future debt path, leading to a demand for risk premiums. A surge in inflation is therefore likely to have only a relatively limited impact on the nominal interest rate level. As a result, the effects of state market interventions on rents and interest rates partly cancel each other out. However, if the house price cycle continues for some time and the undervaluations calculated above are eliminated, then interest rate sensitivity should increase significantly. A surge in inflation in the next few years could herald the end of the cycle much sooner. This is especially true if the jump in inflation is not just temporary.

End of cycle in metropolises and metropolitan region based on a simple net present value model

81

y-axis: year for metropolitan region ex metropolis
x-axis: year for metropolis



Source: Deutsche Bank Research

End of cycle in metropolitan regions based on baseline values and simple present value model

82

	End of cycle in year	Metropolitan Region including Metropolis	End of cycle in year	Metropolitan Region excluding Metropolis	End of cycle in year
Berlin	2022	Berlin/Brandenburg	2025	Berlin/Brandenburg	2027
Bremen	2026	Northwest	2027	Northwest	2027
Düsseldorf/Cologne	2023	Rhine-Ruhr	2029	Rhine-Ruhr	2030
Frankfurt	2022	Rhine-Main	2024	Rhine-Main	2025
Hamburg	2021	Hamburg	2024	Hamburg	2026
Hanover	2024	HBGW	2026	HBGW	2026
Heidelberg	2025	Rhine-Neckar	2025	Rhine-Neckar	2025
Leipzig	2024	Central Germany	2030	Central Germany	2030
Munich	2020	Munich	2022	Munich	2022
Nuremberg	2023	Nuremberg	2024	Nuremberg	2024
Stuttgart	2023	Stuttgart	2024	Stuttgart	2025

HBGW = Hanover-Brunswick-Göttingen-Wolfsburg, "2030" implies the end of the cycle lies in 2030 or later

Source: Deutsche Bank Research



8. Are three waves of regulation by 2030 one too many? Regulatory paradox protects investors from first two waves

The coronavirus crisis and the impending wave of insolvencies could accelerate state dirigisme. As a result of this overarching trend, we expect three waves of regulation, the first two of which already had their origins in the last decade. Firstly, we see a further tendency towards even stricter housing policies that continue to seek to limit rent growth or freeze rent levels. There is no doubt that one critical juncture will be the ruling of the Federal Constitutional Court on the Berlin rent cap, expected in the first half of this year, and also on the Bavarian rent freeze initiative. Even if both were found to be unconstitutional, however, this probably would not bring about a U-turn to a market-based housing policy. Secondly, we expect a tightening of macroprudential regulation. Before the coronavirus crisis, activation of the countercyclical capital buffer was more of a symbolic policy. In 2021, regulators are likely to focus on the impending wave of insolvencies and their negative implications for the financial industry. For this reason, we do not expect macroprudential interventions until 2022. The prerequisites for this are likely to be a sustained exit from the coronavirus economy, a continuation of the house price cycle and continued strong credit growth. On the one hand, regulators are likely to successively increase the countercyclical capital buffer so as to try to dampen lending. To curb mortgage lending, on the other hand, both debtor-based and income-based instruments could be used. Income-related instruments would still have to be activated, but could become a focus especially in view of the much increased loan amount per borrower. In this way, caps on debt servicing capacity and loan ceilings depending on income levels could also reduce default risk, thereby protecting overly risky borrowers and lenders.

Both housing policy and macroprudential regulation are very crude steering instruments that have unintended side effects. There are indications, for example, that the Berlin rent cap is dampening investment in housing and also the supply of rental units. Similarly, not all available macroprudential instruments differentiate between lending for the acquisition of existing and new properties. Consequently, their introduction also presumably reduces lending for new construction, thereby limiting supply. Paradoxically, rent and macroprudential regulation therefore reflect the fundamental shortage of supply. As such, they counteract the societally correct goal of ending the rent and price cycles. The result is that those who are supposed to be regulated are in fact rewarded, namely investors in existing properties.

Building sector: CO₂ targets for the year 2030 hardly achievable

The third wave of regulation is looming amid efforts to cut CO₂ emissions. In 2019, buildings in Germany emitted 122 million tonnes of greenhouse gases (CO₂ equivalents). Buildings account for approximately 15% of emissions, so this sector is at the centre of climate policy after the energy, industry and transport sectors. Greenhouse gases emitted by buildings have been reduced by almost 42% over the last 30 years, while emissions across all sectors have fallen by only 36%. Despite this disproportionate decrease in emissions, the goal of emitting only 70 million tonnes of greenhouse gases in 2030 seems hardly achievable. This is because room heating and hot water account for around 70% of final energy consumption in buildings, and the DIW points out that the decline in CO₂ emissions over the last decade has been mainly temperature-related,¹⁰ saying that, adjusted for the rise in temperature, CO₂ emissions have fallen by only 3%. Savings have been particularly sluggish since

¹⁰ Stede, Jan; Schütze, Franziska; Wietschel, Johanna (2019). Wärmemonitor 2019: Klimaziele bei Wohngebäuden trotz sinkender CO₂-Emissionen derzeit außer Reichweite.

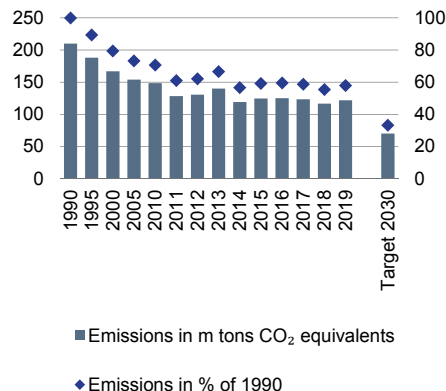


Outlook for the German residential property market 2021 and beyond

Greenhouse gas emissions: Buildings

83

left y-axis: in m tons
right y-axis: in % of 1990

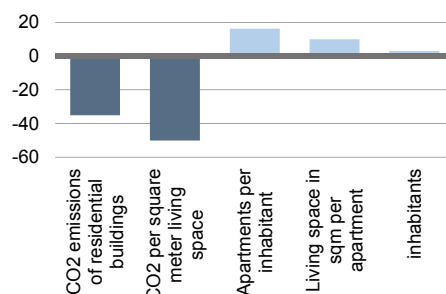


Source: Federal Environmental Agency

1995-2019 Residential buildings: Decomposition of CO₂-emissions in components

85

change in %

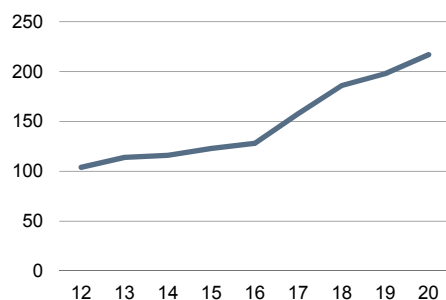


Sources: bulwiengesa, Deutsche Bank Research, Federal Environment Agency

Lack of qualified workers: Plumber, sanitary, heating, air conditioning

86

Cast time for job vacancies in days



Professional group 342 in accordance with the classification of occupations in 2010

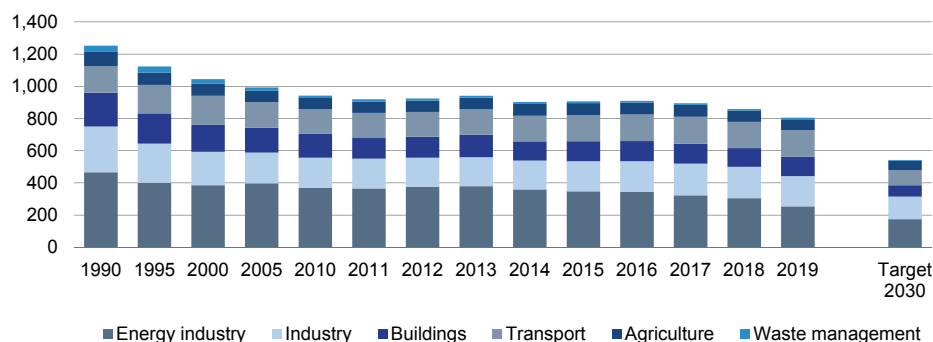
Source: Federal Employment Agency

2015, while in 2019 emissions actually increased compared to the previous year. The lockdowns in 2020 and 2021 and the relatively cold winter in 2021 are also likely to contribute to higher CO₂ emissions.

Germany: Greenhouse gas emissions

84

in million tons CO₂-equivalent



Source: Federal Environment Agency

Residential buildings have to bear the main burden of savings

In this context, the approximately 19 million residential buildings of the 21.7 million buildings in total account for some 70% of CO₂ emissions in the building sector. This is all the more true since, according to the DIW, CO₂ reduction in residential buildings has been less successful than in non-residential buildings. Increased living space, more residential units and a larger population have also contributed to this below-average development. According to our calculations, CO₂ emissions in the residential building sector fell by 35% from 1995 to 2019, while they actually fell by 50% per square metre of living space. The high level of demand for housing has probably contributed to the weak development in recent years.

However, even if Germany finds its way back to the reduction path from before 2015, it will still likely fall well short of the 2030 target. According to our calculations, residential buildings will still be emitting almost 70 million tonnes of CO₂ by that time, missing the target by some 20 million tonnes. Policymakers are already trying to counteract this. In July 2020, a further EUR 2 billion was made available for energy refurbishment under the Energy and Climate Fund. In addition, from 2021 onwards, CO₂ pricing will not only apply to the energy sector and industry as before, but also to transport and buildings. As a result, oil and gas are now taxed at EUR 25 per tonne. By 2026, this CO₂ price will then rise to around EUR 60 per tonne. These tax revenues will in turn go into climate protection, for example federal funding of efficient buildings (BEG). Since 2021, this has combined previously existing measures, such as the KfW building rehabilitation programme and the promotion of renewable energies. All in all, the German government plans to invest EUR 6 billion in building efficiency in 2021.

But even generous state support does not guarantee success: many experts point out that the renovation rate of around 1% of the building stock per year has to roughly double. According to bottleneck analyses by the Federal Agency, however, there is a particularly marked shortage of skilled workers for heating and air conditioning technicians¹¹. The period during which vacancies in such areas remain open was more than half a year before coronavirus and is unlikely

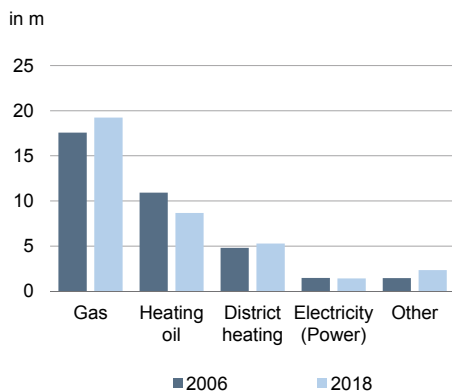
¹¹ Correct designation according to the classification of occupations 2010 = 342 plumbing, sanitary, heating, air conditioning.



Outlook for the German residential property market 2021 and beyond

Germany: Residential buildings by energy type

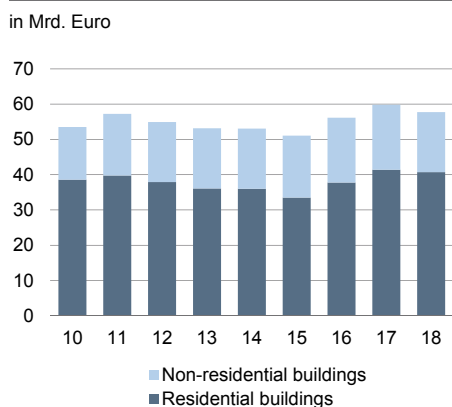
87



Sources: Deutsche Bank Research, Mikrozensus

2010-2018 Investments in energetic building renovation

88



Sources: Deutsche Bank Research, DIW

to have fallen since then. In addition, natural gas often replaced oil as the main energy source. While this is progress in terms of reducing emissions, there was no switch to more climate-friendly energy sources such as district heating, heat pumps, electricity from renewable energies and pellets. The German Association of Energy and Water Industries also points out that the majority of existing oil heating systems in 2019 are located in rural areas, where gas and district heating are often not available.¹²

Consequently, further measures are needed in order to meet the CO₂ targets envisaged. The question thus arises as to when policymakers could make adjustments and decide on further guidelines. In addition to the above-mentioned state subsidies and new laws, the Building Energy Act (GEG) was passed in November 2020. This replaces the Energy Conservation Act (EEG), the Energy Conservation Ordinance (EnEV) and the Renewable Energies Heat Act (EEWärmeG). According to the Federal Ministry of Transport, Building and Urban Affairs, "in order not to further increase construction costs, the current energy requirements for new buildings and refurbishments have not been tightened."¹³ A review of the requirements for both new and existing buildings has been agreed on for 2023, however. It has already been decided that oil heating systems may no longer be installed in new buildings from 2026 onwards. From our point of view, it is quite conceivable that specifications for existing buildings will also be introduced in the course of the decade. Similarly, we would not rule out the possibility of living space size being regulated. As we have shown, CO₂ emissions would have been significantly lower without the additional land consumption. Firstly, it would be possible to monitor new construction and only approve residential units up to a certain size. Secondly, it would be possible to start discussing the introduction of levies on those who wish to use a particularly large amount of living space. In recent weeks, the media has picked up on various proposals such as a ban on the construction of detached houses. In the German super election year of 2021, these issues are likely to provide fuel for discussion once again.

The regulatory paradox applies to these measures as well: they would put another damper on new construction, and demand would be confronted with an even lower level of supply. However, there is a large social consensus in Germany in favour of climate protection and Germany's pioneering role in this area. Economic considerations seem to play a subordinate role. According to the German Institute for Economic Research (DIW), almost EUR 500 billion was invested in energy-efficient renovation (including photovoltaics) between 2010 and 2018. Nevertheless, as described, CO₂ emissions have only fallen marginally. To our knowledge, there has not been any intensive debate regarding these potential misallocations to date. For investors, this certainly means that irrationalities can be expected: in Germany – a country of tenants – it would come as no surprise if residential property owners, who have at least posted substantial valuation gains since 2009, were called upon to finance climate investments. In short, climate policy could increasingly be a drag on investor returns over the current decade.

¹² Wie heizt Deutschland 2019? BDEW study on the heating market.

¹³ <https://www.bmi.bund.de/DE/themen/bauen-wohnen/bauen/energieeffizientes-bauen-sanieren/energieausweise/gebäudeenergiegesetz-artikel.html>. Downloaded on 11 February 2021.

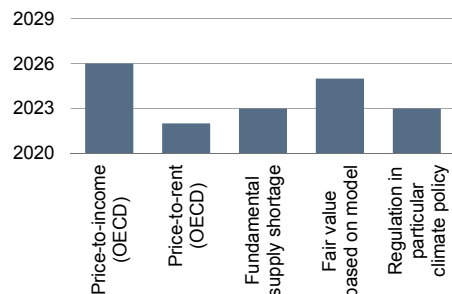


Outlook for the German residential property market 2021 and beyond

Current German house price cycle:
When does the cycle end?

89

Year according to our models, calculations and estimates

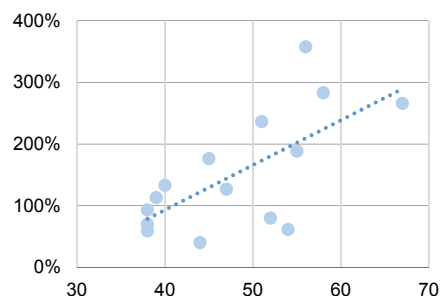


Source: Deutsche Bank Research

Top 20 OECD cycles: Duration of cycle and prices in boom

90

y-axis: Price increases in boom
x-axis: No. of quarters in boom

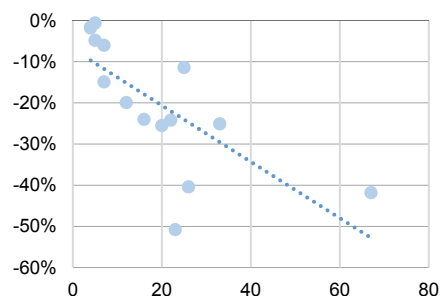


Sources: Deutsche Bank Research, OECD

Top 20 OECD cycles: Duration of cycle and prices in bust

91

y-axis: Price increase in boom
x-axis: No. of quarters in bust



Sources: Deutsche Bank Research, OECD

Summary and outlook for Germany

Forecasts are naturally subject to a high degree of uncertainty and we will probably review and correct our assessment in the coming years. Nevertheless, we believe that our analysis provides a useful basis for investors. Having evaluated and weighed all the arguments, we assume the price cycle will end in 2024. In particular, we expect the decline in the fundamental nationwide supply shortage in 2023 to substantially change the situation this year. Even if, according to our calculations, vacancy rates in the towns and cities with high population densities (Class A and B) continue to decline until 2025 and 2027, respectively, higher vacancy rates in the metropolitan regions are likely to have an exemplary impact on the market as a whole. Interestingly, according to our model, undervaluations in the Class A cities end in 2023, but aggregated in all other towns and cities (i.e. Class B, C and D) they run until 2027. As such, undervaluation and supply shortage are mirror images of each other in terms of the size of a town or city. In regulatory terms, 2023 could see further tightening. This year, in accordance with the Building Energy Act, there will be a review of energy requirements which may become effective in 2024. In addition, the new federal government could have adopted further measures by then with a view to meeting CO₂ targets in 2030. The situation is also likely to change in the coming years with regard to relative and absolute valuations in the residential property market. Our calculations therefore suggest an end of cycle according to the OECD affordability indices in 2022 for the price-to-rent ratio and in 2026 for the price-to-income ratio. From this perspective, the end of the cycle could also come in 2024.

How deep and how long is the projected downturn?

Here, too, we start with a look at history. We calculate the duration and price decline of the downturns based on our 20 longest house price cycles in the OECD database. Five of the longest OECD cycles run up to the current period, which is why we only have 15 comparison points. On average, downturns last 18 quarters. There is considerable divergence, however. The downturn in Japan following the bursting of what was probably the largest house price bubble in at least recent economic history in 1991, is likely to have been virtually unique. It spanned almost 17 years, lasting until the financial crisis in 2008. In many other countries, however, the financial crisis marked not the low point but the high point of often very lengthy upswings. The subsequent downturns also often lasted for a relatively long period. The lesson from history should be this: when an economic or financial crisis ends a house price cycle, the downturns are often very deep and unusually long.

Assuming that the German house price cycle ends without an economic and financial crisis, one can expect more of a short and relatively mild downturn. Major upheavals would probably only occur if, for example, the German automotive industry became less competitive in the wake of the trend towards e-mobility and autonomous driving, if immigration suddenly led to a wave of emigration, or if other major structural disruptions turned the current economic model on its head. For this reason, we also anticipate a relatively moderate price decline. Price increases have so far been below average as compared to the other top 20 cycles, with an inflation-adjusted gain of around 50%. Even three more boom years up until 2024 would do little to change this. From our data, we can deduce that the average price increase per quarter in the upswing correlates with the average price decrease per quarter in the downturn by around -0.6. A simple bivariate regression implies that the price increase from 2009 to 2020 of around 1% per quarter compared to the previous quarter is followed by a price decrease of 0.7 per quarter in the downturn. Assuming that

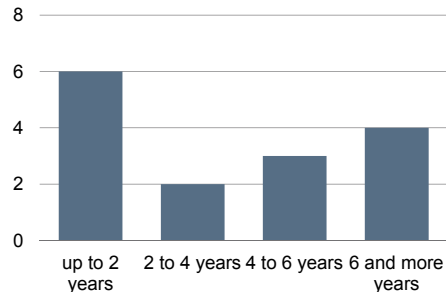


Outlook for the German residential property market 2021 and beyond

Top 20 OECD cycles histogram:
Length of bust

92

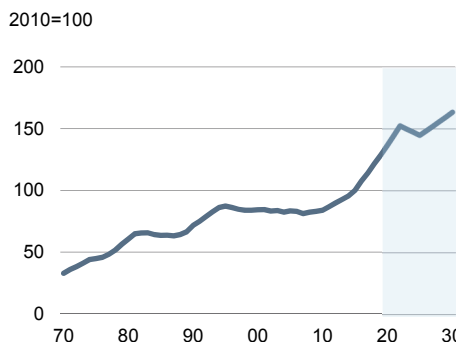
y-axis: No. of observations
x-axis: Length of cycle



Sources: Deutsche Bank Research, OECD

1970-2030: Nominal house prices plus
forecast

94

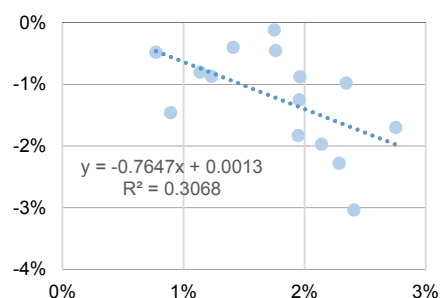


Sources: Deutsche Bank Research, OECD

Top 20 OECD cycles: Price increase
and price decline per quarter

95

y-axis: Price decline per quarter in bust
x-axis: Price increase per quarter in boom



Sources: Deutsche Bank Research, OECD

the German downturn lasted three years, this would correspond to an inflation-adjusted price decline of around 8%. If inflation were around 1% per year, as in recent years, this would correspond to a nominal price decline of 5%. Presumably, much of this decline is likely to occur within a few quarters.

OECD history of particularly long house price cycles (inflation-adjusted price indices)

93

Rank	Start	End	Country	Upswing			Downturn		
				Quarters	Real prices	Prices per quarter	Quarters	Real prices	Prices per quarter
1	1992	2008	Netherlands	67	266%	2.0%	22	-24%	-1.3%
2	1993	2008	Norway	58	283%	2.3%	5	-5%	-1.0%
3	1960	1974	Japan	56	358%	2.8%	16	-24%	-1.7%
4	1993	2007	Denmark	55	189%	1.9%	12	-20%	-1.8%
5	1993	2007	USA	54	62%	0.9%	20	-26%	-1.5%
6	1978	1991	Japan	52	80%	1.1%	67	-42%	-0.8%
7	1993	2007	Ireland	51	236%	2.4%	23	-51%	-3.0%
8	1996	2008	Sweden	47	127%	1.8%	4	-2%	-0.5%
9	1996	2007	UK	45	177%	2.3%	7	-15%	-2.3%
10	1996	2008	Eurozone	44	40%	0.8%	25	-11%	-0.5%
11	2008	2019	Canada	43	62%	1.1%	*	*	*
12	2009	2020	Luxembourg	43	71%	1.2%	*	*	*
13	2010	2020	Estonia	41	64%	1.2%	*	*	*
14	1997	2007	Spain	40	133%	2.1%	26	-40%	-2.0%
15	2010	2020	Germany	39	50%	1.0%	*	*	*
16	1998	2008	France	39	113%	2.0%	7	-6%	-0.9%
17	1999	2008	Canada	38	70%	1.4%	4	-2%	-0.4%
18	2008	2017	Israel	38	93%	1.7%	5	-1%	-0.1%
19	1998	2008	Italy	38	59%	1.2%	33	-25%	-0.9%
20	2011	2020	Columbia	36	48%	1.1%	*	*	*
Average over top 20				46	129%	1.6%	18	-20%	-1.2%

*Upswing or downswing at the current margin

Source: Deutsche Bank Research

Cumulative through the year 2030: Price increases despite forecast downturn

If the cycles of 2021 and 2023 continue unchecked, house prices could again increase by almost 6% per year (average 2009-2020: 5.8%). If this is followed by a nominal downturn of -5% cumulatively over three years and if we then assume the same price dynamics as before 2009 (average annual price increase from 1970 to 2008: 2.5%), the cumulative increase for the decade would be around 24% – a significant decline compared to the previous decade, which saw an increase of around 60%. However, the German residential property market should remain an attractive investment for many investors, especially due to the initial rental yields of around 4% per year, even if these continue to decline. We also consider this cautious outlook for house prices up to 2030 to be a solid basis if the cycle continues beyond 2023 or even results in a historic bubble. In this case, the price decline in the downturn is likely to be very sharp. As can be seen in our table, the average inflation-adjusted price decline over the top 20 cycles was 20%.



Outlook for cities and metropolitan regions

Based on our analysis of the fundamental supply shortage and the present value model (see Chart 96), we expect relatively early ends to the cycle in Bremen and Hamburg. We have pointed out several times in recent years that Hamburg's cycle is likely to end earlier than in other cities due to its relatively moderate population growth and supply-oriented housing policy. For Bremen and especially the Northwest metropolitan region, the fundamental supply shortage is also relatively low.

Our models show a relatively early end to the cycle for Munich, as well. However, this analysis does not take vacancy rates into account. Due to a vacancy rate close to zero, the cycle in Munich is likely to run a little longer than our analysis implies. However, absolute and relative price valuations are now so high that further price increases would make Munich the most expensive city in Europe. In our view, Munich is gradually losing its appeal for investors for this reason. It is possible that the Munich cycle and the nationwide cycle will end simultaneously in 2024.

The end of the cycle in Munich could also have an impact on the metropolitan regions of Stuttgart and Nuremberg. This is particularly true since, according to our calculations, the fundamental supply shortage has already been eliminated, especially in the metropolitan regions not including the regional capital. However, it will probably still be some time before higher vacancy rates make it easier to find housing. The towns and cities in the Nuremberg metropolitan region could also benefit from regional influx: there is a relatively high number of districts with declining populations, which could also delay the end of the cycle in the towns and cities.

In the other western metropolitan regions Rhine-Main, Rhine-Neckar, Rhine-Ruhr and Hanover-Brunswick-Göttingen-Wolfsburg (HBGW), the cycle is forecast to end in 2023 or later. In the HBGW metropolitan region, as in Nuremberg, there are also a large number of districts with a declining population, which could likewise boost regional influx in the towns and cities there, thereby delaying the end of the cycle in those locations. Nonetheless, the general question arises as to whether the end of the nationwide cycle will not put an end to many of the regional cycles.

End of cycle in metropolitan regions based on present value model and fundamental supply shortage (both criteria equally weighted)

96

Metropolis	End of cycle in year	Metropolitan Region including Metropolis	End of cycle in year	Metropolitan Region excluding Metropolis	End of cycle in year
Berlin	2024	Berlin/Brandenburg	2026	Berlin/Brandenburg	2019
Bremen	2023	Northwest	2023	Northwest	2019
Düsseldorf/Cologne	2027	Rhine-Ruhr	2024	Rhine-Ruhr	2024
Frankfurt	2026	Rhine-Main	2027	Rhine-Main	2028
Hamburg	2022	Hamburg	2023	Hamburg	2023
Hanover	2027	HBGW	2028	HBGW	2023
Heidelberg	2027	Rhine-Neckar	2028	Rhine-Neckar	2028
Leipzig	2027	Central Germany	2030	Central Germany	2023
Munich	2020	Munich	2019	Munich	2021
Nuremberg	2025	Nuremberg	2022	Nuremberg	2021
Stuttgart	2027	Stuttgart	2023	Stuttgart	2023

Note: HBGW = Hanover-Brunswick-Göttingen-Wolfsburg, "2030" implies a fundamental supply shortage or undervaluation that still exists in 2030.

Source: Deutsche Bank Research



Outlook for the German residential property market 2021 and beyond

Last but not least, we provide our assessment for the metropolitan regions of Berlin/Brandenburg and Central Germany. For these two, including the respective cities, the calculated end of the cycle is also in the second half of the decade. As we have pointed out several times in recent years, we see Berlin on its way to becoming a global metropolitan hub.¹⁴ Berlin's economy is likely to see powerful growth for years, possibly decades. It has also developed from a subsidy stronghold into a first-class European location. With this change, its population is expected to grow to over four million and, together with better economic strength, boost housing demand, although rental growth may be limited for some time due to regulatory headwinds. Accordingly, we expect at best a dip in the house price cycle for Berlin. This development is likely to continue to have an impact on the Berlin region in Brandenburg and also on Leipzig and the metropolitan region of Central Germany. We therefore expect a relatively late end to the cycle there. Leipzig is also likely to be the city in Germany that benefits most from the regional influx. As a result, there could be a population decline in about 60% of the districts in Central Germany. A large share of the regional housing demand could therefore be concentrated in Leipzig.

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¹⁴ Möbert, Jochen (2020). Berlin housing market: Rent cap may decouple real estate cycle from economic supercycle for a number of years. Germany Monitor. Deutsche Bank Research. 27 February 2020.



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Printed by: HST Offsetdruck Schadt & Tetzlaff GbR, Dieburg

ISSN (Print): 2511-8552