Real estate price polarization projected to increase until 2030 in Germany

By Christian Westermeier and Markus M. Grabka

Demographic projections for Germany indicate a drop in the population of many regions by 2030. This is likely to have an impact on the real estate market. Our report presents the result of a model calculation of asking prices for residential real estate in Germany up to 2030 based on market data from empirica-systeme GmbH and a population projection from the Bertelsmann Foundation. Depending on the model specifications, it appears that real estate price polarization will increase by 2030. As with all model calculations, the results are subject to uncertainty. In the scenario presented here, we strictly focus on the demographic effect on real estate prices. According to our projections, in one-third of all rural districts (Landkreise) and urban districts (kreisfreie Städte), the market value of condominiums will fall by over 25 percent. This will also be the case for single- and two-family homes in one-quarter of all districts. Some regions in eastern Germany will be hit particularly hard by this development. In and around urban centers, however, the trend of rising prices is expected to continue. Our findings also show that the polarization of real estate prices might cause the inequality of wealth in Germany to rise slightly.

The demographic trend in Germany is predominantly determined by three main factors: fertility, mortality, and the sum of cross-border migration. At present, Germany's birth rate is below the sustainable level and at the same time, life expectancy is on the rise. As a result, the size and age structure of the population is changing significantly. According to the 13th coordinated population forecasts of the German Federal Statistical Office,[1] the population level is predicted to fall by 7.7 million to 13.2 million persons[2] by 2060 in comparison to base year 2013—depending on the assumed scope of migration.[3]

Changing population demographics and the associated regional variations in age structure will also have an effect on the real estate market. We presume that in regions with population shrinkage, the demand for real estate will fall and with it, prices. In expanding regions, prices will rise. This effect will be reinforced by a change in the population's composition: demand for living space is lower among older people than it is among younger people.

And population movement within Germany plays a role alongside migration. The continuing trend toward urban center growth and migration away from rural areas—especially by the young—reinforces the aging process in structurally weak regions. Since the supply of real estate is long-lasting yet inflexible in the short term, the housing stock will most likely react sluggishly to changes in demand.[4] This should heighten the phenomenon of diverging price trends. Despite great uncertainty with regard to migration, we can presume that regional dis-

1 Olga Pötzsch and Felix Rößger, "Bevölkerung Deutschlands bis 2060. 13. koordinierte Bevölkerungsvorausberechnung," (PDF, German Federal Statistical Office, Wiesbaden, 2015). (available online; retrieved May 31, 2017. This applies to all other online sources cited in this report unless otherwise noted).

2 The composition of the age groups will also radically change, in particular with regard to the proportion of very old persons. For example, the dependency quotient—the proportion of persons ages 65 and older in relationship to 20 to 65-year-olds—is predicted to substantially increase between 2013 and 2060 (34 percent in 2013, 56 percent in 2030 and 65 percent in 2060).

3 This information refers to the scenario with constant birth frequency (L1) and a moderate rise in life expectancy (G1).

4 See Edward L. Glaeser and Joseph Gyourko, "Urban decline and durable housing," *Journal of Political Economy* 113.2 (2005): 345–375.

parities in population structure will continue to increase by 2030.[5]

The goal of this study supported by the Hans Böckler Foundation[6] is to generate a model-based projection of real estate prices dependent upon the demographic trend up to 2030. Real estate prices are the focus since private real estate ownership represents the most important component of private household wealth in Germany by far.[7] For this reason, changes in the assessment and structure of this component of wealth would definitely have an effect on the overall distribution of wealth.

Real estate prices react strongly to changes in demand

Real estate prices are influenced by both demand- and supply-side determinants. Demographic developments such as changes in age structure and total population are the primary demand-side factors that influence price structures.[8] The demand-side also encompasses changes in household composition (e. g., an increasing number of one-person households) and changes in preference with regard to acquiring real estate. General economic growth—as manifested by level of disposable income, the interest rate, and the unemployment rate, for example—is another key determinant on the demand side.[9]

Supply-side determinants of real estate prices include construction activity, availability of land for both residential and commercial usage, prices in the surrounding regions, urban development and infrastructure-related trends (such as transport connections) or the availability of public infrastructure (e. g., daycare, schools, retailers or leisure time programs), housing policy (e. g., subsidy of owner-occupied housing), and the condition and quality of the buildings themselves.[10]

A special feature of real estate market is the "virtually impossibility" of adjusting the real estate inventory to changing demand-side real estate market determinants in the short term, due to the longevity of real estate and the relatively long periods required for planning and completing construction. For this reason, prices react strongly to unanticipated changes in demand in the short term.[11]

Regional differences in real estate prices are already significant

A relationship between population growth and real estate prices can be shown for the five districts with the largest percentage population growth and largest population decline (see Table 1). For example, in the city of Leipzig, the total population has grown by 6.8 percent and at the same time, median asking prices have increased by 20 percent. On the contrary, in the Elbe-Elster rural district in Brandenburg, the population fell by 3.7 percent and asking prices by over 25 percent.[12]

There is already evidence of marked polarization in real estate prices. The information on asking prices from the empirica-systeme market data shows high regional variation for single- and two-family houses in 2015 (see Figure 1). For example, the majority of median

5 See Frank Swiaczny, "Auswirkungen des demographischen Wandels auf die regionale Bevölkerungsdynamik in Deutschland," *Raumforschung und Raumordnung* 73(6) (2015): 407–421.

6 We would like to express our gratitude to the Hans Böckler Foundation for financing the research project "Vermögen in Deutschland—Status-quo-Analysen und Perspektiven" (Project number: S-2012-610-4, conducted by DIW Berlin and the Hertie School of Governance under the project direction of Markus M. Grabka). We would also like to thank empirica-systeme for allowing us to use microdata from the empirica regional database.

7 See Markus M. Grabka and Christian Westermeier, "Anhaltend hohe Vermögensungleichheit in Deutschland," *DIW Wochenbericht* no. 9 (2014): 151–164. (available online).

8 In addition to primary demographic effect on real estate prices, birth cohort effects on demand for living space also affect overall demand and therefore, real estate prices. See Philipp Deschermeier and Ralph Henger, "Die Bedeutung des zukünftigen Kohorteneffekts auf den Wohnflächenkonsum" *IW Trends* 3 (2015): 23–39. Available online (Accessed May 31, 2017). The authors argue that the cohort effect prevails over the pure age effect, since per capita living space consumption increases only slightly with age.

9 Deutsche Bundesbank, the German central bank, assumes that due to the drop in overall population and the aging of wage earners, economic growth will trend sharply downward in the medium term. See Deutsche Bundesbank, "Demografischer Wandel, Zuwanderung und das Produktionspotenzial der deutschen Wirtschaft," (PDF, Deutsche Bundesbank, Frankfurt am Main, 2017). (available online). As a key demand-side determinant of real estate prices, this can accordingly have a dampening effect on real estate prices in the future. The quantitatively key determinants of real estate prices are real disposable per capita income, population growth, level of urbanization, and the long-term real interest rate. See Konstantin A. Kholodilin, Jan-Oliver Menz, and Boriss Siliverstovs, "Immobilienkrise? Warum in Deutschland die Preise seit Jahrzehnten stagnieren" *DIW Wochenbericht* no. 17 (2008): 214–220. (available online).

10 See Denise DiPasquale, "Why don't we know more about housing supply?" *The Journal of Real Estate Finance and Economics*, 18(1) (1999): 9–23 and Stephen Malpezzi, "Hedonic pricing models: a selective and applied review," *Housing Economics and Public Policy* (2003): 67–89.

11 The starting point for most empirical studies on the development of real estate supply, demand, and prices is the Stock-Flow Model that DiPasquale and Wheaton developed in 1992 and 1994. It explicitly models the rigid offer and adjustment processes after demand shocks. See Denise DiPasquale and William C. Wheaton, "Housing market dynamics and the future of housing prices," *Journal of Urban Economics* 35(1) (1994): 1–27 and Denise DiPasquale and William C. Wheaton, "The markets for real estate assets and space: a conceptual framework," *Real Estate Economics* 20(2) (1992): 181–198.

12 In the medium term, the negative price effect in shrinking regions can be stronger than the positive one in growing regions. In line with the ratchet effect, in regions with population growth there will be a price increase in the short term, but in the medium term an increase in supply will cause prices to fall again. However, there is hardly any adjustment on the supply side in regions with a shrinking population. Instead, real estate remains on the market and can therefore continue to affect prices negatively (see Tobias Just, *Demografie und Immobilien* (Munich: Oldenburg Verlag, 2013).

Table 1

Changes of asking prices of condominiums and population in selected districts (2012–2015)

District	Changes of asking prices of condominiums per m² (median), in percent	Population change, in percent
Population growth (Top 5)		
Leipzig (City)	20.5	6.8
Frankfurt am Main	25.4	6.1
Offenbach am Main	31.7	5.3
Landshut (City)	35.8	5.0
München (City)	35.4	4.7
Population loss (Top 5)		
Elbe-Elster	−27.8	−3.7
Salzlandkreis	−9.4	−3.5
Oberspreewald-Lausitz	−41.1	−3.4
Anhalt-Bitterfeld	−5.8	−3.4
Altenburger Land	−11.9	−3.3

Source: Real estate asking prices of condominiums (empirica-systeme market data); Current population statistics published by German Federal Statistical Office and Federal State Statistical Offices (Regionaldatenbank)

In cities with significant population growth the asking prices of real estate appear to increase sharply.

prices[13] in eastern German rural and urban districts were below 850 euros per square meter of living area. In urban centers such as Berlin, Hamburg, Frankfurt am Main, and Munich, asking prices were generally higher than in rural areas. At over 4,290 euros per square meter, asking prices were the highest in the Munich greater metropolitan area.

The asking prices of condominiums in 2015 deviated from those of single- and two-family homes in many regions (see Figure 2). We saw the largest differences in coastal regions. While asking prices for single- and two-family homes in the Rostock and Western Pomerania-Rügen rural districts were between 850 and 1,250 euros per square meter for example, they were between 1,950 and 2,420 euros per square meter for condominiums. With comparable price levels for houses and condominiums in rural districts in Saxony, Saxony-Anhalt, and parts of Thuringia, where both types of real estate have the lowest asking prices, or in and around Munich, which has the highest prices, the situation was different.

Demographic shift already showing an effect

In particular, low asking prices in large parts of eastern Germany indicate already present demand-side effects (e.g., of the demographic shift) on real estate prices. For example, the median asking price for single- and two-family homes in the Harz rural district (Saxony-Anhalt) was 624 euros per square meter of living space in 2015, less than half of the overall German median of 1,580 euros per square meter.[14] According to the information in the Bertelsmann Foundation's *Wegweiser Kommune*, a website with population statistics and forecasts for municipalities, in 2014 the average age in that rural district was 48.4 and the dependency quotient 44.2 percent. Since 2011, the population has fallen by 2.5 percent.

On the other hand, the population of the Biberach rural district (Baden-Württemberg) in 2014 was 1.6 percent higher than it was in 2011.[15] There, the average age was 42.3 and the dependency quotient, 29.8 percent. At the same time, the median asking price for single- and two-family homes was 1,633 euros per square meter of living space in 2015, and therefore above the overall German median.

Many rural districts will have to face falling real estate prices

Due to the overall decrease in population forecast for Germany and the current trend toward urbanization,[16] we can expect that real estate prices will continue to polarize. For example, the Federal Institute for Research on Building, Urban Affairs and Spatial Development (*Bundesinstitut für Bau-, Stadt- und Raumforschung*, BBSR) presumes that due to the demographic shift, the number of vacant apartments will continue to increase in the future: "Above all, in shrinking rural areas—and particularly for multi-story apartment buildings. According to calculations for the BBSR residential market forecast for 2030, 15 percent of rural districts can count on a very high risk of vacancies for rental apartments by 2030 and an addi-

13 In the following report, we provide median prices only since unlike arithmetic means, they have the advantage of being robust against outliers at the upper end of the distribution.

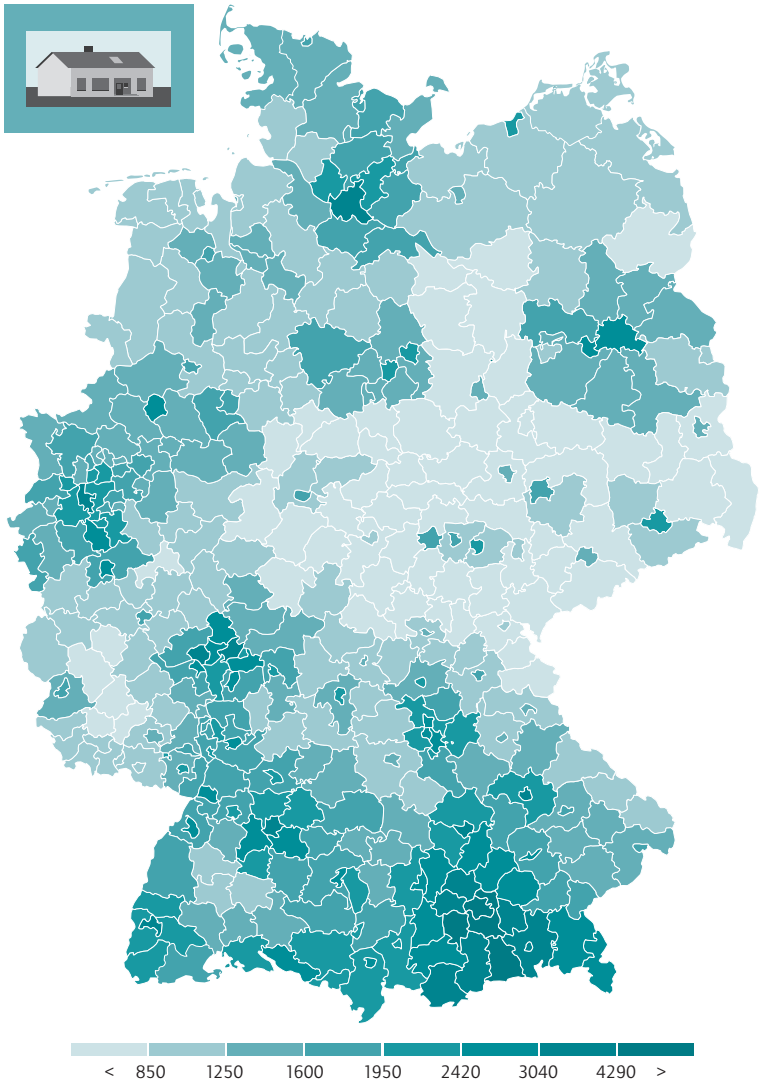
14 The state of Saxony-Anhalt has experienced the highest decline in population since German reunification. According to information from the German Federal Statistical Office, the population plunged by almost 22 percent between 1991 and 2015. The Harz rural district's population declined by just under 23 percent.

15 Alongside Bavaria, at just under nine percent the resident population of Baden-Württemberg has climbed most sharply since German reunification. In the Biberach rural district alone, growth between the end of 1990 and 2015 was almost 20 percent.

16 In the period 2004–2013, the domestic migration balance (inward movement minus outward movement across municipal borders within Germany) was consistently positive for the seven largest cities in Germany. This means that in those cities, the population grew as a result of migration. However, in 2014 this established trend not only came to a stop, but the corresponding migration balance was actually negative. See Konstantin A. Kholodilin, "Wanderungen in die Metropolen Deutschlands," *Der Landkreis* 87 1/2 (2917): 44–47.

Figure 1

Real Estate Prices in German rural and urban districts (2015)– Single- and Two-Family Homes
Median price per m² in Euro



Source: empirica-systeme market data.

tional 18 percent on a high risk of vacancies."[17] On the municipal level, this could lead to a drop in price of up to eight percent for single-family houses.[18]

Population forecasts assume that in large parts of eastern Germany, the overall population will decline by 2030—in some regions at a rate in the two-digit range.[19] In western Germany on the contrary, the population of most rural districts is expected to remain virtually constant. Using the information from the Bertelsmann Foundation projections on the population change in rural and urban districts up to 2030 and estimates of the change in real estate prices between 2012 and 2015 from the empirica-systeme market data, it is possible to estimate the development of real estate prices by district until 2030. As with all model calculations, our estimate is subject to uncertainty. However, according to our core specification, we find that real estate price polarization among regions in Germany will increase. The individual results presented vary depending on the model assumptions with regard to future growth of the job market or interest rate level, for example (see Box).

The results of the underlying regression model show the expected effect for all age groups considered, namely, that a change in population is positively correlated to the asking prices of real estate. The effect is strongest for the 45–64 age group. The additional explanatory variables, such as interest rate and regional unemployment rate, also show significant effects. As the regional unemployment rate increases, regional real estate prices fall.

The polarization of real estate prices across rural and urban districts can be described using an aggregate measure. In this report, we use a polarization index based on the work of Duclos, Esteban, and Ray.[20] The index increases when the tails of the real estate price distribution gain in importance and at the same time, the mean that dominates the distribution's center decreases in importance. A significant increase in polarization is already apparent in the period used for the model calculation (see Table 2). Up to 2030, we can assume a significant rise in the polarization of real estate prices for both condominiums and single- and two-family homes.

In eastern Germany, projected real estate prices will develop more weakly than those in the western part of the country (see Figures 3 and 4). In some rural districts of Brandenburg, Saxony, Saxony-Anhalt, and Mecklenburg-Western Pomerania, prices for single- and two-family homes are likely to fall by over 25 percent. This will probably be the case in 100 of the 402 rural and urban

17 Federal Institute for Research on Building, Urban Affairs and Spatial Development, "Wohnungsleerstände," (Expert contribution, BBSR, Bonn, 2016). Available online.

18 See Oliver Lerbs and Markus Teske, "The House Price-Vacancy Curve," *ZEW Discussion Paper* no. 16-082, 2016. (available online).

19 The BBSR also forecasts an overall decline in demand for living space in eastern Germany. See Federal Institute for Research on Building, Urban Affairs and Spatial Development, "Entwicklung der Bevölkerung und Haushalte 2015 bis 2030," (Map, BBSR, Bonn, 2015). Available online. Of course a positive immigration balance could disrupt this trend.

20 See Jean-Yves Duclos, Joan Esteban, and Debraj Ray, "Polarization: Concepts, Measurement, Estimation," *Econometrica* 72(6) (2004): 1737–1772.

Table 2

Polarization indices of residential properties

	l	Condominiums	u	l	Single- and two-familiy homes	u
2012	0.155	0.163	0.170	0.166	0.174	0.181
2015	0.170	0.178	0.186	0.180	0.188	0.196
2030	0.224	0.234	0.244	0.216	0.227	0.238

Values for 2030 derived using forecasting model by Duclos, Esteban, and Ray (2003). l/u: lower and upper bound of a 95 % confidence interval.

Source: empirica-systeme market data and own projections of values of owner-occupied property until 2030, private households.

Polarization of asking prices of residential properties is expected to increase.

districts of Germany. In and around urban centers, however, the projection indicates that the rise in prices will continue. This is the result of rising living space demand on the one hand,[21] and domestic migration to urban centers, which should lead to a population increase in these districts, on the other hand. We also project an increase in real estate prices of over 25 percent for single- and two-family homes in 32 rural and urban districts.

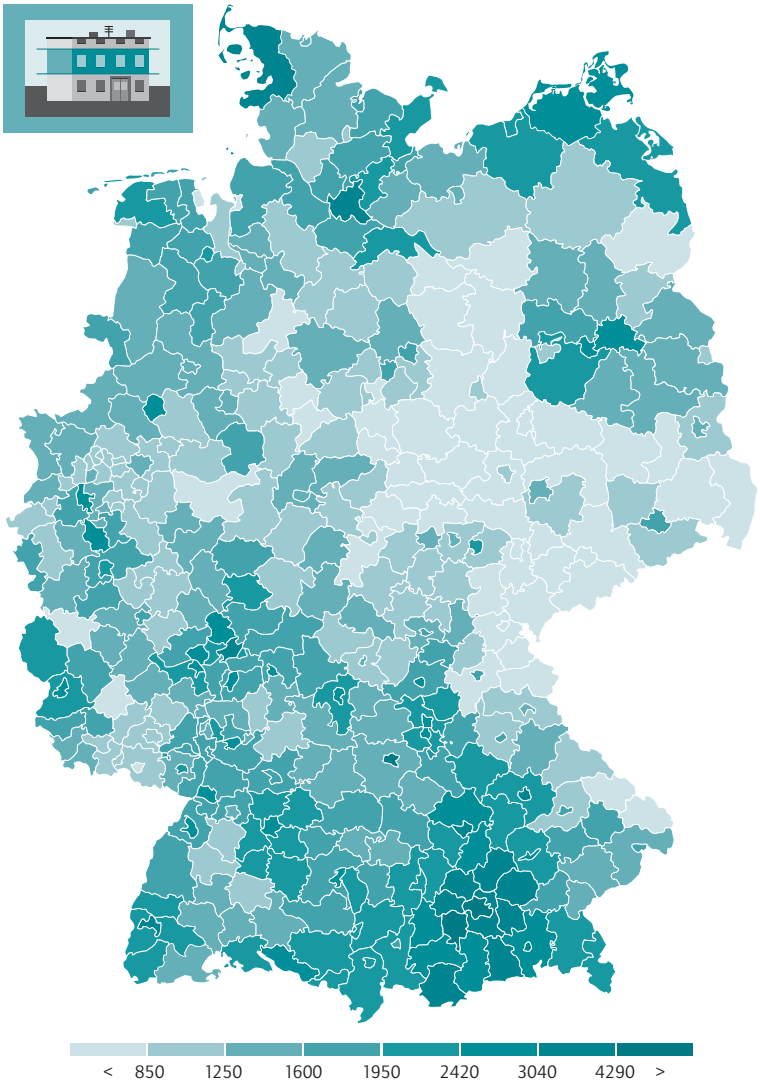
In the short and medium terms, the prices of condominiums react more strongly to changes in demand than the prices of single- and two-family homes.[22] In 133 districts (33 percent), owners will face a price decline of over 25 percent. At the same time, a significant price increase will be more strongly concentrated in urban centers and less so in the suburbs, unlike the case of single- and two-family homes. For over 50 rural districts (14 percent) the price increase in this case is projected to be over 25 percent on average.

To illustrate this, we present the Harz and Biberach rural districts as examples again. For the Harz rural district, *Wegweiser Kommune* presumes a decline in population by 2030 of around 15 percent (34,000 persons) compared to 2012. According to the model calculation used here, the price per square meter of living space for single- and two-family homes in Harz should fall by around 275 euros per square meter (40 percent).

Figure 2

Real Estate Prices in German rural and urban districts (2015)– Condominiums

Median price per m² in Euro



Source: empirica-systeme market data.

The situation is different in the Biberach rural district. There, the population is expected to grow by about two percent by 2030. The prices of single- and two-family homes are projected to rise by just under 150 euros per square meter of living space (almost ten percent).

21 Federal Institute for Research on Building, Urban Affairs and Spatial Development, "Entwicklung der Wohnflächennachfrage insgesamt bis 2030," (Map, BBSR, Bonn, 2015). (available online).

22 This finding is confirmed by other studies, which also indicate that different segments of the real estate market could react differently to changes in demographics. See Norbert Hiller and Oliver W. Lerbs, "Aging and Urban House Prices," *ZEW Discussion Paper* no. 15-024 (2015). (available online).

Box

Data and methods

Our projection of real estate prices by rural districts and urban districts in Germany up to 2030 is primarily based on three data sources. They are: the Socio-Economic Panel (SOEP) data, representative of the population and current to 2015, real estate price information for 2012–2015 from the *empirica-systeme* market data,[1] which is divided into single- and two-family homes and condominiums, and information on future population growth from the Bertelsmann Foundation's *Wegweiser Kommune*.

Our information on population growth up to 2030 (differentiated among six age groups) in 295 rural districts and 105 urban districts is based on a population projection by Bertelsmann Foundation, which in turn bases its assumptions on the birth rates and life expectancies in the 12th population projection, coordinated by the German Federal Statistical Office (*Statistisches Bundesamt*) and the Federal State Statistical Offices (*Statistische Landesämter*).[2] Variant L1—a continued moderate rise in life expectancy and constant birth rate—underlies the data in our report. We assume a net migration rate to Germany of 400,000 persons in 2013 that will decline to 200,000 persons per year by 2020. The population extrapolation is based on the overall population as of December 12, 2012, which takes the results of the 2011 census into account.

We use a two-stage regression model for our estimates. First, a regression model describes the median price per square meter of living space for real estate—for single- and two-family homes and condominiums separately—depending on the existing population in six different age groups, the regional unemployment rate, the regional GDP, the average interest rate on mortgages, information on the stock and scope of new buildings, and region-specific fixed effects.

In most earlier studies, the effect of population aging was estimated separately from the effect of population growth. Studies influenced by Mankiw and Weil (1989) first estimate living space usage specific to age cohort and, based on the results, calculate aggregate living space demand—the latter's impact on real estate prices is estimated next. DiPasquale and Wheaton's approach (1992) has influenced researchers to derive the model's regressors from a stock-flow model. Typically, the model takes variables into consideration that separate the effect of agglomeration (population density) from scarcity ratios (living space per resident) and from the effects of population composition (proportion of young vs. old residents) and control for unemployment and income growth. These models allow for analytical dissection of the demographic shift's effects on real estate prices.

The regression model used in our study is specified much more simply. It is related to the ad hoc model formulated by Maenning and Dust (2008), who used the logarithmized prices of average residential real estate in different regions in order to estimate the direct effect of population changes on real estate prices.[3] Unlike Maenning and Dust (2008), we use logarithmized median asking prices in rural districts and urban districts as dependent variables. Also unlike Maenning and Dust (2008),[4] we do not employ interaction effects to identify population shrinkage or population growth. Instead, our study only takes the number of residents within a rural district (divided into different age groups) into consideration. All other effects that are usually controlled for, such as level of agglomeration or scarcity on the housing market, are captured as region-specific fixed effects. In this specification, the influence of age cannot be clearly separated from the effect of population change or changes in agglomeration. However, because we are using this model for forecasting and not for analytical purposes, we accept this imprecision.

1 (available online).

2 The results of the projection calculations can be retrieved by municipality, gender, and age. (available online).

3 The special significance of demographic trends for real estate prices has been documented in a variety of studies. See for example, N. Gregory Mankiw and David N. Weil, "The baby boom, the baby bust, and the housing market," *Regional Science and Urban Economics* 19(2) (1989): 235–258; Elöd Takáts, "Aging and House Prices," *Journal of Housing Economics* 21(2) (2012): 131–141; or Yumi Saita, Chihiro Shimizu and Tsutomu Watanabe, "Aging and real estate prices: evidence from Japanese and US regional data," *International Journal of Housing Markets and Analysis* 9(1) (2016): 66–87.

4 Wolfgang Maenning and Lisa Dust, "Shrinking and growing metropolitan areas asymmetric real estate price reactions? The case of German single-family houses," *Regional Science and Urban Economics* 38(1) (2008): 63–69.

One shortcoming is that due to data restrictions, the first-stage regression is based on the rather brief period from 2012 to 2015. A strong real estate market upswing occurred in that period. A priori, it is not clear whether this under- or overestimates the effects of population changes.[5] In order to determine the average long-term effect, an observation period of between nine and 12 years would be required for Germany in order to cover an entire market cycle.[6] Similar to Dust and Maenning (2008), since we do not explicitly differentiate between price reactions in already depopulating and currently growing regions, the prices simulated here are not precisely in focus for each different market. For this reason and also due to the imponderable nature of population projections, our simulation results should be understood as qualitative—that is, less than precise—estimates of the effects.

We use the estimated regression coefficients to project the price per square meter of real estate up to 2030. In the process, our main source of information is the development of the population structure for rural districts and urban districts based on information from the Bertelsmann Foundation's population projections.[7] We hold the region-specific unemployment rate constant and after 2016, the growth of region-specific GDP is also assumed to be constant at two percent. We also presume that the interest rate on mortgages will rise slightly and new construction activity would react with a bit of delay to the changes in population after 2016. The regression models do not explicitly include aspects such as changes in household size, home ownership rates, and changes in the investment of private wealth due to sinking real estate prices. And with the variables at our disposal, we are not able to distinguish between a change in living space demand caused by aging and a purely demographic aging effect.

These estimates also contain further restrictions that must be considered when interpreting the results. Since real estate prices were only available for single- and two-family homes and condominiums, we are not able to make statements regarding the overall real estate market, which also encompasses rented multi-family buildings as investment properties and other buildings, such as undeveloped property or commercial real estate. And the information from the empirica-systeme market data reflects asking prices, not actual selling prices.[8] This should have only a slight influence on the estimate results because the asking price trend in the period 2012–2015 probably paralleled that of market prices.

The projections are subject to uncertainty as they rest on normative assumptions. For example, higher or lower immigration would result in rising or falling demand, generating higher or lower market prices in turn. We did not make any explicit assumptions about changes in demand for living space. Instead, we included this aspect indirectly via the change in age structure. Here it is noteworthy that as the population ages, demand for rental property instead of ownership can rise. In this case, the model calculations in this report would be underestimates. The scenario we use assumes average new construction activity and an average interest rate of 2.5 percent.

5 In order to improve the validity of the estimate, a longer period would be helpful—in particular, for taking housing price cycles more fully into consideration. However, data for a longer period were not available. The period we selected does have advantages, including the fact that exogenous effects—such as the short-term effects of the financial crisis in 2008–2009 on real estate prices—were unable to influence the estimates. Earlier studies such as that of Maenning and Dust (2008) used only cross-sectional data, which would overestimate negative effects of a projection in the case of population shrinkage (see Just, *Demografie und Immobilien*.).

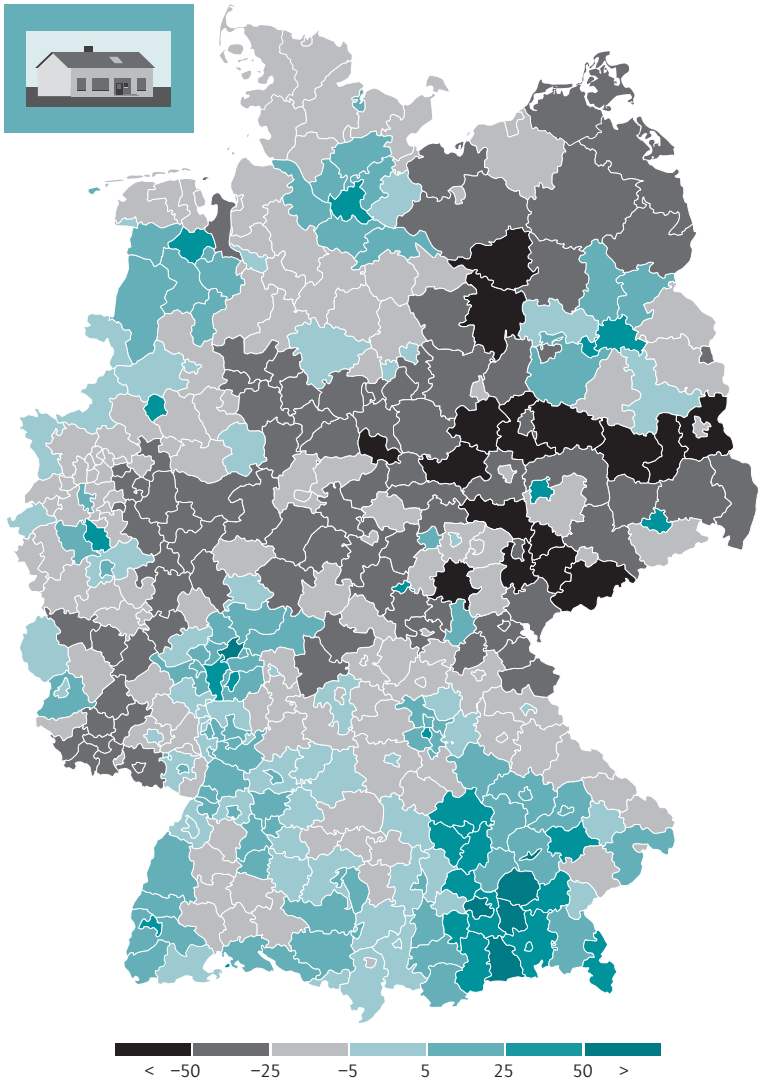
6 Philippe Bracke, "How long do housing cycles last? A duration analysis for 19 OECD countries," *Journal of Housing Economics* 22(3) (2013): 213–230.

7 The model calculation for condominiums may provide an exaggerated picture here. Condominiums were somewhat overvalued during the observation period, while single-family homes did not deviate from their fundamental value with any statistical significance (see Florian Kajuth, Thomas A. Knetsch, and Nicolas Pinkwart, "Assessing house prices in Germany: evidence from an estimated stock-flow model using regional data," *Deutsche Bundesbank Discussion Paper* no. 46/2013 (2013). (available online).

8 A comparison of the asking and actual selling prices for selected German states indicates that asking prices were overestimated by around seven to eight percent on average. See Bernhard Faller, et al., "Möglichkeiten zur Bildung eines Regionalindex Wohnkosten unter Verwendung von Angebotsdaten," *RatSWD Research Note* 34 (2009). Available online. (Accessed: May 31, 2017) and Ralph Henger and Michael Voigtländer, "Transaktions- und Angebotsdaten von Wohnimmobilien—eine Analyse für Hamburg," *IW Trends* 4 (2014): 85–100. (available online).

Figure 3

Real estate development in Germany—Single- and Two-Family Homes
Price changes in percent, 2015–2030



Source: empirica-systeme market data and own projections of values of owner-occupied property until 2030, private households.

Table 3

Mean value and distribution of owner-occupied properties

	Owner-occupied property		For informational purposes: household net worth
	Mean in Euro	Gini coefficient	Gini coefficient
2012	214,076	0.36	0.74
2015	244,706	0.37	0.74
2020	246,186	0.39	0.74
2025	247,899	0.42	0.75
2030	243,968	0.44	0.76

Source: SOEPv32 and own projections of the values of owner-occupied properties until 2030, private households.

Inequality of the distribution of owner-occupied property will increase until 2030.

Impact on the distribution of wealth

We combined the price developments projected until 2030 with housing data from the SOEP[23] in order to gauge the expected average value of owner-occupied real estate and make meaningful statements about the distribution of wealth. The average gross value of owner-occupied real estate—without deducting any liabilities—was around 215,000 euros in 2012, according to the SOEP data (see Table 3). We were able to track the rise in real estate prices currently observable in Germany for the period 2012–2015. According to the SOEP data and considering the price trend from the empirica-systeme market data, there was an increase in gross value of 14 percent to an average value of 245,000 euros. Based on the model calculation, all things being equal the average value of owner-occupied real estate will not change by 2030.[24] This is an aggregate result of different regional trends: the weak price development in shrinking regions will balance out price increases in urban centers. This is also reflected in the inequality of the value of owner-occupied real estate. Whereas the Gini index[25] for this type of wealth was 0.36 in 2012, based on the model calculation and again all other things being equal, it will rise to 0.44 by 2030.

Holding all other components of wealth constant and observing the stand-alone effect of real estate prices for owner-occupied real estate on the inequality of net household wealth, we find that inequality of wealth would

23 SOEP is a recurring annual representative survey of private households. It began in West Germany in 1984 and expanded its scope to include the new federal states in 1990, see Gert G. Wagner et al., "Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland—Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender)," *AStA Wirtschafts- und Sozialstatistisches Archiv 2* no. 4 (2008): 301–328.

24 However, it must be taken into consideration that we estimated the impact of the demographic shift alone on the prices of owner-occupied real estate here. We did not include other possible effects caused by a change in wealth portfolio.

25 Also see the term *Gini-Koeffizient* in the DIW Berlin glossary (available online in German only).

increase by at least two percent by 2030 as compared to 2012 (0.74 to 0.76).

Conclusion

Owner-occupied real estate is the quantitatively most important component of wealth in Germany. The model calculation presented here indicates increasing polarization of the prices of owner-occupied real estate in Germany by 2030. However, this also means that in a significant number of rural districts, investing in real estate should be less appealing from the economic viewpoint due to falling prices. Moreover, with increasing polarization of real estate prices wealth inequality is bound to increase as well.

Christian Westermeier is Doctoral Student in the Research Infrastructure Socio-Economic Panel (SOEP) at DIW Berlin | cwestermeier@diw.de

Markus M. Grabka is a Research Associate in the Research Infrastructure Socio-Economic Panel (SOEP) at DIW Berlin | mgrabka@diw.de

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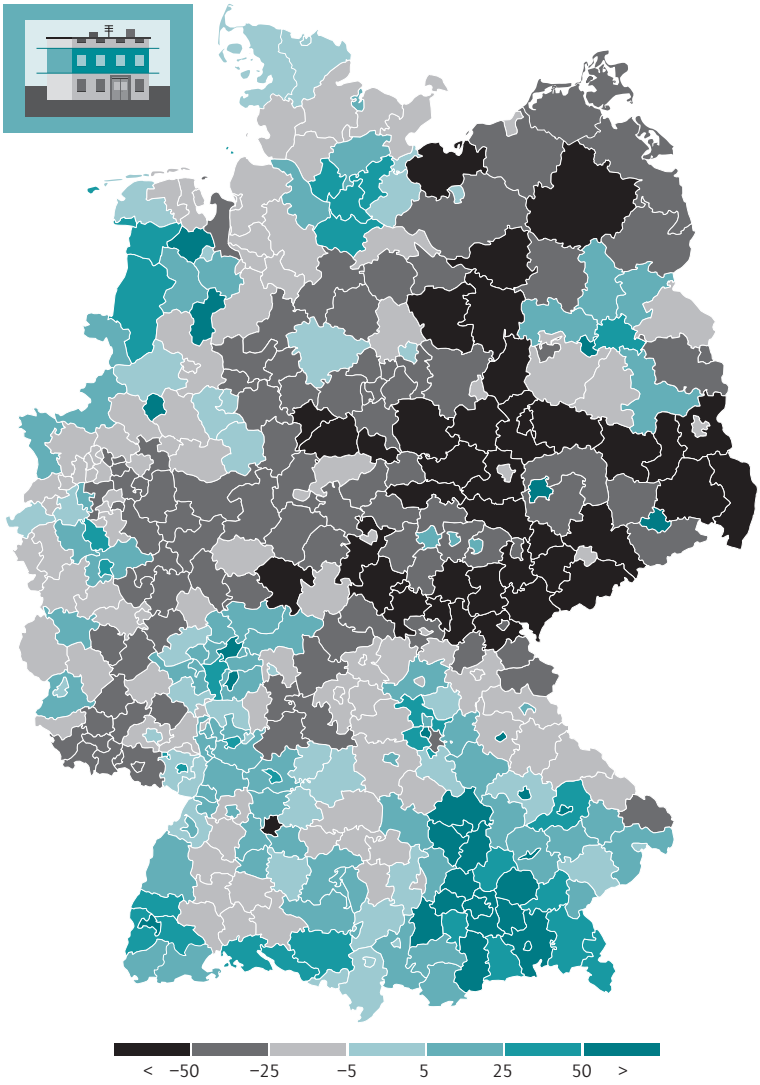
Keywords: Demographic change, property prices, projection, SOEP, Empirica-Systeme Marktdaten

Figure 4

Real estate development in Germany—Condominiums
Price changes in percent, 2015–2030



Source: empirica-systeme market data and own projections of values of owner-occupied property until 2030, private households.

DIW BERLIN

DIW Berlin — Deutsches Institut
für Wirtschaftsforschung e. V.
Mohrenstraße 58, 10117 Berlin
T +49 30 897 89 -0
F +49 30 897 89 -200

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