User Cost of Housing Analysis of the German Real Estate Market

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Abstract

Background: This study looks at the development of the German real estate landscape, which recorded a continuous rise in prices between 2009 and 2022. These were due to a genuine excess demand, a shortage of supply and favorable financing conditions. In the course of 2022, mortgage rates then rose after a historically long period of low interest rates.

Aim: This study aims in particular to assess whether the financial advantage of home ownership remains robust. The aim is to determine the relative attractiveness of home ownership compared to renting in all 401 German districts and independent cities.

Methods: The owner-occupier costs are determined using the user cost of housing approach and compared with the current rental prices in the respective cities and districts. Various factors are taken into account, including the purchase price, financing costs, maintenance and rental prices.

Results: The results of the analysis show that home ownership still offers a considerable cost advantage on average across Germany: In mid-2023, it is around 57% cheaper per square meter to invest than to rent. However, it is important to point out that this result does not take into account differences in the population's ability to afford home ownership. Furthermore, the analysis raises questions about the sustainability of past house price growth and whether this increase is due to fundamental factors or low mortgage rates. In this sense, the study confirms that home ownership on the German real estate market remains economically favorable compared to renting, even with increased interest rates. It underlines how important it is to consider the long-term benefits for wealth accumulation when deciding between owning and renting.

Practical relevance/social implications: The study is of practical relevance for people who rent an apartment or house in Germany and are considering whether it is sensible and economical for them to invest in property. The findings from the analysis are helpful for current purchasing decisions.

Originality/value: It also offers original results and provides the reader with added value, as it captures and evaluates current real estate developments on the German market in a well-founded manner.

Keywords

Property Price Boom, Real Estate, Real Estate Economics, Residential Property, User Cost of Housing, User Cost of Housing Analysis

JEL Codes
D23, R2, R3

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Introduction

The real estate market plays a central role in the economy and the everyday lives of citizens in Germany. Changes in this market can have far-reaching effects, from the stability of the financial system to consumer choices. In particular, strong demand for real estate can quickly turn into speculative bubbles (imbalances). In this context, the "user cost of housing" approach offers an alternative to identify regional speculative bubbles and evaluate the advantageousness of homeownership compared to renting. This paper aims to apply this approach in the German real estate landscape and to analyze its impact on the market. The following two research questions are to be answered:

Q1: Will owner-occupier housing costs be higher than rental costs in Germany in 2023?

Q2: Has the rise in interest rates in 2022 put an end to the advantages of home ownership?

The central motivation for this work lies in the need to better understand the German real estate market and the question of home ownership versus renting. It is of great importance to determine whether, despite possible interest rate increases, it is still more cost-effective to purchase a property instead of renting. This question not only concerns potential real estate buyers and tenants, but also has a significant impact on financial stability and the economic situation in Germany. Identifying speculative bubbles in the real estate market is crucial, as these bubbles can not only lead to distortions in the market but also jeopardize the financial well-being of citizens.

The main objective of this paper is to apply the "user cost of housing" approach in Germany and to evaluate the cost of home ownership compared to renting. We will investigate whether it is still advantageous to buy a property even after a possible increase in interest rates. Our analysis will help not only to understand the current situation in the real estate market, but also to identify potential signs of speculative bubbles.

In the "user cost of housing" approach, the costs for tenants and property owners are compared. This requires converting the purchase price of real estate into ongoing costs incurred by the owner. These costs include the purchase price, utility costs, financing costs, and lost returns on invested equity. Taxes, maintenance and depreciation costs as well as expected price increases of the real estate are also taken into account.

Various data sources were used for this analysis. The purchase price per square meter of living space and price changes were used from available real estate date sources. Data on

mortgage rates, yields on bearer bonds, and tax rates were obtained from reliable sources. These data sources enable the cost of home ownership to be calculated in comparison with renting in various regions of Germany for the period from 2017 to 2023.

The results of the analysis show that in Germany, despite potential interest rate increases, it is still cheaper to buy than to rent residential property. In all 401 districts and independent cities in Germany, there is a positive cost advantage of home ownership. Even in metropolitan regions, where real estate prices have risen sharply, this cost advantage remains. The study also illustrates that the cost of home ownership is lower on average in the eastern states than in the western states. This could mean that it is financially more attractive for citizens in the eastern states to purchase residential property.

This paper is organized as follows: In the next section (Section 1), the user cost of housing approach is explained in more detail, including the theoretical foundations and possible applications. Section 2 is devoted to the methodology, describing the calculation of housing costs and the data basis. Section 3 presents the results of the analysis, highlighting regional differences and metropolitan areas. Finally, Section 4 will interpret the results and summarize their significance for the German real estate market. The summary of this paper will then once again note the key points. This introduction is intended to provide the reader with a comprehensive overview of the paper, clarifying the motivation, the objective, the approach, the data, the results and the structure of the following sections.

1 User Cost of Housing Approach

In general, the real estate market is assumed to be divided into a rental housing market and a residential property market. It is assumed that both the purchase price of real estate and the rental price on the market are determined primarily by the macroeconomic factors of supply and demand (Gürtler & Rehan, 2008). Strong demand for real estate can quickly lead to speculative bubbles. In this context, the user cost of housing approach represents an alternative approach to identify regional speculative bubbles (Schier & Voigtländer, 2015). It allows for a comparison of the costs incurred by renters and the regular costs incurred by a homeowner (Lehmann, 2016; Voigtländer & Sagner, 2019). In addition, it aims to determine, the relative advantageousness of homeownership compared to renting (Voigtländer & Sagner, 2019). If the analysis then identifies strong differences in costs, this indicates a need for correction and thus provides evidence of overheating in the market (Schier & Voigtländer, 2015). The European Central Bank (2024) sees the user cost of housing approach as key driver of housing investment, by which the affordability of housing can be measured by the cost of the capital invested by a household in its housing, i.e. the user cost of housing.

The user cost of housing approach is a widely used international approach that can be used to evaluate developments in the housing market (Poterba, 1984; Himmelberg et al., 2005). This approach was also used, for example, by the U.S. and Irish central banks to identify speculative excesses in their housing markets in the run-up to the financial crisis

(Himmelberg et al., 2005; Browne et al., 2013). It is particularly well suited to reflecting the effect of monetary policy changes (Lehmann, 2016). According to Lehmann (2016), it is much better suited for this purpose than the price-to-rent ratio.

Basically, the approach goes back to Poterba (1984) and Himmelberg et al. (2005), who used this approach to study the impact of taxes on residential use forms of buying and renting. The approach is based on the premise that households are in principle indifferent between buying a home or living for rent in the same property (Voigtländer & Sagner, 2019; Hill et al., 2023). However, this is only true if the relative costs of the two options are identical. For, example if the costs change in favor of homeownership, the relative attractiveness of buying a home increases and the demand for real estate increases. This increased demand in the market for owner-occupied property would then subsequently also lead to purchase price increases in the corresponding regions, and renting becomes relatively less expensive until a new equilibrium is reached.

It should additionally be noted that the residential real estate market is rigid in the short term (Voigtländer & Sagner, 2019). For example, if the demand for housing in a region increases, new construction can only respond with delay, in most countries with a significant one. More importantly, relocations occur infrequently, so the speed of adjustment is very slow. This slow reaction speed, even in the face of a decline in demand, means that housing occupancy costs and rents can drift apart in the short term (Voigtländer & Sagner, 2019).

1.1 Methodology

In the user cost of housing approach, as in any empirical analysis, the data used and the underlying assumptions are reviewed and adjustments are made if necessary (Voigtländer & Sagner, 2019). Comparing the costs of renters and owners of a property is not trivial in this context because, after all, rental costs are incurred as a flow variable and the purchase price is due once. This is where the concept of owner-occupier costs comes in: The purchase price, including ancillary acquisition costs, taking into account financing costs and lost returns on the equity used to purchase the property, is converted into a flow variable (Voigtländer & Sagner, 2019). This allows for the comparison of rental costs and the costs faced by an owner-occupant. According to Schier and Voigtländer (2015), annual owner-occupied costs in the county at the time can be determined as follows:

$$(1) \qquad SNK_{kt} = P_{kt} * (1 + g_{kt} + m_{kt} + e + n) * [b * i_{F,t} + (1 - b) * i_{A,t} * (1 - \tau_t) + s + a - \Delta P_k]$$

P_{kt} is the purchase price of the property in euros per square meter of living space. The term in the following parenthesis summarizes the ancillary costs incurred when purchasing the property: g stands for the amount of land transfer tax; depending on the federal state, between 3.50 and 6.50 percent of the purchase price is payable here in Germany. In addition, the calculation assumes that the property is purchased through a broker. The brokerage fee m differs thereby likewise between the German Lands of the Federal Republic. Here, as a rule, between 3.57 and 7.14 percent of the purchase price must be

paid. However, since this is a purchase of a property for private use, according to the newly applicable commission division, the same must be shared between buyer and seller. Therefore, an average of just over 3.00 percent is to be expected. A flat rate of 2.00 percent is estimated for the mandatory entry in the land register e and any notary fees (*n*) incurred (Homeday, 2024; Homeday, 2023). As a rule, the purchase price is financed with a mortgage loan. The average debt ratio b in recent years was around 78.12 percent (Voigtländer & Zdrzalek, 2022).

For the time-variable borrowing rate i_F, we assume the average effective interest rate of German banks for housing loans to private households with an initial fixed interest rate of more than 10 years. The time-variable debit interest rate i_F that could be determined for the period from 2003 to July 2023 is 3.26. To calculate this value, the average of the interest rates received from the bank for real estate financing during this period was formed. Data from the German Federal Bank (2023) was used for this purpose. In addition to the actual payments to be made for the house purchase, opportunity costs are incurred for the equity invested (on average 21.88 percent of the purchase price (Voigtländer & Zdrzalek, 2022)). As an opportunity interest rate, we assume the mean current yields of domestic bearer bonds $_{iA}$ (2.14% (German Federal Bank, 2020)). A mean value was also calculated for this, analogously to the time-variable borrowing rate i_F.

The income generated from the investment on the capital market must be taxed at the τ tax rate. For this purpose, the average tax rate was determined after accrual of the Finanzstitik (25.02% (calculation based on data from BMF, 2023)). Added to this are the annual costs in the form of maintenance *s* and depreciation *a* incurred by homeowners. A flat 3 percent is assumed for this (Clamor et al., 2013). These costs must be considered on an opportunity basis. Assuming that the residential property owner would not actually invest these costs in the property, for example in the form of a renovation or modernization measure, the property would lose value annually (Voigtländer & Sagner, 2019). Last, the long-term expected price increases of the residential property in the respective count ΔP with a negative sign have to be included in the calculation. The long-term price expectations are based here on the mean annual price increase rate of the years 2017 to 2023. The mean annual price increase rate was calculated as follows:

(2) $$P = \left(\frac{VPI_2}{VPI_1} - 1\right) * 100$$

For this purpose, data from the second-largest German real estate portal (immowelt, 2023a) were used. The individual price increases were calculated for each of the 401 districts using the formula provided above. These are list prices.

2 Data

To determine the housing occupancy costs in each county, various data sources were utilized. The equation comprises numerous variables that are not available in a single dataset (at least not publicly accessible). Table 1 is intended to list the various components of the equation along with their data sources. See Table 1: Variables and data sources.

Table 1: Variables and data sources

Variable	Explanation	Source
P_{kt}	Purchase price in euros per square meter of living space	immowelt (2023a)
g_{kt}	Amount of real estate transfer tax	Wüstenrot (2023)
m_{kt}	Brokerage fee	Homeday (2024)
e, n	Entry in the land register and notary fees	Homeday (2023)
b	Debt financing portion	Voigtländer and Zdrzalek (2022)
$i_{F,t}$	Mortgage interest rate	German Central Bank (2023)
$i_{A,t}$	Current yields on bearer bonds	German Central Bank (2020)
T_t	Tax rate	BMF (2023)
s	Maintenance	flat-rate
a	Depreciation	flat-rate
ΔP_k	Change in the purchase price	immowelt (2023a)

Sources: Own representation. Formulas based on Schier and Voigtländer (2015).

As can be seen from the table, both the purchase price in euros per square meter of living space (P_{kt}) and the purchase price change (ΔP_k) were calculated using data from immowelt (2023a). In this calculation, the square meter prices of individual districts from 2017 to 2023 were included, and the average square meter price of the past years was determined, or the annual purchase price change was calculated using the equation described earlier. Both values for condominiums and houses were included in the calculation. An average purchase price in euros per square meter of living space was deliberately calculated, rather than using the 2023 value, to prevent speculative price exaggerations. Currently, only values from 2017 to 2023 are publicly available, which is why older values could not be included in the calculations.

For the mortgage interest rate i_F, we assume the average effective interest rate of German banks for home loans to private households with an initial fixed interest period of over 10 years, which is 3.26 percent. To determine this rate, monthly average interest rates from 2003 to July 2023 were used, and the annual average was calculated to subsequently determine the overall average effective interest rate. Data from the Deutsche Bundesbank (2023) were used for this purpose. As for the opportunity cost of capital, we assume the average yields on domestic bearer bonds i_A (2.14%) (Deutsche Bundesbank, 2020). Similarly, an average was calculated for this using the same method as for the time-varying external capital interest rate i_F. To determine the tax rate τ, the average tax rate was calculated based on financial statistics (25.02% (calculation based on BMF data, 2023)).

3 Results of the analysis

After carrying out the calculation, it quickly became clear that the price growth rates determined for the various districts and independent cities would lead to negative signs in the owner-occupier costs. As costs cannot be negative, but represent expenditure, the equation had to be adjusted. To prevent speculative exaggerations, the price growth rate was therefore capped at a maximum of 4.00 percent. The trend in property prices, as seen in the square meter prices in recent years (immowelt, 2023a), indicates that a price decrease can be expected in the coming years. Such high annual price growth rates would distort the current comparison between purchasing a property now or entering into a rental agreement. Other experts have set a maximum price growth rate of 3.00 percent (Voigtländer & Sagner, 2019) or 2.50 percent (Voigtländer & Sagner, 2022) in recent years. However, as these values are significantly lower than the observed price increases, the mentioned 4.00 percent is used here. Since the values used are only supply values and not actual sales prices, this measure appears necessary to eliminate overly optimistic offers from the calculation and to use realistic sales prices as the basis.

After conducting the calculations, numerous results were recorded. First and foremost, the owner-occupier costs on the average across Germany amount to approximately €4.11 per square meter. For a 100 square meter apartment, this would correspond to costs of €411.00 per month or €4,932.00 per year. In comparison, the average rental price in Germany is currently around €9.14 per square meter. Therefore, a 100 square meter rented apartment would cost €914.00 per month or €10,968.00 per year. Considering these values, a cost advantage of ownership over renting can already be estimated. Currently, on average across Germany, this advantage is 56.57%. This means that the average advantage of homeownership over a rental agreement is about 56.57%, and this holds true on average across all 401 counties and independent cities in Germany. Thus, it currently costs people less than half as much in euros per square meter to invest in ownership rather than a comparable apartment.

Metropolitan areas always play a significant role in the analysis of the German real estate market, as extreme developments are often observed here. Table 2 shows the owner-occupier costs, rental prices and cost advantages of the German metropolitan regions. See Table 2: Analysis of Germany's metropolitan regions.

Table 2: Analysis of Germany's metropolitan regions

Metropolis	Owner-occupied cost (in € per sqm)	Rent price (in € per sqm)	Cost advantage over rents (in %)
Berlin	7.69	13.51	43.08
Cologne	7.76	13.56	42.77
Düsseldorf	7.91	11.21	29.44
Frankfurt am Main	9.57	16.43	41.75
Hamburg	9.01	13.00	30.69
Munich	14.57	21.41	31.95
Stuttgart	9.05	16.64	45.61

Source: Based on own calculation and own presentation. Rent prices data from: Immobilien Scout GmbH (2023); Immowelt (2023b); SmartMiete GmbH (2023); SP Software GmbH (2023); Zarenga GmbH (2023).

With the help of the user cost of housing analysis, it was possible to determine that Munich is currently the leader in terms of owner-occupancy costs and rents. None of the other metropolitan areas record such high owner-occupier and rental prices. However, at the same time, Munich does not exhibit the lowest cost advantage of homeownership over renting. With approximately 29.44%, homeownership in Düsseldorf is "least" advantageous when directly compared to the other German metropolitan areas. Hamburg (30.69%) and Munich (31.95%) narrowly miss claiming the top spot for "lowest cost advantage among German metropolitan areas". However, in the context of an overall analysis of the German real estate market, it is not only the largest cities that are of interest but also a comparison among the individual federal states. In the following table, the corresponding values for the 16 federal states were determined with the help of the user cost of housing analysis. See Table 3: Analysis of the German federal states.

Table 3: Analysis of the German federal states

Federal state	Owner-occupied cost (in € per sqm)	Rent price (in € per sqm)	Cost advantage over rents (in %)
Baden-Württemberg	5.26	11.00	52.52
Bavaria	5.28	10.15	49.80
Berlin	7.69	13.51	43.08
Brandenburg	3.54	8.62	59.71
Bremen	3.70	8.55	57.13
Hamburg	9.01	13.00	30.69
Hesse	4.60	9.99	55.30
Lower Saxony	3.22	8.32	61.34
Mecklenburg-Western Pomerania	3.26	7.97	59.59
North Rhine-Westphalia	3.93	8.68	54.81
Rhineland-Palatinate	3.54	8.78	60.20
Saarland	2.71	8.84	69.24
Saxony	2.44	6.51	63.64
Saxony-Anhalt	2.00	6.27	68.58
Schleswig-Holstein	4.60	9.83	53.53
Thuringia	2.25	7.02	68.61

Source: Based on own calculation and own presentation. Rental prices data from: Immobilien Scout GmbH (2023); Immowelt (2023b); SmartMiete GmbH (2023); SP Software GmbH (2023); Zarenga GmbH (2023).

In a direct comparison of the federal states, Saxony-Anhalt stands out as the most affordable state for homeownership, with owner-occupier costs of only €2.00 per square meter. On average, a 100 square meter apartment here costs only €200.00 per month or €2,400.00 per year. Thuringia (€2.25 per square meter) and Saxony (€2.44 per square meter) closely follow Saxony-Anhalt as the next most affordable options. In this comparison, the highest owner-occupier costs are found in Hamburg (€9.01 per square meter) and Berlin (€7.69 per square meter). Excluding the two city-states, Bavaria (€5.28 per square meter) and Baden-Württemberg (€5.26 per square meter) occupy the last positions in terms of affordability. Analyzing the average rental prices of the federal states also revealed that renting is most expensive in Baden-Württemberg (€11.00 per square meter) and Bavaria (€10.15 per square meter) when excluding Hamburg and Berlin from consideration. Currently, renting is most affordable on average in Saxony-Anhalt (€6.27 per square meter).

Lastly, it is important to compare the cost advantages of the individual federal states. In this category, Saarland is currently the most attractive state for investing in homeownership rather than renting, with a cost savings of 69.24%. Thuringia (68.61%) and Saxony-Anhalt (68.58%) closely follows in this comparison. Currently, the states with the lowest cost advantages are once again Hamburg (30.69%) and Berlin (43.08%). Since these two city-states are excluded from this comparison, Bavaria currently has the lowest cost advantage at 49.80%. Just behind are Baden-Württemberg (52.52%) and Schleswig-Holstein (53.53%).

4 Interpretation of the results

After a comprehensive analysis and calculation, the question arises as to what insights can be derived for the real estate market and its future development. It is also important to determine whether and in what form the research questions Q1 and Q2 posed in the introduction can be answered. First and foremost, it is worth noting that even after an increase in interest rates towards more normal levels, investing in homeownership will still be significantly more attractive than renting. A positive cost advantage was found in all counties in Germany, even though the expected price increases in real estate were not fully incorporated into the evaluation. Therefore, in Germany at the current time, it is more expensive to rent a comparable apartment or house than to invest in one.

However, it is important to note that the user cost of housing approach does not take into account that the approximately 22% assumed as the equity ratio cannot be universally applied to the population. While the average German had per capita financial assets of €88.600 in 2022 (Statista, 2023), there has been a trend for decline (Statista, 2023). Additionally, it raises the question of whether this high level of per capita financial assets is evenly distributed across the entire country or concentrated in high-income regions. In this regard, the analysis quickly reveals that the eastern states of German have high cost advantages, low owner-occupier costs, and "relatively lower" rental prices. Therefore, living in these states is generally more affordable than in western Germany. A closer look at the two southern states of Bavaria and Baden-Württemberg shows that they often have lower cost advantages and high rents.

Even in the German metropolitan areas, despite significant price increases in recent years, positive cost advantages continue to exist. However, it should be noted that the high entry prices do not necessarily provide every citizen with the opportunity to invest in homeownership instead of renting.

Overall, the following can be stated with regard to research questions Q1 and Q2: On average nationwide and without exception, owner-occupier costs are lower, in some cases significantly so. This means that it is still advantageous to invest in home ownership instead of paying monthly for a rented apartment or house. Research question Q1 must therefore be answered in the negative: Residential user costs are not higher than rental costs, but the other way around. With regard to research question Q2, it can be stated that the rise in interest rates has not ended the advantages of home ownership. As explained at the beginning of Chapter 3, the calculated price increase rate of real estate in the districts and independent cities even had to be limited to 4.00 percent, as the results would otherwise yield "negative costs" for owner-occupiers. In other words, owner-

occupiers would mathematically receive money for living in their own property. It can therefore be concluded that the interest rate increases did not have a significant impact on the price increase rates either. This research question can therefore also be answered in the negative.

Conclusion

The study of the German real estate market using the "user cost of housing" approach shows that buying real estate is still cheaper than renting, despite possible interest rate increases. This cost advantage extends across all 401 counties and independent cities in Germany and is also maintained in metropolitan regions. It was found that the average cost of home ownership in Germany is about 57% lower than the cost of renting. This finding not only has an impact on potential property buyers and tenants, but also contributes to Germany's financial stability and economic situation. The study shows that, even taking into account possible price increases for real estate, home ownership remains advantageous over renting. The calculations take into account various factors, including financing costs, taxes, maintenance costs and expected price increases. Interestingly, the eastern states of Germany have lower average ownership costs than the western states, indicating that it may be more financially attractive for citizens in the eastern states to purchase residential property.

It should be noted, however, that the "user cost of housing" approach does not take into account the individual financial situations of the population, especially the amount of equity that can be raised by citizens. This finding highlights the need to consider the distribution of assets in Germany. Lower cost advantages and "relatively lower" rental prices were found in the eastern states, indicating that living in these regions is generally more affordable than in the west. Finally, it was found that although high price increases were recorded in the real estate market in German metropolitan areas, the cost advantage of home ownership remains. The objective of the study, to determine whether home ownership will still be cheaper than renting in 2023, was therefore fully achieved. The two research questions Q1 and Q2 were also answered satisfactorily in this context.

However, it is important to note that the high entry prices do not offer all citizens the opportunity to invest in home ownership. Overall, this study shows that the real estate market in Germany continues to offer favorable conditions for homeownership, despite existing challenges, particularly with respect to the financial situation of the population and the regional distribution of wealth. Future research directions could focus on analyzing these factors and their impact on the real estate market.

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Appendix

Table 4: Owner-occupied cost, rental price and cost advantage of the 401 German counties

	Region	Owner-occupied cost (in € per sqm)	Rent price (in € per sqm)	Cost advantage over rents (in %)
Schleswig-Holstein				
01001	Flensburg	4.25	8.82	51.81
01002	Kiel	5.29	11.70	54.79
01003	Lübeck	5.48	9.85	44.37
01004	Neumünster	3.36	8.05	58.26
01051	Dithmarschen (dist.)	3.29	9.30	64.62
01053	Duchy of Lauenburg (dist.)	4.27	9.12	53.18
01054	North Frisia (dist.)	7.34	10.82	32.16
01055	East Holstein (dist.)	5.30	10.22	48.14
01056	Pinneberg (dist.)	5.33	11.96	55.43
01057	Plön (dist.)	4.38	10.33	57.60
01058	Rensburg-Eckernförde (dist.)	3.86	9.18	57.95
01059	Schleswig-Flensburg (dist.)	3.62	8.22	55.96
01060	Segeberg (dist.)	4.68	11.25	58.40
01061	Steinburg (dist.)	3.04	7.44	59.14
01062	Stormarn (dist.)	5.46	11.17	51.12

Hamburg				
02000	Hamburg	9.01	13.00	30.69
Loxer Saxony				
03101	Brunswick	4.79	9.12	47.48
03102	Salzgitter	2.66	5.88	54.76
03103	Wolfsburg	4.21	9.32	54.83
03151	Gifhorn (dist.)	3.36	9.39	64.22
03153	Goslar (dist.)	2.04	7.86	74.05
03154	Helmstedt (dist.)	2.53	7.06	64.16
03155	Northeim (dist.)	2.06	7.05	70.78
03157	Peine (dist.)	2.99	8.87	66.29
03158	Wolfenbüttel (dist.)	3.08	8.40	63.33
03159	Göttingen (dist.)	3.60	10.89	66.94
03241	Hannover (dist.)	4.54	8.83	48.58
03251	Diepholz (dist.)	3..07	8.11	62.15
03252	Hameln-Pyrmont (dist.)	2.41	6.57	63.32
03254	Hildesheim (dist.)	2.92	7.12	58.99
03255	Holzminden (dist.)	1.60	5.98	73.24
03256	Nienburg (Weser) (dist.)	2.36	6.91	65.85
03257	Schaumburg (dist.)	2.51	6.73	62.70
03351	Celle (dist.)	2.82	7.70	63.38
03352	Cuxhaven (dist.)	3.65	9.59	61.94
03353	Harburg (dist.)	4.79	10.72	55.32
03354	Lüchow-Dannenberg (dist.)	1.97	6.07	67.55
03355	Lüneburg (dist.)	4.43	8.63	48.67
03356	Osterholz (dist.)	3.38	8.63	60.83
03357	Rotenburg (Wümme) (dist.)	2.76	9.73	71.63
03358	Heidekreis (dist.)	2.63	7.43	64.60
03359	Stade (dist.)	3.77	10.03	62.41
03360	Uelzen (dist.)	2.67	8.52	68.66
03361	Verden (dist.)	3.39	9.02	62.42
03401	Delmenhorst	3.31	8.20	59.63
03402	Emden	2.70	9.12	70.39

03403	Oldenburg	4.77	10.33	53.82
03404	Osnabrück	4.41	9.58	53.97
03405	Wilhelmshaven	2.78	6.28	55.73
03451	Ammerland (dist.)	3.63	8.68	58.18
03452	Aurich (dist.)	4.58	7.77	41.06
03453	Cloppenburg (dist.)	2.81	9.44	70.23
03454	Emsland (dist.)	2.69	9.37	71.29
03455	Friesland (dist.)	3.32	7.36	54.89
03456	Bentheim (dist.)	2.88	8.10	64.44
03457	Leer (dist.)	3.52	8.55	58.83
03458	Oldenburg (dist.)	3.38	8.73	61.28
03459	Osnabrück (dist.)	3.06	9.37	67.34
03460	Vechta (dist.)	3.34	7.88	57.61
03461	Wesermarsch (dist.)	2.52	8.02	68.58
03462	Wittmund (dist.)	4.09	7.28	43.82
Bremen				
04011	Bremen	4.62	10.35	55.36
04012	Bremerhaven	2.77	6.74	58.90
North Rhine-Westphalia				
05111	Düsseldorf	7.91	11.21	29.44
05112	Duisburg	3.39	7.15	52.59
05113	Essen	4.90	8.86	44.70
05114	Krefeld	4.22	8.08	47.77
05116	Mönchengladbach	3.62	7.62	52.49
05117	Mülheim on the Ruhr	4.42	8.64	48.84
05119	Oberhausen	3.39	7.02	51.71
05120	Remscheid	3.47	6.67	47.98
05122	Solingen	4.16	7.50	44.53
05124	Wuppertal	3.67	7.36	50.14
05154	Kleve (dist.)	3.30	8.13	59.41
05158	Mettmann (dist.)	5.07	10.46	51.53
05162	Rhein-Kreis Neuss (dist.)	5.12	12.48	58.97
05166	Viersen (dist.)	3.89	9.34	58.35
05170	Wesel (dist.)	3.71	7.14	48.04
05314	Bonn	6.15	12.76	51.80
05315	Cologne	7.76	13.56	42.77

05316	Leverkusen	5.04	10.06	49.90
05334	Aachen city region (dist.)	4.27	9.99	57.26
05358	Düren (dist.)	3.27	8.30	60.60
05362	Rhein-Erft (dist.)	4.85	10.84	55.26
05366	Euskirchen (dist.)	3.30	9.49	65.23
05370	Heinsberg (dist.)	3.15	9.98	68.44
05374	Oberberg (dist.)	3.03	6.92	56.21
05378	Rheinisch-Bergischer Kreis (dist.)	4.90	9.39	47.82
05382	Rhein-Sieg (dist.)	4.76	9.89	51.87
05512	Bottrop	3.72	7.76	52.06
05513	Gelsenkirchen	2.92	10.62	72.50
05515	Münster	6.68	13.27	49.66
05554	Borken (dist.)	3.44	9.47	63.67
05558	Coesfeld (dist.)	3.88	8.93	56.55
05562	Recklinghausen (dist.)	3.41	7.30	53.29
05566	Steinfurt (dist.)	3.39	8.71	61.08
05570	Warendorf (dist.)	3.54	8.71	59.36
05711	Bielefeld	4.18	9.02	53.66
05754	Gütersloh (dist.)	3.93	8.79	55.29
05758	Herford (dist.)	2.92	7.73	62.23
05762	Höxter (dist.)	2.17	6.68	67.51
05766	Lippe (dist.)	2.94	7.20	59.17
05770	Minden-Lübbecke (dist.)	2.66	7.68	65.36
05774	Paderborn (dist.)	3.87	8.51	54.52
05911	Bochum	4.08	7.74	47.29
05913	Dortmund	4.51	8.92	49.44
05914	Hagen	3.22	5.70	43.51
05915	Hamm	3.30	8.73	62.20
05916	Herne	3.31	6.90	52.03
05954	Ennepe-Ruhr (dist.)	3.81	7.36	48.23
05958	Hochsauerlandkreis (dist.)	2.42	7.33	66.98
05962	Märkischer Kreis (dist.)	2.79	6.30	55.71
05966	Olpe (dist.)	2.86	8.03	64.38
05970	Siegen-Wittgenstein (dist.)	3.09	7.02	55.98

05974	Soest (dist.)	3.19	8.57	62.78
05978	Unna (dist.)	3.45	8.03	57.04
Hesse				
06411	Darmstadt	6.89	13.78	50.00
06412	Frankfurt am Main	9.57	16.43	41.75
06413	Offenbach am Main	6.42	16.19	60.35
06414	Wiesbaden	7.57	11.63	34.91
06431	Bergstrasse (dist.)	4.48	9.30	51.83
06432	Darmstadt-Dieburg (dist.)	5.20	10.95	52.51
06433	Groß-Gerau (dist.)	5.66	11.49	50.74
06434	Hochtaunus (dist.)	7.09	10.96	35.31
06435	Main-Kinzig-Kreis (dist.)	4.53	9.92	54.33
06436	Main-Taunus (dist.)	7.00	11.47	38.97
06437	Odenwald (dist.)	3.24	8.29	60.92
06438	Offenbach (dist.)	5.96	10.49	43.18
06439	Rheingau-Taunus (dist.)	4.88	9.39	48.03
06440	Wetterau (dist.)	4.84	9.84	50.81
06531	Gießen (dist.)	4.03	10.71	62.37
06532	Lahn-Dill (dist.)	3.05	7.30	58.22
06533	Limburg-Weilburg (dist.)	3.14	10.35	69.66
06534	Marburg-Biedenkopf (dist.)	3.47	10.56	67.14
06535	Vogelsbergkreis (dist.)	2.19	6.57	66.67
06611	Kassel	4.36	9.17	52.45
06631	Fulda (dist.)	3.66	7.73	52.65
06632	Hersfeld-Rotenburg (dist.)	2.30	7.75	70.32
06633	Kassel (dist.)	3.03	8.45	64.14
06634	Schwalm-Eder (dist.)	2.42	7.02	65.53
06635	Waldeck-Frankenberg (dist.)	2.43	7.61	68.07
06636	Werra-Meißner (dist.)	2.14	6.48	66.98

Rhineland-Palatinate				
07111	Koblenz	4.77	9.88	51.72
07131	Ahrweiler (dist.)	3.54	8.57	58.69
07132	Altenkirchen (Westerwald) (dist.)	2.32	6.78	65.78
07133	Bad Kreuznach (dist.)	3.21	10.09	68.19
07134	Birkenfeld (dist.)	2.00	8.53	76.55
07135	Cochem-Zell (dist.)	2.43	8.40	71.07
07137	Mayen-Koblenz (dist.)	3.30	8.37	60.57
07138	Neuwied (dist.)	3.20	7.90	59.49
07140	Rhine-Hunsrück (dist.)	2.68	6.32	57.59
07141	Rhine-Lahn (dist.)	2.83	7.96	64.45
07143	Westerwald (dist.)	2.57	7.48	65.64
07211	Trier	4.75	11.57	58.95
07231	Bernkastel-Wittlich	2.76	9.07	69.57
07232	Eifel Bitburg-Prüm (dist.)	2.95	8.89	66.82
07233	Vulkaneifel (dist.)	2.34	6.64	64.76
07235	Trier-Saarburg (dist.)	3.59	8.29	56.69
07311	Frankenthal (Palatinate)	4.42	9.94	55.53
07312	Kaiserslautern	3.27	8.30	60.60
07313	Landau in the Palatinate	4.94	10.24	51.76
07314	Ludwigshafen on the Rhine	4.57	9.73	53.03
07315	Mainz	6.57	14.31	54.09
07316	Neustadt a.d. Weinstrasse	4.73	8.79	46.19
07317	Pirmasens	1.97	6.35	68.98
07318	Speyer	5.82	11.27	48.36
07319	Worms	4.20	10.21	58.86
07320	Zweibrücken	2.65	6.40	58.59
07331	Alzey-Worms (dist.)	3.61	7.96	54.65
07332	Bad Dürkheim (dist.)	4.00	10.29	61.13

07333	Donnersbergkreis (dist.)	2.76	7.09	61.07
07334	Germersheim (dist.)	4.44	8.87	49.94
07335	Kaiserslautern (dist.)	2.69	7.94	66.12
07336	Kusel (dist.)	2.13	6.73	68.35
07337	Südliche Weinstrasse (dist.)	3.90	11.57	66.29
07338	Rhein-Pfalz (dist.)	4.55	8.54	46.72
07339	Mainz-Bingen (dist.)	4.63	10.14	54.34
07340	Southwest Palatinate (dist.)	2.28	6.75	66.22
Baden-Württemberg				
08111	Stuttgart	9.05	16.64	45.61
08115	Böblingen (dist.)	6.64	12.65	47.51
08116	Esslingen (dist.)	6.52	12.81	49.10
08117	Göppingen (dist.)	4.80	9.77	50.87
08118	Ludwigsburg (dist.)	6.68	12.87	48.10
08119	Rems-Murr (dist.)	6.10	11.16	45.34
08121	Heilbronn	5.91	12.23	51.68
08125	Heilbronn (dist.)	5.06	10.92	53.66
08126	Hohenlohe (dist.)	4.13	9.52	56.62
08127	Schwäbisch Hall (dist.)	3.98	11.30	64.78
08128	Main-Tauber (dist.)	3.38	9.34	63.81
08135	Heidenheim (dist.)	3.86	9.64	59.96
08136	Ostalbkreis (dist.)	4.36	13.51	67.73
08211	Baden-Baden	6.33	9.59	33.99
08212	Karlsruhe	6.93	14.11	50.89
08215	Karlsruhe (dist.)	5.09	9.33	45.44
08216	Rastatt (dist.)	4.72	9.61	50.88
08221	Heidelberg	8.06	15.32	47.39
08222	Mannheim	5.89	12.61	53.29
08225	Neckar-Odenwald (dist.)	3.25	9.20	64.67
08226	Rhine-Neckar (dist.)	5.11	10.13	49.56

08231	Pforzheim	5.05	10.48	51.81
08235	Calw (dist.)	4.21	9.59	56.10
08236	Enzkreis (dist.)	4.70	9.93	52.67
08237	Freudenstadt (dist.)	3.37	9.08	62.89
08311	Freiburg im Breisgau	8.19	14.70	44.29
08315	Breisgau-Hochschwarzwald (dist.)	5.76	10.49	45.09
08316	Emmendingen (dist.)	5.55	10.34	46.32
08317	Ortenaukreis (dist.)	4.49	10.11	55.59
08325	Rottweil (dist.)	3.48	8.75	60.23
08326	Schwarzwald-Baar (dist.)	3.87	11.70	66.92
08327	Tuttlingen (dist.)	3.93	8.94	56.04
08335	Constance (dist.)	6.69	11.30	40.80
08336	Lörrach (dist.)	5.58	12.81	56.44
08337	Waldshut (dist.)	4.30	9.29	53.71
08415	Reutlingen (dist.)	5.39	10.59	49.10
08416	Tübingen (dist.)	6.09	11.24	45.82
08417	Zollernalbkreis (dist.)	3.53	9.68	63.53
08421	Ulm	6.67	10.73	37.84
08425	Alb-Donau (dist.)	4.55	9.44	51.80
08426	Biberach (dist.)	4.24	11.30	62.48
08435	Bodensee (dist.)	6.79	12.00	43.42
08436	Ravensburg (dist.)	5.45	10.45	47.85
08437	Sigmaringen (dist.)	3.51	8.62	59.28
Bavaria				
09161	Ingolstadt	7.29	13.66	46.63
09162	Munich	14.57	21.41	31.95
09163	Rosenheim	8.25	11.93	30.85
09171	Altötting (dist.)	4.55	8.77	48.12
09172	Berchtesgadener Land (dist.)	6.52	11.13	41.42
09173	Bad Tölz-Wolfratshausen (dist.)	8.94	11.17	19.96
09174	Dachau (dist.)	9.19	13.18	30.27

09175	Ebersberg (dist.)	9.53	14.30	33.36
09176	Eichstätt (dist.)	5.51	9.76	43.55
09177	Erding (dist.)	7.63	11.69	34.73
09178	Freising (dist.)	8.19	12.11	32.37
09179	Fürstenfeldbruck (dist.)	9.73	13.37	27.23
09180	Garmisch-Partenkirchen (dist.)	8.85	11.81	25.06
09181	Landsberg a. Lech (dist.)	7.33	11.77	37.72
09182	Miesbach (dist.)	10.99	14.28	23.04
09183	Mühldorf a. Inn (dist.)	5.05	9.43	46.45
09184	Munich (dist.)	11.83	17.11	30.86
09185	Neuburg-Schrobenhausen (dist.)	5.33	11.12	52.07
09186	Pfaffenhofen a.d. Ilm (dist.)	6.23	11.45	45.59
09187	Rosenheim (dist.)	7.59	10.96	30.75
09188	Starnberg (dist.)	11.43	15.43	25.92
09189	Traunstein (dist.)	6.16	11.40	45.96
09190	Weilheim-Schongau (dist.)	6.99	9.75	28.31
09261	Landshut	7.32	11.18	34.53
09262	Passau	4.74	10.14	53.25
09263	Straubing	4.86	9.56	49.16
09271	Deggendorf (dist.)	4.10	7.76	47.16
09272	Freyung-Grafenau (dist.)	2.56	6.91	62.95
09273	Kelheim (dist.)	4.55	9.32	51.18
09274	Landshut (dist.)	5.18	8.93	41.99
09275	Passau (dist.)	3.33	7.99	58.32
09276	Regen (dist.)	2.79	6.88	59.45
09277	Rottal-Inn (dist.)	3.57	8.30	56.99
09278	Straubing-Bogen (dist.)	3.74	8.68	56.91
09279	Dingolfing-Landau (dist.)	4.13	9.42	56.16
09361	Amberg	4.42	9.61	54.01
09362	Regensburg	7.62	12.99	41.34

09363	Weiden i.d.OPf.	3.73	8.68	57.03
09371	Amberg-Sulzbach (dist.)	3.20	7.52	57.45
09372	Cham (dist.)	2.79	7.94	64.86
09373	Neumarkt i.d.OPf. (dist.)	4.33	9.98	56.61
09374	Neustadt a.d. Waldnaab (dist.)	2.80	8.46	66.90
09375	Regensburg (dist.)	5.09	9.35	45.56
09376	Schwandorf (dist.)	3.47	7.90	56.08
09377	Tirschenreuth (dist.)	2.44	6.19	60.58
09461	Bamberg	5.84	10.93	46.57
09462	Bayreuth	4.94	11.16	55.73
09463	Coburg	3.94	9.00	56.22
09464	Hof	2.45	7.20	65.97
09471	Bamberg (dist.)	4.00	8.38	52.27
09472	Bayreuth (dist.)	3.03	7.79	61.10
09473	Coburg (dist.)	2.91	7.50	61.20
09474	Forchheim (dist.)	4.64	8.93	48.04
09475	Hof (dist.)	1.91	6.37	70.02
09476	Kronach (dist.)	2.44	8.77	72.18
09477	Kulmbach (dist.)	2.71	7.42	63.48
09478	Lichtenfels (dist.)	2.97	8.67	65.74
09479	Wunsiedel i. Fichtelgebirge (dist.)	1.99	7.37	73.00
09561	Ansbach	4.19	11.64	64.00
09562	Erlangen	7.15	13.36	46.48
09563	Fürth	6.18	12.99	52.42
09564	Nuremberg	6.49	13.07	50.34
09565	Schwabach	5.54	10.91	49.22
09571	Ansbach (dist.)	3.54	8.70	59.31
09572	Erlangen-Höchstadt (dist.)	5.50	10.30	46.60
09573	Fürth (dist.)	5.51	10.00	44.90
09574	Nuremberg (dist.)	4.88	8.89	45.11
09575	Neustadt a.d. Aisch-Bad Windsheim (dist.)	3.51	8.19	57.14
09576	Roth (dist.)	4.58	9.70	52.78

09577	Weissenburg-Gunzenhausen (dist.)	3.70	9.20	59.78
09661	Aschaffenburg	5.97	13.06	54.29
09662	Schweinfurt	4.24	9.11	53.46
09663	Würzburg	6.10	13.63	55.25
09671	Aschaffenburg (dist.)	4.54	9.15	50.38
09672	Bad Kissingen (dist.)	2.82	8.38	66.35
09673	Rhön-Grabfeld (dist.)	2.77	6.40	56.72
09674	Haßberge (dist.)	2.82	7.73	63.52
09675	Kitzingen (dist.)	3.63	8.01	54.68
09676	Miltenberg (dist.)	3.71	8.42	55.94
09677	Main-Spessart (dist.)	3.22	7.23	55.46
09678	Schweinfurt (dist.)	3.28	8.21	60.05
09679	Würzburg (dist.)	4.33	8.74	50.46
09761	Augsburg	7.24	13.57	46.65
09762	Kaufbeuren	5.28	10.23	48.39
09763	Kempten (Allgäu)	6.06	9.78	38.04
09764	Memmingen	5.32	11.01	51.68
09771	Aichach-Friedberg (dist.)	6.36	10.85	41.38
09772	Augsburg (dist.)	5.99	11.30	46.99
09773	Dillingen a.d. Donau (dist.)	3.93	10.95	64.11
09774	Günzburg (dist.)	4.09	8.95	54.30
09775	Neu-Ulm (dist.)	5.28	10.16	48.03
09776	Lindau (Lake Constance) (dist.)	6.60	10.16	35.04
09777	East Allgaeu (dist.)	5.40	10.60	49.06
09778	Unterallgäu (dist.)	4.75	11.48	58.62
09779	Donau-Ries (dist.)	3.97	9.90	59.90
09780	Oberallgäu (dist.)	6.12	10.59	42.21
Saarland				
10041	Saarbrücken city association (dist.)	2.87	10.36	72.30
10042	Merzig-Wadern (dist.)	2.88	9.17	68.59
10043	Neunkirchen (dist.)	2.31	7.90	70.76

10044	Saarlouis (dist.)	2.74	8.92	69.28
10045	Saarpfalz (dist.)	2.80	8.02	65.09
10046	Sankt Wendel (dist.)	2.65	8.66	69.40
Berlin				
11000	Berlin	7.69	13.51	43.08
Brandenburg				
12051	Brandenburg on the Havel	3.56	7.48	52.41
12052	Cottbus	3.09	8.07	61.71
12053	Frankfurt (Oder)	3.02	6.23	51.52
12054	Potsdam	7.71	10.83	28.81
12060	Barnim (dist.)	4.04	10.83	62.70
12061	Dahme-Spreewald (dist.)	4.31	12.15	64.53
12062	Elbe-Elster (dist.)	1.76	6.08	71.05
12063	Havelland (dist.)	4.15	8.93	53.53
12064	Märkisch-Oderland (dist.)	3.75	9.28	59.59
12065	Oberhavel (dist.)	4.73	10.46	54.78
12066	Oberspreewald-Lausitz (dist.)	2.07	6.84	69.74
12067	Oder-Spree (dist.)	3.32	8.82	62.36
12068	Ostprignitz-Ruppin (dist.)	2.91	7.58	61.61
12069	Potsdam-Mittelmark (dist.)	4.83	10.38	53.47
12070	Prignitz (dist.)	2.00	6.62	69.79
12071	Spree-Neisse (dist.)	2.12	6.82	68.91
12072	Teltow-Fläming (dist.)	3.97	10.80	63.24
12073	Uckermark (dist.)	2.46	7.02	64.96
Mecklenburg-Western Pomerania				
13003	Rostock	5.49	10.08	45.54
13004	Schwerin	3.57	8.34	57.19
13071	Mecklenburg Lake (dist.)	2.31	6.26	63.10
13072	Rostock (dist.)	3.17	9.58	66.91
13073	Vorpommern-Rügen (dist.)	3.41	7.70	55.71

13074	Northwest Mecklenburg (dist.)	3.19	7.35	56.60
13075	Vorpommern-Greifswald (dist.)	2.74	7.59	63.90
13076	Ludwigslust-Parchim (dist.)	2.20	6.82	67.74
Saxony				
14511	Chemnitz	2.71	6.00	54.83
14521	Erzgebirgskreis (dist.)	1.60	4.88	67.21
14522	Central Saxony (dist.)	1.68	5.78	70.93
14523	Vogtlandkreis (dist.)	1.42	5.42	73.80
14524	Zwickau (dist.)	1.79	5.80	69.14
14612	Dresden	4.72	10.16	53.54
14625	Bautzen (dist.)	2.01	5.73	64.92
14626	Görlitz (dist.)	1.45	5.49	73.59
14627	Meißen (dist.)	2.65	6.60	59.85
14628	Saxon Switzerland-Osterzgebirge (dist.)	2.68	6.23	56.98
14713	Leipzig	4.05	9.26	56.26
14729	Leipzig (dist.)	2.73	6.66	59.01
14730	North Saxony (dist.)	2.19	6.68	67.22
Saxony-Anhalt				
15001	Dessau-Roßlau	1.99	6.50	69.38
15002	Halle/Saale	3.63	7.84	53.70
15003	Magdeburg	3.22	7.10	54.65
15081	Altmarkkreis Salzwedel (dist.)	1.70	5.88	71.09
15082	Anhalt-Bitterfeld (dist.)	1.71	6.37	73.16
15083	Börde (dist.)	1.91	5.92	67.74
15084	Burgenlandkreis (dist.)	1.70	5.75	70.43
15085	Harz (dist.)	1.89	6.23	69.66
15086	Jerichower Land (dist.)	1.84	5.90	68.81
15087	Mansfeld-South Harz (dist.)	1.34	6.14	78.18

15088	Saalekreis (dist.)	1.99	6.50	69.38
15089	Salzlandkreis (dist.)	1.54	5.74	73.17
15090	Stendal (dist.)	1.83	6.27	70.81
15091	Wittenberg (dist.)	1.71	5.70	70.00
Thuringia				
16051	Erfurt	4.33	8.73	50.40
16052	Gera	2.01	7.22	72.16
16053	Jena	5.03	12.83	60.80
16054	Suhl	2.17	7.05	69.22
16055	Weimar	3.88	9.07	57.22
16056	Eisenach	2.38	6.70	64.48
16061	Eichsfeld (dist.)	2.22	6.51	65.90
16062	Nordhausen (dist.)	1.91	5.91	67.68
16063	Wartburgkreis (dist.)	1.83	5.98	69.40
16064	Unstrut-Hainich (dist.)	1.73	5.74	69.86
16065	Kyffhäuserkreis (dist.)	1.46	5.92	75.34
16066	Schmalkalden-Meiningen (dist.)	1.82	6.75	73.04
16067	Gotha (dist.)	2.20	6.92	68.21
16068	Sömmerda (dist.)	2.10	6.58	68.09
16069	Hildburghausen (dist.)	1.78	6.59	72.99
16070	Ilm (dist.)	2.15	7.66	71.93
16071	Weimarer Land (dist.)	2.45	7.00	65.00
16072	Sonneberg (dist.)	1.76	5.62	68.68
16073	Saalfeld-Rudolstadt (dist.)	1.84	7.05	73.90
16074	Saale-Holzland (dist.)	2.12	8.50	75.06
16075	Saale-Orla (dist.)	1.62	5.65	71.33
16076	Greiz (dist.)	1.50	5.95	74.79
16077	Altenburger Land (dist.)	1.55	5.64	72.52

** The figures in the table are each rounded to two decimal places.*

Sources: Based on own calculation and own presentation. Rental prices data from: Immobilien Scout GmbH (2023); Immowelt (2023b); SmartMiete GmbH (2023); SP Software GmbH (2023); Zarenga GmbH (2023).