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Are Real Estate Prices Evolving into an Asset Price Bubble?

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Abstract
The development of real estate prices is of extraordinary importance for the financial and economic system, as undesirable developments could endanger financial stability - as seen in the financial crisis of 2008 and 2009. This applies not only to speculators, but also to private households, which have to borrow to pay the purchase price. The market has been "fueled" in particular by the monetary policy of the central banks - expansion of the money supply and low interest rates. Investors are looking for investment opportunities due to the money glut, and the real estate market still promises a return. Furthermore, many people looking to build are willing to go into debt to buy a property. This demand ultimately has a driving effect on real estate prices. The aim of this paper is to compare and analyze the development of real estate prices in the most important OECD countries with those of Germany. A model of real estate prices is presented, which takes into account the most important indicators and provides information on when a price bubble exists. The model shows that asset price bubbles can be identified in some OECD countries. In Germany, on the other hand, there are only signs of a price bubble in a few major cities. Since private debt is low, it does not seem to be a problem across the board in Germany. A general problem remains with regard to the timely detectability of price bubbles.

Keywords
Asset price bubbles, Monetary policy, Price bubble index

Introduction

In 2008, the bankruptcy of the U.S. investment bank Lehman Brothers triggered one of the biggest global economic crises (Mishkin, 2011; Shiller, 2014). The bank had been significantly involved in financing the housing price bubble in the U.S. and insuring credit default risks, and eventually had to declare bankruptcy. The U.S. government was no longer willing to prop up Lehman Brothers after support actions for the two government mortgage state agencies, Freddie Mac and Fannie Mae. This fateful step triggered a bursting of the real estate price bubble worldwide. This led to massive real economic problems on the financial markets, characterized by pessimism and uncertainty about future developments. In the United States, the unemployment rate rose to more than 10%. In Germany, for example, overall economic output fell by 5.6% in 2009. Banks stopped lending money to other banks because confidence in the solvency of commercial banks was severely damaged. This ultimately represented a failure of the money market. There was a concern that it would lead to a major credit crunch. Global support measures by governments and, in particular, central banks were therefore necessary. Governments and central banks around the world were forced to introduce support measures, backed in particular by monetary policy focusing on an expansion of liquidity to banks and a low interest rate policy. As a result, central banks pursued a very expansionary monetary policy and key interest rates, and thus financing costs, became significantly more favorable. Overall, the global economy recovered.

In the years that followed, real estate prices rose sharply (see the following Chart, OECD, Housing Prices, 2021). Housing prices include housing rent prices indices, real and nominal house prices indices, and ratios of price to rent and price to income.

Figure No. 1: Housing prices

Source: OECD (2021)

Real estate price bubbles are a threat to financial and macroeconomic stability (Blot, 2017). The recent financial crisis has highlighted the importance of housing markets as both a source and a transmission mechanism of financial instability (Bauer, 2014). This view has been forcefully supported by the Bank for International Settlements (BIS). Several prominent BIS economists have argued that monetary policy should "lean against the wind," i. e. try to prevent the build-up of financial imbalances by reacting early on to upward-trending asset prices (Cecchetti et al. 2000, Borio and Lowe, 2002, White, 2006, Brunnermeier and Schnabel, 2014). The empirical analysis of this paper shows that there is evidence of a significant multidirectional link between house prices, broad money, private credit and the macroeconomic.

The following section uses data from OECD countries to show whether and to what extent risks have built up again on the international real estate markets. A common answer is that the monetary policy of central banks has encouraged this development. This is followed by a comparison of selected OECD countries with real estate price developments in Germany. A brief review of the literature opinion as well as empirical tests for the identification of speculative price bubbles follow.

Literature Review

In recent years, a large number of research papers have been published dealing with the causes and forecasting models of real estate price bubbles. In the following, some papers on this topic are briefly presented.

Kholodilin and Michelsen compare the experiences of different countries with speculative price bubbles and contrast this with Germany. They focus on the institutional framework and whether this can prevent such a real estate price bubble. Although the authors do not see any signs of a speculative price bubble in Germany, they believe that there is an increased risk in some larger metropolitan areas. The authors see one reason for this in lending to customers with a low equity ratio (Kholodilin and Michelsen, 2019a).

Engsted uses econometric methods to examine data from 18 OECD countries from 1970 to 2013 for explosive increases in real estate prices and were able to prove this in all countries - with the exception of Germany and Italy (Engsted, Hviid, and Pedersen, 2016).

Brunnermeier analyses the relationship between asset price bubbles and systemic risk using bank-level data in 17 OECD countries for the period 1987 to 2015. The systemic risk of banks increases already during the build-up phase of a bubble and even more during its bursting. The increase varies considerably across banks and bubbles and depends in particular on the size of the bank. The results show that higher credit growth, stronger maturity mismatch, and especially bank size make financial institutions, and thus the financial system, vulnerable to asset price bubbles. The increase in systemic risk is largest for housing price bubbles (Brunnermeier, 2019).

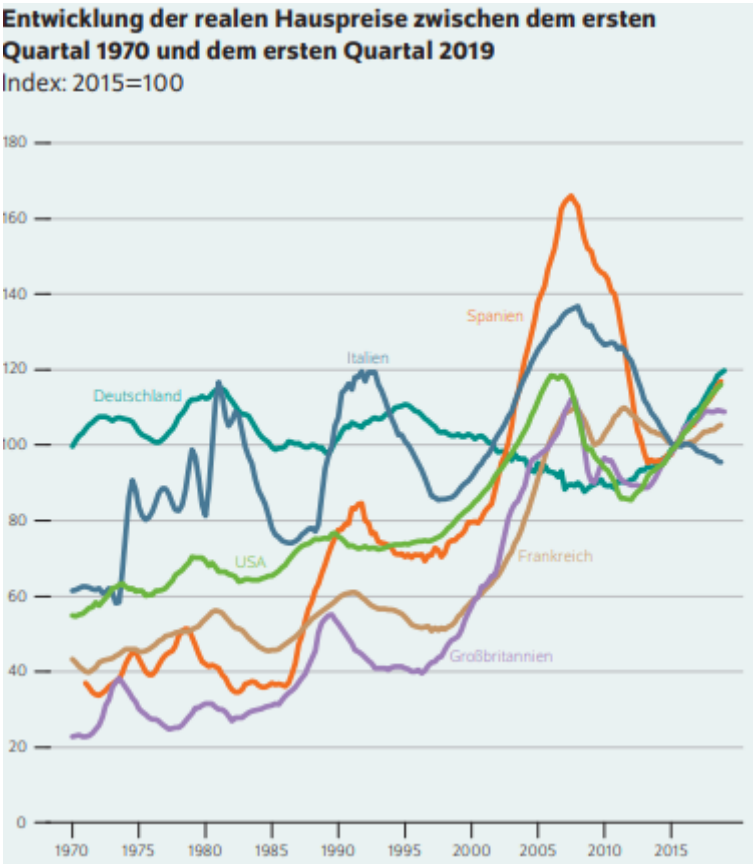
In their paper, Huber and Punzi (2016) propose a model with time-varying parameters for the housing market in the United States, the United Kingdom, Japan and the euro area. The results indicate that the monetary policy transmission mechanism to the housing market has not changed with the implementation of quantitative easing or forward guidance and that central banks can influence the composition of an investor portfolio by investing in the housing market. Furthermore, it is shown that the U.S. was able to influence the consequences of the financial crisis more successfully through unconventional monetary policy than the other countries considered.

In his paper, Wölfle (2017), for example, presented the purchase prices of residential real estate for the very disparate cities of Hamburg and Freiburg, noting that in both cities there was already an increase in bubble risk between 2009 and 2012.

Development of the real estate prices in OECD countries

The risks in many OECD countries are high. In Germany, there has been an explosive price development, which has decoupled from the returns on real estate. (Kholodilin 2017, 2019a). Housing price bubbles have developed especially in the following OECD countries as France, Germany, Italy, Spain, UK and USA.

Figure No. 2: Development of real house prices Q1_1970 / Q 1_2019



House prices are rising again in many countries after falling sharply from 2008 onwards as a result of the financial crisis.

Source: Kholodilin (2019a)

It should be noted that price developments have been supported to a large extent by the very expansive global monetary policy. Almost all central banks lowered their key interest rates to historically low levels in response to the global financial and economic crisis. As a result, yields on government bonds fell significantly, which also made financing costs for real estate investments much more favorable.

In some countries the analyses show that the development of real estate prices points to speculative investment behavior on the part of investors. In particular, the continuing high level of household debt and the generally very low level of interest rates suggest a new bubble in many places. Corresponding patterns can be seen in the time series of the countries examined. For example, price exaggerations have been likely again in Sweden since 2012, in Australia and Belgium since 2014, in Germany, the UK and Italy since 2015, and in Portugal and the USA since 2016.

In view of the breadth and momentum of price increases, concerns are increasingly being voiced that overvaluations on the real estate markets could occur or are already a reality. In this context, two risks are viewed synonymously that should actually be separated from each other. A distinction must be made between the risks arising from the low-interest phase and those attributable to speculative investment behavior. The low interest rates increase demand for real estate, the price of which is rising sharply in view of the rigid supply in the short term.

If there are unexpectedly rapid increases in the key interest rate, demand for real estate could fall drastically, whereupon prices are likely to come under pressure. Households that have not taken sufficient account of such developments in their financing could be forced to sell their property. If the market price of the property is lower than the mortgage in the meantime, the household will be over-indebted. This can lead to macroeconomic problems for a country, so that politicians might be forced to support indebted households and mortgage banks. These risks are not as relevant for Germany, since mortgage borrowers enter into a relatively long-term interest rate commitment (Kholodilin, 2019a and 2018).

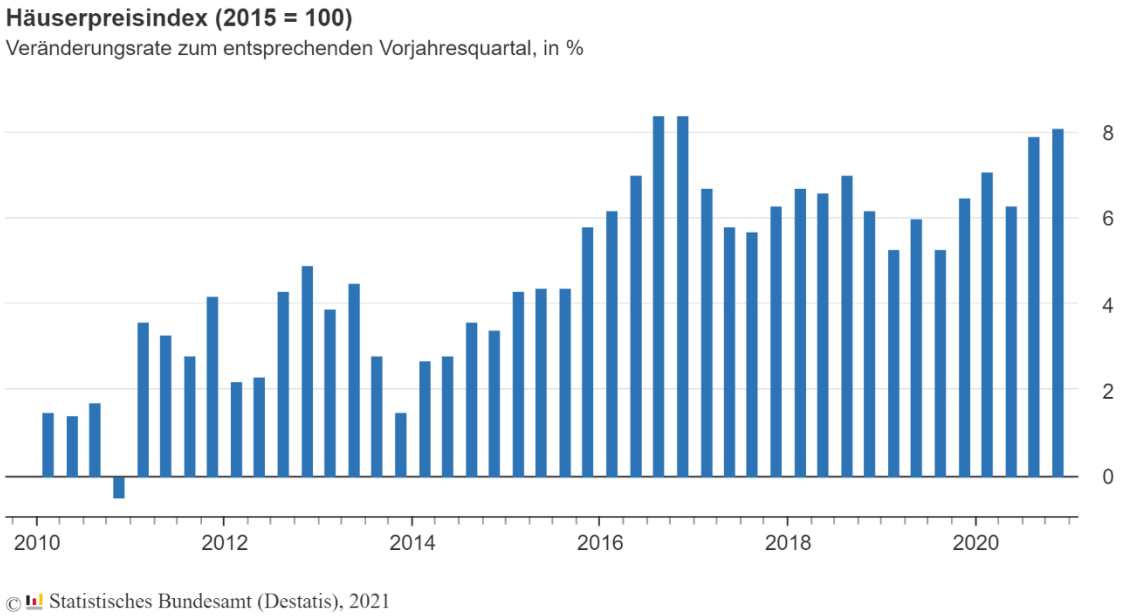
Development of real estate prices in Germany

Starting from the 1st quarter of 2004 (index = 100), the so-called empirica real estate index in Germany was 165 points in the 4th quarter of 2020. The price index is based on a weighted average of purchase and rental prices (owner-occupied or rented apartments and single- and two-family houses of all construction years) and on over 100 sources of advertisements (empirica, 2020).

Steadily rising real estate prices have resulted from strong demand coupled with low supply. Despite the many new buildings, the supply of housing is not enough, as the population has also increased in recent years. This creates a shortage of living space, especially in metropolitan areas, which leads to rising rents or price increases for properties for sale. Another shortage is affordable building land. In 2019, a square meter of land ready for construction in Germany cost an average of around 190 euros. Fifteen years earlier, it was still around 100 euros for the square meter. Scarce building land is becoming more expensive and is therefore also causing property prices to rise overall. Another reason for the development of real estate prices is the current monetary policy of the European Central Bank. Low interest rates are making it cheaper to finance real estate and are crowding out other investment opportunities for lack of an alternative. As a result, more is being invested in real estate and prices on the real estate market are rising due to increased demand (Statista Research Department, 2021 and Statistisches Bundesamt, 2021).

According to the Statistisches Bundesamt, the house price index in the third quarter of 2020 was 7.8 % higher on average than in the prior-year quarter (Statistisches Bundesamt, 2020). Furthermore, prices for apartments as well as for detached and semi-detached houses rose by 2.9 % compared with the previous quarter. In the seven largest metropolitan areas with the major cities of Berlin, Hamburg, Munich, Düsseldorf/Cologne, Frankfurt and Stuttgart, the year-on-year increase was 8.9 % for detached and semi-detached houses and 7.3 % for condominiums. In the other major cities (from 100,000 inhabitants) house prices rose by 8.3 % and condominium prices by 10.2 % compared to the same quarter last year. However, rural counties (less populated counties) also saw price increases of 9.7% (8.4%) for houses and 7.1% (8.1%) for condominiums.

Figure No. 3: House price index 2020



Source: Statistisches Bundesamt (2021)

In Germany, signs of speculative overvaluation are seen primarily in the major cities. The macroeconomic risks are considered to be low, not least because of the significantly lower level of private household debt (Kholodilin, 2017 and 2018). According to a UBS study, however, there are warnings of price bubbles on the real estate markets in Europe and Germany, as price growth has accelerated considerably (UBS Study, 2020).

Data Description and Methodology

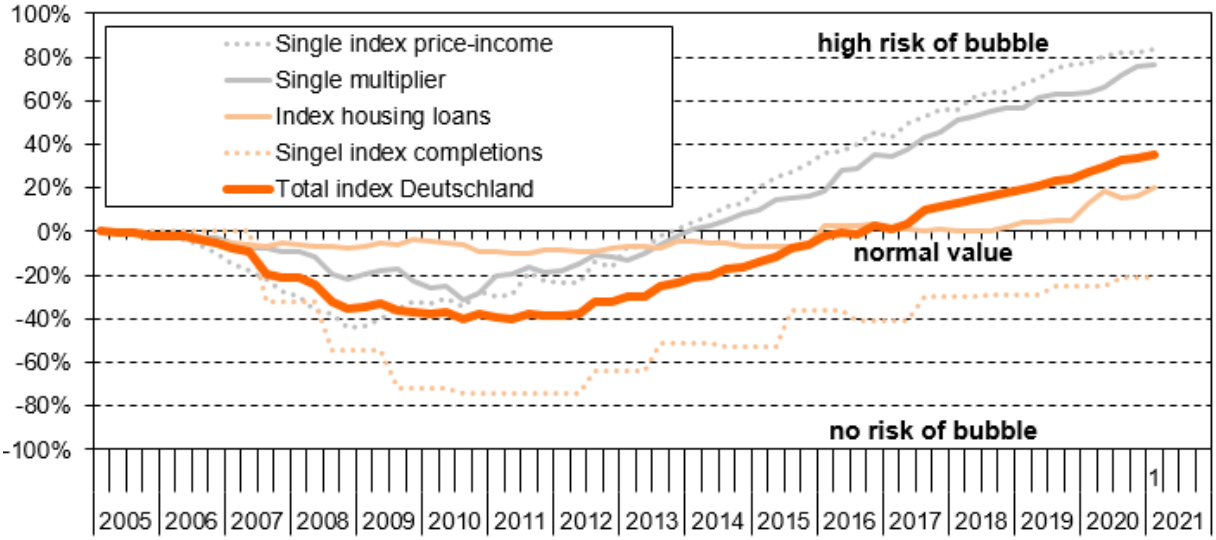
It is important for regulators to identify the emergence of price bubbles at an early stage which developed an early warning system to signal speculative price bubbles (Hagemann and Wohlmann, 2019). Evaluations of price-rent ratios are valuable for this purpose - but it is better if the "ingredients" for speculative bubbles are known. There are already assessments of this, according to which loose monetary policy in particular harbors major risks.

Following Gilles and LeRoy (1992) and Gürkaynak (2008), every price system can be decomposed into two parts, namely a fundamental component and a bubble component. In the given context, the fundamental house price equals the sum of the present values of expected future rents. The bubble component equals the difference between the market value and the fundamental value. Two statistical methods are used for the investigation of the price development in the German housing market: tests for stationarity and for explosive behaviour. The terms stationarity and difference stationarity are used simultaneously. In both tests, bubbles are assumed to be rational. The previously explained features of a price system and a rational bubble are modified respectively (Mayer and Gehrke, 2018).

In Germany, the empirical property price index is published regularly on the basis of the empirical price database - published for the first time in 2005 - and compiled using statistical methods. The index contains data from the Bundesbank, Statistisches Bundesamt and

information on real estate advertisements. The empirica bubble index for Q4 2020 is shown in the table below. The bubble index is subdivided according to the indices multiplier (purchase price / annual rent), price-income (purchase price / annual income), completions (dwellings per 1,000 inhabitants) and housing loans and combined into an total index > bubble index (empirica, 2020).

Figure No. 4: empirica bubble index: individual indices (2005q1= 0%)

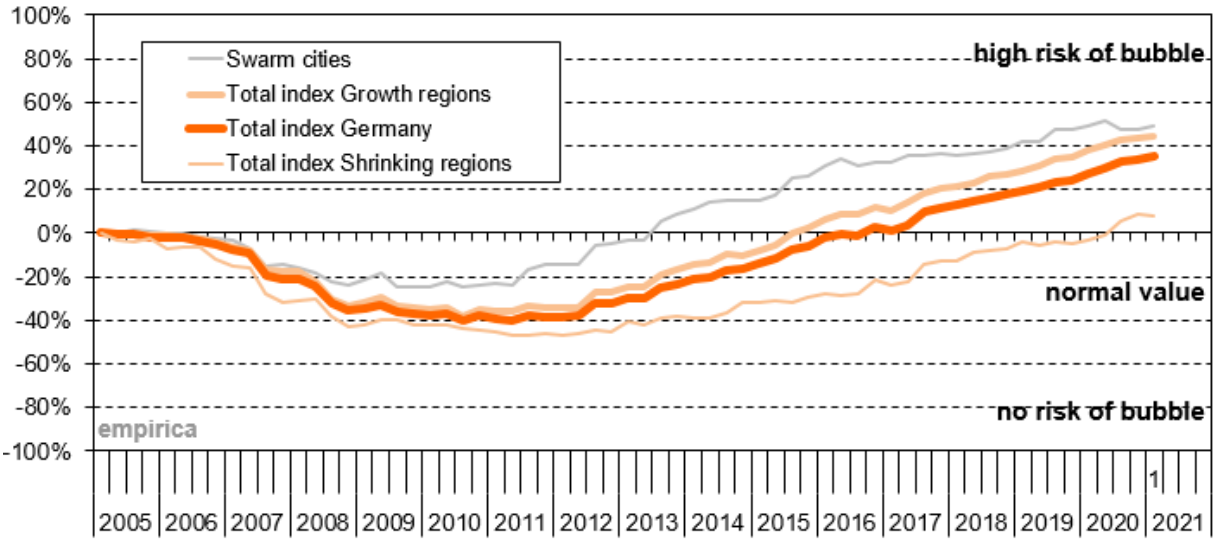


Source: empirica (2020)

The values for the 4th quarter of 2020 are compared with those of the base year 2005. Purchase prices have been rising faster than both rents and incomes for more than 10 years. New construction activity is growing, but cannot keep up with demand. The so-called normal value of the bubble index has been exceeded since 2017, so there is a danger of a bubble on the real estate market.

When subdivided according to region types, growth, so-called swarm cities (especially Leipzig, Regensburg, Heidelberg, Freiburg and Dresden) and shrinking regions, the shrinking regions are also above the normal value of the index for the first time since 2020. The index for the swarm cities is developing even more dynamically than that of the growth regions. The reasons for this may be that these cities have a great attraction for those willing to build and for investors, or that the purchase of property in the metropolitan regions is no longer affordable. In 295 of 401 districts, purchase prices have decoupled from rents and in three-quarters of all districts purchase prices are no longer in line with income development.

Figure No.5: empirica-bubble index in different types of regions



Source: empirica (2020)

A bubble risk is seen, as purchase prices are rising faster than rents or incomes. The low interest rate level may justify this, but it is an unstable equilibrium. The risk of a bubble is also high because prices have moved away from median income or equity in many places. Thus, a "rather high" bubble risk is now indicated for 11 out of 12 major cities (previous quarter 10, three years ago 9). Accordingly, a bubble is imminent if the "normal earner" can no longer afford a property because purchase prices are rising faster than a) rents or b) incomes and c) more and more housing is being built (beyond demand) d) more and more loans are being taken out for this purpose. These four indicators (multiplier, price-income ratio, completions per inhabitant and housing loans in relation to GDP can be observed (empirica, 2020).

Kholodolin (2018) determine the probability of a speculative bubble as a function of various external variables such as (gross value added, real interest rate, credit-to-GDP ratio, and population growth) using a so-called panel logit estimation. Logit models find wide application in determining and predicting economic recessions, currency crises and speculative excesses in asset markets, and allow to estimate the significance and sign of the relevant variables and thus to draw conclusions about the conditions under which a speculative bubble is likely to occur. They calculated logit models for a panel of 20 OECD countries in their model. According to Kholodolin's research, it shows that real estate prices in many countries have risen significantly in recent years and the forecast models see further risks from speculative exaggerations in many countries. In their study, Kholodolin (2019b) show that ten years after the financial crisis, price developments can again be observed in many countries, which are probably also characterized by speculative investment behavior. This applies to eight of the 20 countries studied (in European countries, North America as well as Australia), where corresponding patterns can be identified in the time series.

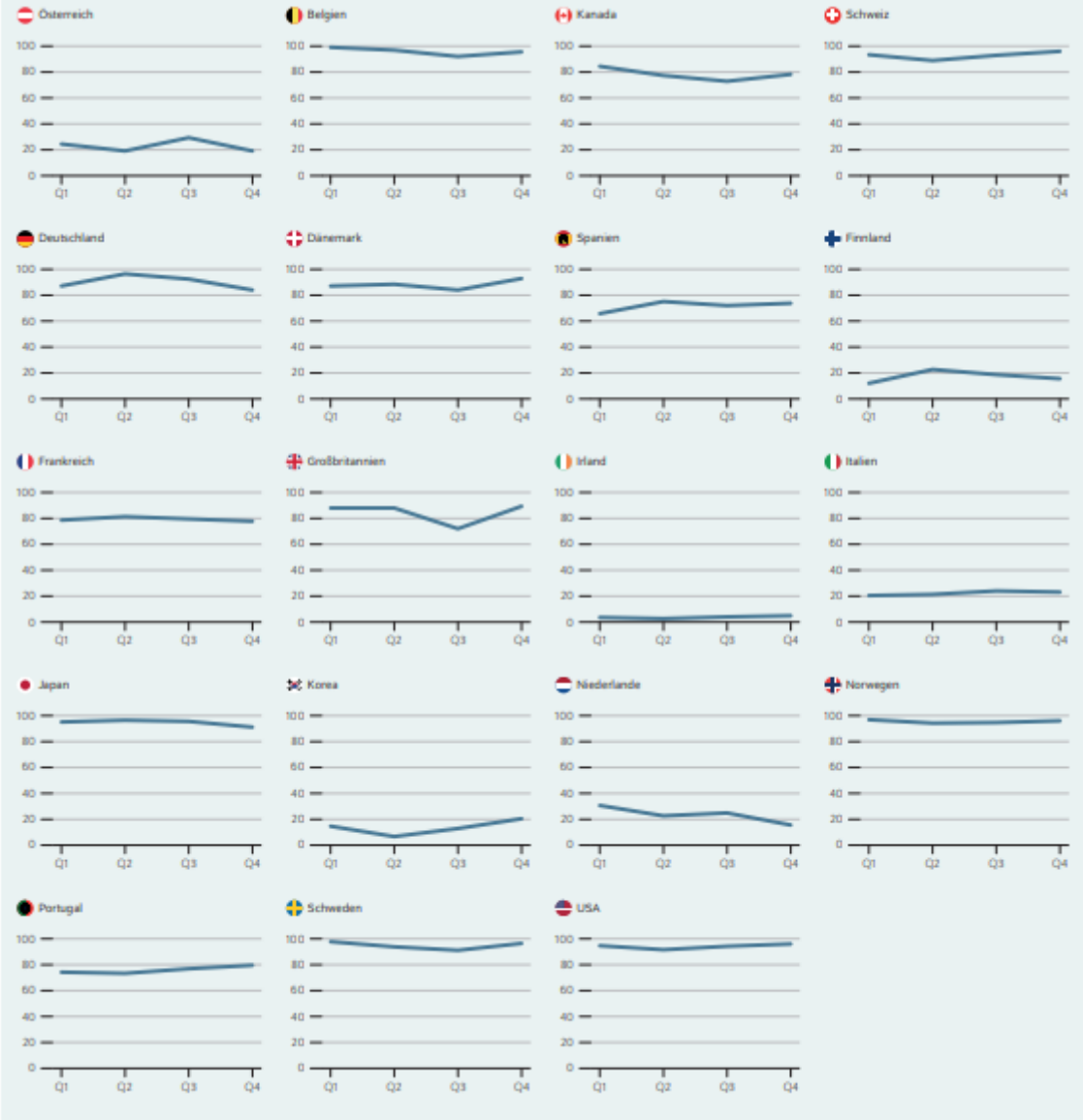
A high price development is also seen for Germany, which is detached from the returns on real estate. German mortgage borrowers have essentially secured their loan liabilities with long-term fixed interest rates, so that no immediate danger is seen from this side.

The forecast models show that the risks of speculative exaggerations are again very high in many countries. It can explosive price development can be observed, as rental income rental

income has decoupled from property prices. The development on the financing side is seen less critically compared to the real estate crisis in 2008, since as a rule debtors have entered into a long-term interest rate commitment.

In his forecast model for 2019, Kholodilin shows the likelihood of speculative rent bubbles in some OECD countries (see figure No. 6). The risk of price bubbles is particularly high in the USA, as well as in the Scandinavian countries, Japan, Belgium, Switzerland and Germany.

Figure No. 6: Forecasting speculative rent bubbles in OECD countries for 2019
Probabilities in percent, by quarters of 2019



There is a high probability of speculative property price bubbles in most OECD countries.

Source: Kholodilin (2019a)

Conclusion

The development in selected OECD countries shows that after the financial crisis in 2008 there have been high purchase prices for real estate again. Incomes cannot keep up with this price development, so that despite the favorable credit conditions - with relatively low interest rates for mortgages - it is becoming increasingly difficult to buy a property. Compared to other countries, an asset price bubble also seems to be developing in Germany, especially in the big cities. The cause of this development could be, among other things, the monetary policy of the central banks, which have led to the fact that although the interest rates on loans are favorable, many people who want to buy or build can no longer afford the high purchase prices of the properties. Furthermore, the negative interest rates introduced by the central banks lead many investors to invest their money in real estate, for example, in order to avoid the negative interest rates they have to pay on their capital assets. On the other hand, high purchase prices lead to an inadequate return on capital, as adequate rental income cannot always be realized.

In Germany, debtors have mostly secured their loans with long-term fixed interest rates, so that a possible dislocation on the real estate markets is seen less, in contrast to other countries (Kholodolin, 2019a). Whether the Corona pandemic will lead to major collapses in real estate prices due to, for example, the loss of jobs, cannot be estimated at present, as governments support their citizens and business companies with state programmes (unemployment benefits, economic aid etc.).

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