DIW Weekly Report 30+31 2018

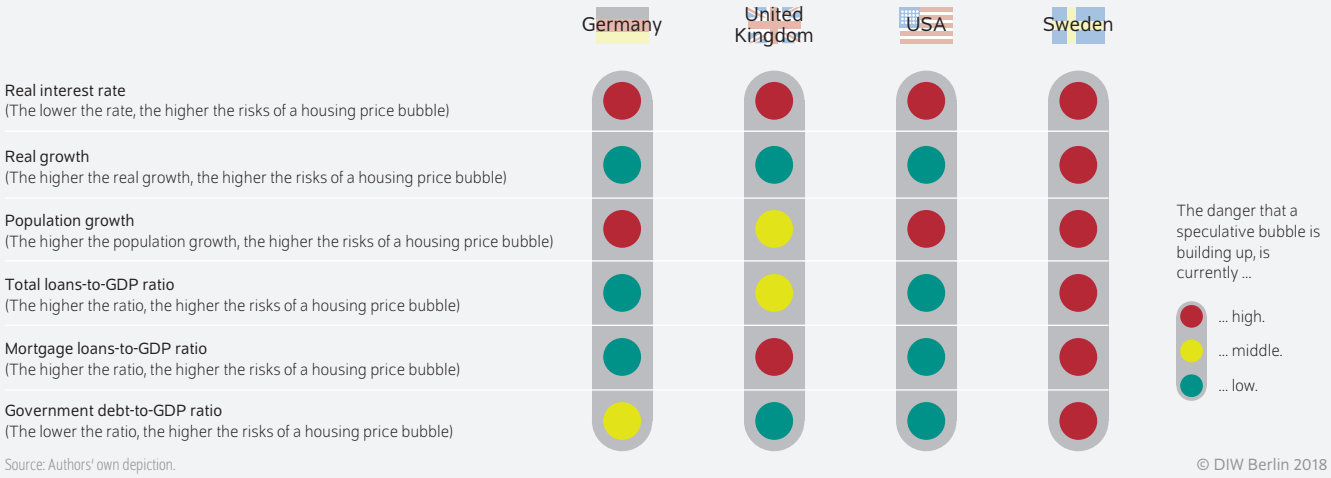
AT A GLANCE

Signs of new housing bubble in many OECD countries – lower risk in Germany

By Konstantin A. Kholodilin and Claus Michelsen

- Ten years after the financial and economic crisis, real estate prices are once again rising strongly worldwide
- Study based on OECD data on the development of real estate prices in 20 countries; signs of speculative bubbles in eight countries found, among them Sweden and the United Kingdom
- Price-to-rent ratio also cause for concern in major German cities, but nationwide price bubble unlikely
- Relatively low level of private household debt lowers risk of housing bubble
- Need for action as no suitable precautionary measures are in place; capping the loan-to-household income ratio would be an especially desirable measure

Currently, low interest rates and relatively high population growth are the only signs of a speculative bubble building up in Germany



Source: Authors' own depiction.

FROM THE AUTHORS

"The danger of a new real estate bubble is real as the regulation of the financial market has not developed as much as hoped and as was promised after the financial crisis in 2007 and 2008."

— Claus Michelsen, survey author —

MEDIATHEK

Audio Interview with Claus Michelsen (in German)
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Signs of new housing bubble in many OECD countries – lower risk in Germany

By Konstantin A. Kholodilin and Claus Michelsen

ABSTRACT

Ten years after the worldwide financial and economic crisis was triggered by the American real estate market, real estate prices are rising around the globe. Concerns about a new housing bubble are growing. The present report based on OECD data for 20 countries demonstrates that this concern is not unwarranted. In eight countries, including the United Kingdom and the USA, the evolution of real estate prices indicates that speculative investment behavior is at work. The continued high level of private household debt and low interest rates are evidence of a new bubble in those countries. There are also signs of this in Germany, but primarily in the country's largest cities. The risk of a nationwide housing price bubble is assumed to be lower in Germany due to the country's significantly lower level of private household debt. But since no suitable precautionary measures are in place, there is a need for action. Although it is now possible to cap lending, many market observers feel that the existing instruments could be reinforced. Capping the loan-to-household income ratio would be an especially desirable measure to prevent possible negative developments.

Ten years ago, the American investment bank Lehman Brothers went bankrupt, triggering one of the biggest economic crises. The bank, which was heavily involved in financing the housing bubble in the U.S. and insuring loan default risks, posted a loss of around 3.3 billion dollars in the summer of 2008. The short-term capital increase of around nine billion dollars in the spring of that year did not help to keep the bank liquid. The U.S. government at the time decided to take action in order to "save" the mortgage loan institutions, Fannie Mae and Freddie Mac, but refused to help the next in line and Lehman Brothers had to file bankruptcy. This fateful step triggered a chain reaction that shook the global financial architecture to its foundations, and the world spiraled into a deep recession.[1]

The chain of events was set in motion when the housing bubble burst in the United States. In addition to very low interest rates, the American president at that time, George W. Bush, had adopted policies that heated up the housing market. Real estate purchasers received subsidies and tax advantages and the market for mortgage loans was liberalized. In this environment, real estate owners were faced with almost no financial risk. If they could no longer make their mortgage payments, all they had to do was assign the house to the bank for further use. Private insolvency had no consequences for delinquent borrowers, which ultimately led to significantly lower risk aversion among private households.[2] Because the mortgage debts were bundled and sold as derivatives, many investors incorrectly judged the risk associated with these securities, which as a result eventually found their way onto the balance sheets of major commercial banks, including those of Germany. In particular, the books of regional banks such as HSH Nordbank and Sachsen LB were under considerable stress.

The crisis years 2008 and 2009 bear painful witness to the fact that such distortions in the financial markets can have

1 See Frederic S. Mishkin, "Over the cliff: From the subprime to the global financial crisis," *Journal of Economic Perspectives*, 25 (1) (2011): 49–70.

2 See Bj rnar Karlsen Kivedal, "Testing for rational bubbles in the US housing market," *Journal of Macroeconomics*, 38 (2013); 369–381; and Steven P. Clark and T. Daniel Coggin, "Was there a US house price bubble? An econometric analysis using national and regional panel data," *The Quarterly Review of Economics and Finance*, 51(2) (2011): 189–200.

an enormous impact on the real economy. In the U.S., GDP fell by 2.8 percent in 2009. In the United Kingdom it fell by 4.3 percent and in Germany the drop was 5.1 percent. The slump had several contributing factors. On the one hand, the financial crisis led to a credit crunch. Banks no longer lent each other money since confidence in the financial solvency of commercial banks had taken a severe battering. Nobody knew exactly which latent risks were on whose balance sheets – the interbank market collapsed almost completely. Companies in turn found it difficult to access new capital. In addition, rising asset prices are the so-called "financial accelerators." Higher asset values allow more loans to be granted to companies or permit households to demand more consumer goods at a specific level of savings. A sudden fall of asset prices leads to a declining demand for investment goods and shrinking private consumption.[3]

Real estate prices rising again around the world

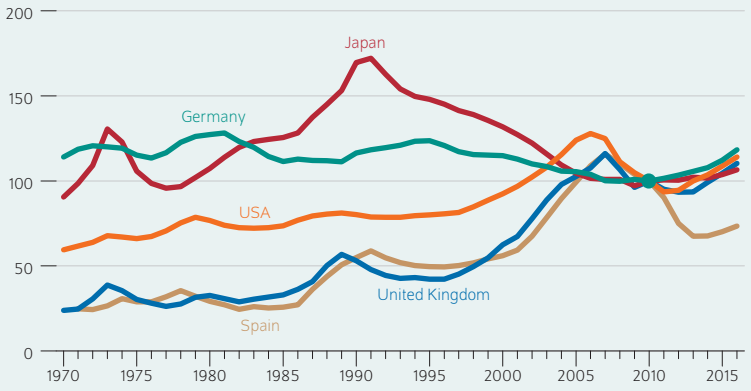
Ten years after the financial crisis, the global real estate market has recovered. In recent years, prices for houses and condominiums have risen, sometimes significantly in many countries. This is why more and more warnings about a new price bubble are mounting.[4] In Germany, the issue of speculative price development is the subject of heated debate. For example, Deutsche Bundesbank regularly issues warnings about overvaluation in the country's larger cities, and the latest report on the world economic outlook by the International Monetary Fund sees signs of a housing bubble.[5]

Germany, Japan, Spain, the United Kingdom, and the U.S. are exemplary of the global price trend. According to information from the Organisation for Economic Co-operation and Development (OECD), real estate prices in the United States are close to their pre-crisis level of 2006. In the UK, the housing market has also recovered and offset the losses of the financial crisis. In countries with major economic problems, the price dynamics have also gained momentum. For example, real estate prices in Japan and Spain bottomed out in 2013 and have been rising sharply since then. After many years in which real estate lost value in real terms, the price trend has also been on an upswing in Germany since 2010. Despite a steady increase, the real housing prices in Germany have only reached the level of the early 1990s (Figure 1).

Monetary policy around the globe has been very expansive, likely supporting the price trend to a great extent. In reaction to the worldwide financial and economic crisis, almost all central banks have lowered their prime interest rate to

Figure 1

Evolution of real housing prices in selected OECD countries
In percent, 2010=100

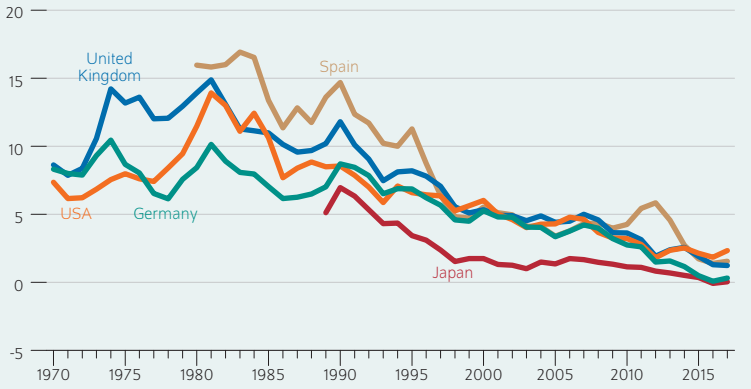


Source: Organisation for Economic Cooperation and Development (OECD).

Since the financial and economic crisis, the real housing prices have increased substantially again.

Figure 2

Yields of the ten-year government bonds in selected OECD countries
In percent



Source: Organisation for Economic Cooperation and Development (OECD).

Currently, interest rates are at historically low levels.

3 See Matteio Iacoviello, "House prices, borrowing constraints, and monetary policy in the business cycle," *American Economic Review*, 95(3) (2005): 739–764; and Ben Bernanke, Mark Gertler, and Simon Gilchrist, "The financial accelerator in a quantitative business cycle framework," *Handbook of Macroeconomics*, 1 (1999): 1341–1393.

4 See European Systemic Risk Board, Vulnerabilities in the EU residential real estate sector (2016). (Available online, accessed July 10, 2018; This applies to all other online sources in this report unless stated otherwise.); International Monetary Fund, "Global House Prices: Time to Worry Again?" *IMF Blog*, (2016) (available online); and Markus Brunnermeier and Isabel Schnabel, "Bubbles and central banks: Historical perspectives," *CEPR Discussion Paper*, 10528 (2015) (available online).

5 See Deutsche Bundesbank, Monthly Report February 2018 (2018) (available online); and International Monetary Fund, Germany Staff Report for the 2018 Article IV Consultation (2018) (available online).

historically low levels. Returns on sovereign bonds plunged as a consequence (Figure 2), and the financing of real estate investment became much cheaper. The major central banks have begun to phase out ultra-loose monetary policy. In the U.S., the Federal Reserve System has already raised the interest rate several times. The European Central Bank announced that it would end its asset program of purchasing bonds at the end of 2018.[6]

At the same time, in many countries private household debt has fallen dramatically since the financial crisis. According to the OECD, the burden of debt in relation to household disposable income decreased from 145 percent to 110 percent in the U.S. And Spanish households shed even more debt, going from 155 percent to 118 percent. The debt burden lightened in Japan and Germany as well, though not quite as much (Figure 3).

GDP bounced quickly back after the crisis between 2008 and 2010 in many countries, playing a role alongside household debt relief. For example, Germany only recorded a downturn in the growth of per capita income in 2009. In Spain on the contrary, income plateaued or fell well through 2013 (Figure 4).

Housing bubbles represent major risk

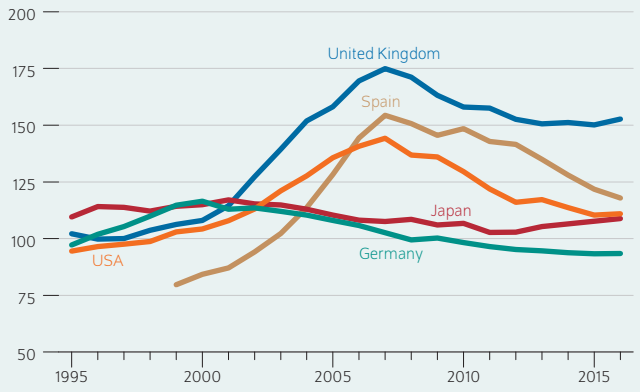
In view of the breadth and dynamism of real estate price increases, more and more people are voicing concern that there could be overvaluation in the real estate market, or that this is already a reality. Most consider two risks as being synonymous, although a distinction should be made between risk resulting from the low interest rate phase and risk caused by speculative investment behavior.

The aim of the unconventional monetary policy is to stimulate additional investment and in turn, strengthen aggregate demand. Low interest rates boost the demand for real estate, whose price jumps due to its short-term supply rigidity. Calculations for Germany showed that a large portion of the price increase since 2010 can be attributed to the drop in financing costs.[7] The result is risk for both banks and private households. If the prime interest rate suddenly and unexpectedly increases, demand for real estate could plunge and ultimately put pressure on prices. Households that have not adequately considered a scenario like this in their financing could be forced to sell their property. When the market price of the property is lower than the mortgage in the interim, the household is overindebted. In Germany, these risks are reduced by comparatively long-term fixation of interest rates. However, such a long fixation could become a problem for banks if cheap credit has to be refinanced at a higher cost. That is why the degree of indebtedness and the evolution of credit supply are important magnitudes that should be considered when evaluating the risks.

Figure 3

Indebtedness of private households in selected OECD countries

In percent of disposable income



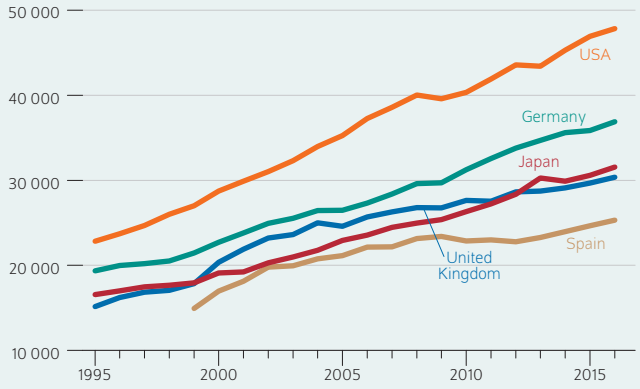
Source: Organisation for Economic Cooperation and Development (OECD).

Since the financial crisis, private households in many countries have noticeably decreased their indebtedness.

Figure 4

Per capita income in selected OECD countries

In USD, adjusted for purchasing power parity



Source: Organisation for Economic Cooperation and Development (OECD).

In many countries, the per capita income has rapidly increased.

6 See European Central Bank, "Monetary policy decisions," press release, June 14, 2018, (available online).

7 See Michael Schier and Michael Voigtländer, "Ist die Entwicklung am deutschen Wohnungsmarkt noch fundamental gerechtfertigt?" *IW-Trends*, 1/2015 (2015) (available online).

Box 1

Identifying speculative price bubbles

Empirical tests for speculative real estate price bubbles are based on two assumptions: the price is exclusively determined by the present value of future rental income and market participants are fully informed and rational. In other words, housing prices are coupled to rental price trends in the long term. Since the assumption implies that all known information immediately affects valuation, the relationship between prices and rents follows a "random walk," meaning that it does not systematically deviate from the fundamentally justified value. In this approach, if prices are not a perfect reflection of returns, the only explanation for the price deviations is speculation. This leads to expected future increases in real estate prices co-determining price trends alongside the expected trend of real demand. If such estimates become the consensus of market participants, a speculative bubble builds up in which prices are increasingly decoupled from demand.

The PSY test was developed by Phillips, Shi, and Yu to identify multiple speculative price bubbles.[1] By applying this test to quarterly data series on the housing price-to-rent ratio, we can determine the turning points of housing price cycles. The PSY test is based on a rolling regression model:

$$\Delta y_t = \hat{\alpha}_{r_1,r_2} + \hat{\beta}_{r_1,r_2} y_{t-1} + \sum_{i=1}^{k} \hat{\varphi}^{i}_{r_1,r_2} \Delta y_{t-i} + \hat{\varepsilon}_t,$$

where y_t is the housing price-to-rent ratio, k is the number of time delays; α, β, and φ are the parameters to be estimated, and ε_t is the error term. The sample for regressions with a rolling window begins with the r_1^{th} fraction and ends at the r_2^{th} fraction of the full sample (T). $r_2 = r_1 + r_w$ and $r_w > 0$ is the fractional size of the window.

The test's null hypothesis is a random walk in which $\beta_{r1,r2} = 1$, is tested against the alternative hypothesis of an explosive development to which $|\beta_{r1,r2}| > 1$ applies. Based on the regression, an augmented Dicky Fuller test (ADF) is calculated for the sequence of forward-expanding samples. The window size r_w expands from r_0 to 1, in which r_0 is the smallest and 1 the largest fraction of window width and the latter is the total sample size. The starting point of the sequence of the samples r_1 is fixed at 0. The end of each sample (r_2) equals r_w and varies between r_0 and 1. The PSY test is the supremum of the following sequence of ADF statistics:

$$SADF(r_0) = \sup_{r_2 \in [r_0, 1]} ADF_0^{r_2},$$

in which $ADF_0^{r_2}$ is the ADF statistic for a sample between 0 and r_2. The asymptotic critical values for this test were calculated using the Monte Carlo simulation.[2]

A major advantage of the PSY test is that it can be used to identify multiple bubbles in a time series. Other tests[3] focus on single speculative bubbles. In the approach used in the present study, each country is analyzed separately. A *p*-value of 0.9 is used as the critical value.

1 See Peter C. B. Phillips et al., "Testing for multiple bubbles."

2 See Peter C. B. Phillips et al., "Testing for multiple bubbles."

3 See, for example, Homm and Breitung, "Testing for speculative bubbles."; and Peter C. B. Phillips et al., "Testing for multiple bubbles."

Another risk is the result of speculative price overvaluations. If real estate is only traded because investors expect prices to continue to rise in the future in the absence of any changes in other conditions, they are often willing to pay a speculative price premium in the present.[8] If real estate prices do not rise as expected, the speculative bubble bursts and can have the negative consequences described above.

Speculative bubbles are difficult to identify

Central banks can manage an increase in capital market interest rates, but their influence on speculative prices is very limited. Thus, there is all the more reason to identify this type of activity early on using one of the various methods available. The simplest approach is to monitor various indicators and define a threshold, for example, for granting new loans that may not be exceeded. Central banks frequently use this type of indicator method.[9] Another option is to rely on econometric methods for defining a more or less justified market price based on the level of disposable income, housing supply, and the interest rate, among other variables. Deviations from the model-based real estate value are interpreted as speculative price under- or overvaluations.[10]

A third alternative relies on theoretically motivated procedures with a methodological focus on the analysis of price time series. This approach is based on the assumption that, given perfect rationality and complete information of those involved, real estate prices are solely determined by the sum of the rental revenues to be earned in the future. Accordingly, housing rents and prices must be in a stable relationship to each other.[11] Systematic deviations indicate speculative investment behavior and such a pattern can be determined using statistical methods.[12]

8 See Sean D. Campbell et al., "What moves housing markets: A variance decomposition of the rent–price ratio," *Journal of Urban Economics*, 66(2) (2009): 90–102.

9 See Luca Agnello and Ludger Schuknecht, "Booms and busts in housing markets: Determinants and implications," *Journal of Urban Economics*, 20(3) (2011): 171–190.

10 See Florian Kajuth, Thomas A. Knetsch, and Nicolas Pinkwart, "Assessing house prices in Germany: evidence from a regional data set," *Journal of Real Estate Research*, 9(3) (2016): 286–307.

11 See Konstantin A. Kholodilin, Claus Michelsen, and Dirk Ulbricht, "Speculative price bubbles in urban housing markets," *Empirical Economics*, (forthcoming).

12 See Peter C. B. Phillips, Shuping Shi, and Jun Yu, "Testing for multiple bubbles: Historical episodes of exuberance and collapse in the S&P 500," *International Economic Review*, 56(4) (2015): 1043–1078; Ulrich Homm and Jörg Breitung, "Testing for speculative bubbles in stock markets: a comparison of alternative methods," *Journal of Financial Econometrics*, 10 (1) (2012): 198–231; and Peter C. B. Phillips, Shuping Shi, and Jun Yu, "Explosive behavior in the 1990s NASDAQ: when did exuberance escalate asset values?" *International Economic Review*, 52 (1) (2011): 201–226.

Figure 5

Housing price bubbles in selected OECD countries

Based on the price-to-rent ratio

Source: Authors' own caluclations based on data from the Organisation for Economic Cooperation and Development (OECD).

The German housing price index, covering seven largest cities, currently indicates a speculative bubble. Since 2010, housing prices have increased 20 percent more rapidly than rents.

Signs of speculative bubbles in eight of 20 OECD countries

Based on a relevant statistical test (for information on the methodology, (Box 1), the price trends in 20 OECD countries between 1970 and 2018 are examined in order to identify speculative price bubbles. The analysis uses the OECD database on housing prices,[13] which includes information on the price-to-rent ratio. If the data document an explosive dynamics, we can assume the presence of a speculative bubble. The OECD's housing price database contains indices of the price-to-rent ratio for 44 countries, but only 20 of them are long enough to produce robust statistical tests. For most countries, the OECD measures the nationwide housing price dynamics but for others, only data for larger cities are included in the database. The latter case applies to Germany, for example (Table 1). This means that when interpreting the statistical test results, signs of housing bubbles can be generalized to the whole country to a limited extent only.

While in some countries (Germany, Portugal, and South Korea) speculative bubbles are a relatively rare event, in other countries (e.g., Belgium, Sweden, and Norway) they persist over long periods of time (Figure 5, Figure 6). Phases of speculative price increases are not necessarily followed by sharp price corrections, as was the case in the United States in the fall of 2006.

Table 1

Database for OECD housing price index by country

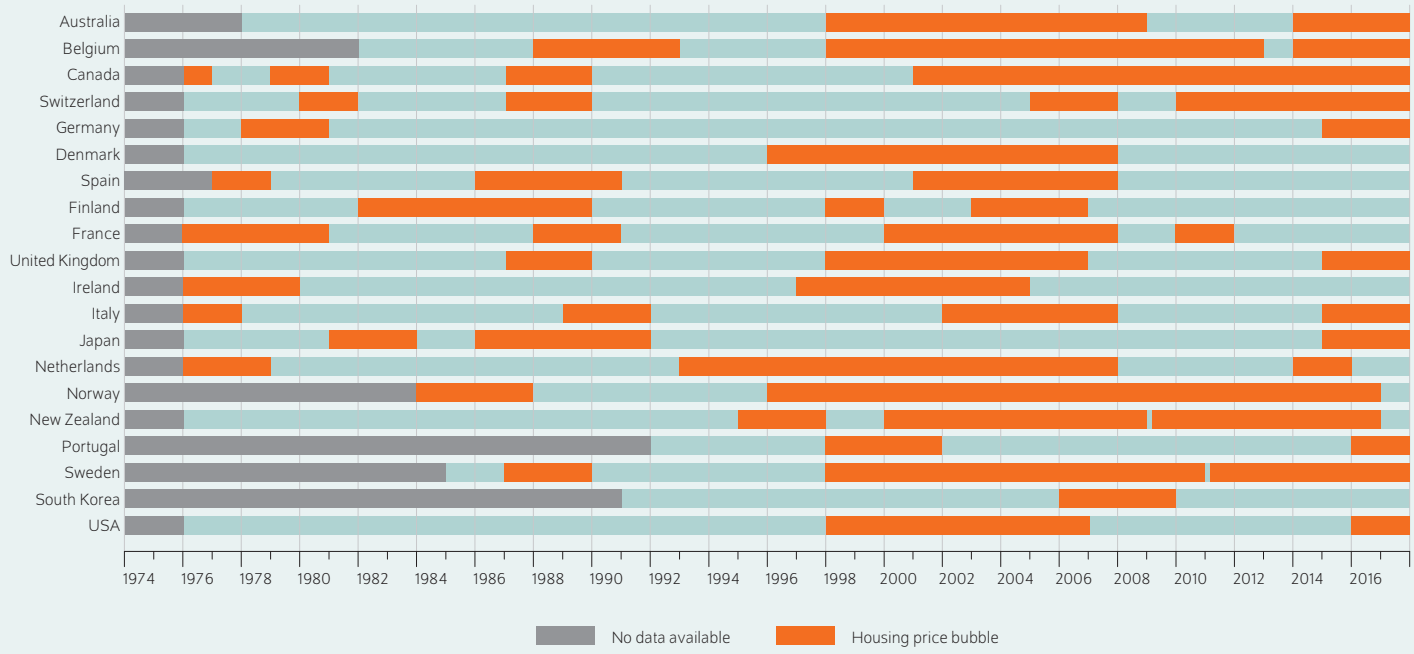
	Covers	Building types
Australia	Eight major cities (two-thirds of the total population)	All
Belgium	Whole country	All
Canada	Whole country	All
Denmark	Whole country	All
Finland	Whole country	All
France	Whole country	All
Germany	Seven largest cities (about 12 percent of total population)	All
Ireland	Whole country	All
Italy	Until 2016, 13 metropolitan areas, since then — the whole country	Used real estate
Japan	Whole country	All
Netherlands	Whole country	All
New Zealand	Whole country	All
Norway	Whole country	All
Portugal	Whole country	All
South Korea	Whole country	All
Sweden	Whole country	All
Switzerland	Whole country	All
United Kingdom	Whole country	All
USA	Whole country	Single-family houses

Source: Authors' own depiction.

13 See OECD, Housing Indicators (2018), (available online).

Figure 6

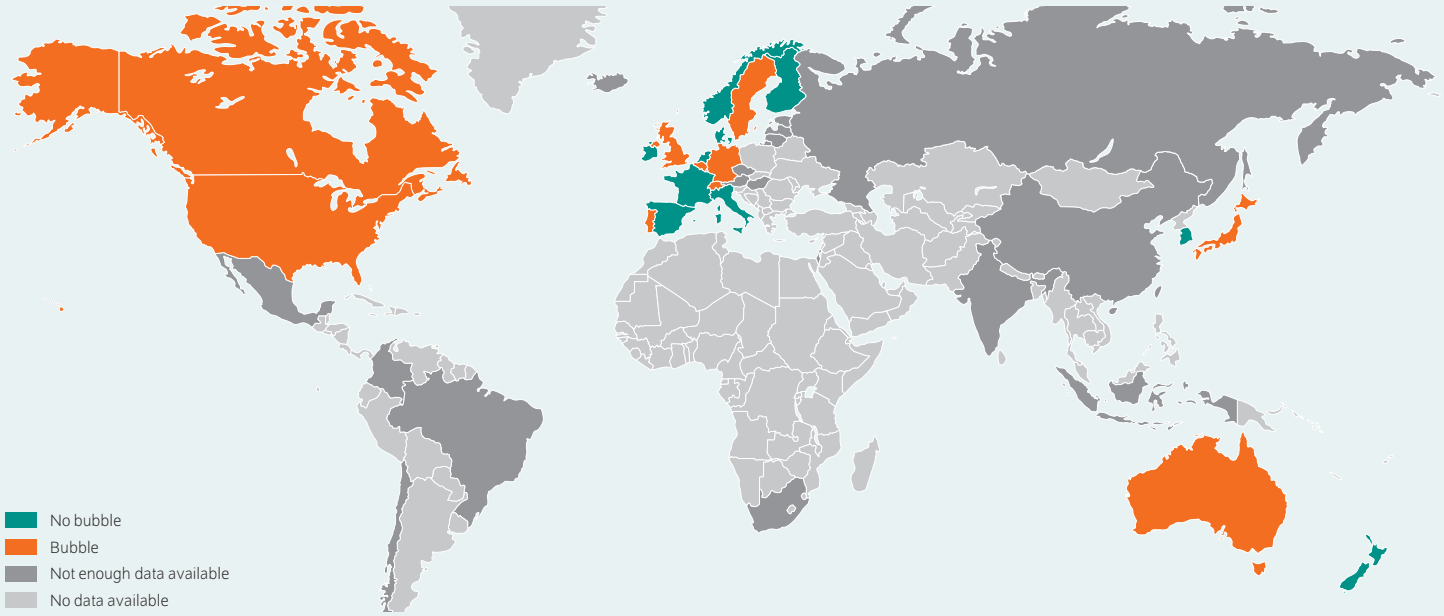
Duration of speculative price bubbles in selected OECD countries



Source: Authors' own caluclations based on data from the Organization for Economic Cooperation and Development (OECD).

Figure 7

Housing price bubbles in 2017



Source: Authors' own caluclations based on data from the Organization for Economic Cooperation and Development (OECD).

Speculative price overvaluations are observed in European and North American countries as well as Australia.

The constructed speculative bubble chronologies show that ten years after the financial crisis, the price dynamics in several countries are probably driven by speculative investment behavior. In eight of the 20 states analyzed, we see the corresponding pattern in the time series. For example, speculative price bubble has been likely again in Sweden since 2012; in Australia and Belgium since 2014; in Germany, Italy, and the UK since 2015; as well as in Portugal and the U.S. since 2016. In Canada, the statistical test shows that a bubble has been forming since 2001. The phenomenon is not confined to individual continents or regions. Undesirable trends are evident in European and North American countries, as well as in Australia (Figure 7).

The findings for Germany confirm the analyses of Deutsche Bundesbank and the results of previous studies by the German Institute for Economic Research (DIW Berlin).[14] Although previous studies showed no evidence of a nationwide housing bubble, they found signs of speculative bubbles, especially in the segment of newly built apartments in multi-story buildings in A-locations (Germany's seven largest cities).[15] The OECD housing price index that is employed in this study uses the Deutsche Bundesbank data, which are, in turn, based on the *bulwiengesa* real estate price index calculated for the seven A-locations.

Low interest rates and high population growth raise likelihood of speculative price bubbles

For policy makers, the early detection of price bubbles is of key importance. Evaluating price-to-rent ratios is helpful for this, but it is better to know the "ingredients" contributing to speculative bubbles. There are already estimates indicating that loose monetary policy increases risk.[16] The likelihood of a speculative bubble dependent on various external variables can be determined with the help of a logit model (for details on the methodology, see Box 2). The model includes private and public sector debt, the long-term interest rate, population growth, GDP growth, and the general price trend.

The estimates show that real variables, such as population growth and the expansion of economic output, plus financial market indicators, such as the interest rate and debt, all have an influence on the probability of a build-up of speculative housing bubble. Higher interest rates reduce that risk, while higher sovereign debt levels have a negative impact on the probability of a bubble. On the other hand, credit

14 See Kajuth, Knetsch, and Pinkwart, "Assessing house prices in Germany."; and Kholodilin et al., "Speculative price bubbles."

15 See Konstantin Kholodilin and Claus Michelsen, "Overvaluation in regional markets and segments, but no Germany-wide property bubble." *DIW Economic Bulletin* no. 25/26 (2017): 255–264 (available online).

16 See Oscar Jordà, Moritz Schularick, and Alan Taylor, "Betting the house," *Journal of International Economics*, 96 (2015): 2–18; and Brunnermeier and Schnabel, "Bubbles and central banks."

Box 2

Analysis of speculative bubble determinants

In order to determine the correlation between relevant macroeconomic and demographic variables (real GDP growth, real interest rates, loans- and government debt-to–GDP ratios, and population growth) and the formation of speculative price bubbles, we estimated panel logit models. Logit models are widely used to determine and forecast economic recessions, currency crises, and speculative bubbles in asset markets.[1] They allow determining the sign and significance of the relevant predictors and drawing conclusions under what conditions a speculative bubble is likely. Since such bubbles are relatively rare events, logit models are more suitable in this context than probit models.[2] We formulated the panel logit regression as follows:

$$\Pr(B_{it} = 1|X_{it}) = \frac{1}{1 + e^{-(\alpha_i + X_{it}\beta)}}$$

where *Pr*(·) is the conditional probability of a speculative price bubble; *B*it is a binary variable (where 1 denotes a bubble period and 0 a non-bubble period) determined for each country using the PSY test; α_i is a country fixed effect that accounts for country-specific influences remaining constant over time for each country; X_{it} is a vector of the explanatory variables, *i=1,..., N; t=1,..., T*, where *N* is the number of countries and *T* is the number of periods. Panel logit models with fixed effects have two main advantages. They take non-observable heterogeneity into account (forgotten variables or hard to measure variables and no restrictions on the correlation between the explanatory variables) and minimize the problem of distortion due to omitted-variable and self-selection bias.

For the present study, logit models for a panel of 20 OECD countries are estimated (Australia, Belgium, Canada, Denmark, Germany, Finland, France, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, Sweden, Switzerland, United Kingdom, and the United States) that covered the period between at most the first quarter of 1970 and the first quarter of 2018. Due to different degree of data availability the panel is unbalanced.

Table 1

Estimation results of the model describing relationship between speculative housing price bubbles and overall economic indicators

	Model 1	Model 2
GDP growth	0.413 * (0.068)	0.410 * (0.067)
Population growth	2.192 * (0.443)	1.995 * (0.452)
Long-term interest rate	−0.201 * (0.053)	−0.178 * (0.053)
Government debt-to-GDP ratio	−2.290 * (0.657)	−2.638 * (0.676)
Total loans-to-GDP ratio	1.787 * (0.525)	
Mortgage loans-to-GDP ratio		2.977 * (0.775)
Number of observations	655	655
Log-likelihood	−300.218	−298.444

Source: Authors' own calculations.

Table 2

Average partial effects of explanatory variables

	Model 1	Model 2
GDP growth	0.064	0.063
Population growth	0.339	0.307
Long-term interest rate	−0.031	−0.027
Government debt-to-GDP ratio	−0.354	−0.405
Total loans-to-GDP ratio	0.277	
Mortgage loans-to-GDP ratio		0.457

Source: Authors' own calculations.

1 See Helmut Herwartz and Konstantin A. Kholodilin, "In-sample and out-of-sample prediction of stock market bubbles: cross-sectional evidence," *Journal of Forecasting*, 33(1) (2014): 15–31; Xiaoli L. Etienne, Scott H. Irwin, and Philip Garcia, "Price explosiveness, speculation, and grain futures prices," *American Journal of Agricultural Economics*, 97(1) (2014): 65–87; and Oscar Jordà, Moritz Schularick, and Alan Taylor, "Leveraged bubbles," *Journal of Monetary Economics*, 76 (2015): 1–20.

2 See Manmohan Kumar, Uma Moorthy, and William Perraudin, "Predicting emerging market currency crashes," *Journal of Empirical Finance* 10 (2003): 427–454.

expansion and growing population and real economic output increase the probability of speculative price bubbles in the real estate market.

The average partial effects from the model showed that an increase of real GDP growth rate by one percentage point would increase the probability of a speculative price bubble by a solid six percent. The same applies when total loans-to-GDP ratio doubles: This would increase the likelihood of a bubble by around 28 percent – or in the case of mortgage loans, by 47.5 percent. On the contrary, an increase in the real interest rate by one percentage point would decrease the probability of speculative bubble by around three percent.

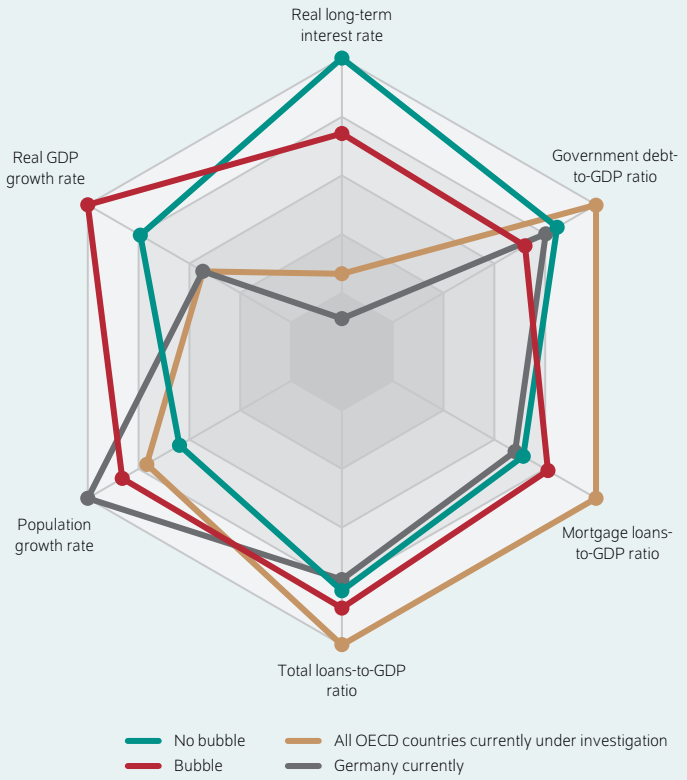
The indicators used in the estimation can be presented in a radar chart, yielding a useful overview of which variables currently make seem a build-up of a bubble more likely and which speak rather for an absence of a speculative price bubble. The four lines of the chart represent the average value of the respective variable during a bubble period, a no-bubble period, the average value for all countries since 2015, and the average value for Germany since 2015 (Figure 8).

When considering the tendencies in 20 OECD countries, we see signs of a new bubble period. The low real GDP growth rates and a relatively high level of government debt are the only two variables that are far removed from the

Figure 8

Danger of speculative price bubble in Germany and selected OECD countries

Measured using six indicators as bubble "ingredients"



Source: Authors' own calculations.

Currently, only very low interest rates and relatively high population growth indicate a speculative price bubble in Germany.

values typically seen in bubble periods. By contrast, the high level of private debt and low real interest rates indicate that a housing bubble is building up.

Germany's situation does not conform to that picture: the indicators show solid financing conditions. Only population growth and very low interest rate levels make a housing bubble seem more probable. However, population growth in Germany is far from its normal value due to the influx of migrants. Overall, the present analysis holds little evidence that Germany as a whole is poised to experience an undesirable, speculation-driven trend.

Conclusion: trend in Germany not as critical as in other countries, yet precautionary measures required

Ten years after the financial crisis, the global real estate market has recovered – at a rate that is raising doubts among some observers as to the sustainability of this trend. The speed at which housing prices have risen in many countries since the collapse is indeed astonishing. Monetary policy has likely played a key role because low interest rates make investing in real estate more attractive. The analysis presented in this study also shows that there are signs of speculative overvaluation in some countries. This also applies to Germany – although the analysis only includes the largest cities and not the entire country.

In view of these and earlier similar findings, critics of expansive monetary policy argue that the risks connected with low interest rates have substantially increased. They have called for a change in the course of monetary policy for quite a while, at the same time demanding the implementation of a comprehensive set of macroprudential measures to allow effective reactions to an undesirable turn of events. Caps on lending would be one such measure.[17]

Since the summer of 2017, the Federal Financial Supervisory Authority (*Bundesanstalt für Finanzdienstleistungsaufsicht*, BaFin) has had extra powers it can apply to react to stability risks resulting from real estate financing. In detail, the new Paragraph 48u of the Banking Act (*Kreditwesengesetz*, KWG) permits BaFin to limit the borrowed capital share in real estate financing. The institution can also specify how loans are repaid, allowing it to determine the debt repayment horizon for private households. However, BaFin is not authorized to implement these instruments directly. Instead, it can put a general ruling into effect if measures for averting risk are required. But there are no precise means for determining this point. Many are also calling for the formulation of detailed criteria for determining when the macroprudential instruments should take hold. Another point of criticism is that there are no rules on the maximum absolute level of debt or debt-to-income ratio. The IMF refers to best practices in other countries in support of these demands.[18]

Critics of more extensive regulatory instruments argue that real estate financing in Germany rests on a solid foundation and radical intervention would never be necessary.[19] As long as lending, loan standards, and debt remain at current levels, it is difficult to argue in favor of intervention. At the same time, one can hardly understand why German regulations did not go the full measure. With the present set of instruments, it would be difficult to react to a crisis – but efforts to cap lending would meet with significant political resistance. This is why policy makers would be well advised to introduce clear rules on when the existing macroprudential measures should be applied and implement further options for restricting lending as required, thus following the recommendations of the Committee for Financial Stability and the International Monetary Fund.

17 See Isabel Schnabel, "Schutz vor Immobilienblasen: Genug der Zugeständnisse!" Guest article, *Handelsblatt*, March 20, 2017.

18 See Urszula Kochanska, "The ESRB Macroprudential Measures Database," European Systemic Risk Board, 2017, (available online).

19 See Oliver Lerbs and Michael Voigtländer, "Ist eine makroprudenzielle Regulierung des deutschen Hypothekenmarktes geboten?" *Perspektiven der Wirtschaftspolitik*, 19(1) (2018): 42–56.

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JEL: E32, C33, C35

Keywords: speculative house price bubbles, explosive root test, panel logit model

LEGAL AND EDITORIAL DETAILS

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Volume 8 July 25, 2018

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Sale and distribution
DIW Berlin Leserservice, Postfach 74, 77649 Offenburg
leserservice@diw.de
Phone: +49 1806 14 00 50 25 (20 cents per phone call)

Layout
Roman Wilhelm, DIW Berlin

Cover design
© imageBROKER / Steffen Diemer

Composition
Satz-Rechen-Zentrum Hartmann + Heenemann GmbH & Co. KG, Berlin

ISSN 2568-7697