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Why House Prices Increased in the COVID-19 Recession: Evidence from Germany

Abstract

After the outbreak of the COVID-19 pandemic, real estate prices in Germany have risen significantly. This happened unexpectedly because several macroeconomic determinants pointed to a fall in property prices during this period. This provides an extraordinary opportunity to empirically investigate the particular connection between interest rates and real estate prices. The aim of the contribution is to verify the real interest rate hypothesis. This study performs a time series regression analysis to test the hypothesis. The time series ranges from 2017Q1 to 2021Q1. The results confirm that the long-term real interest rate might have a negative and significant impact on the growth rate of property prices after the factors of economic growth and unemployment have been controlled. The endogeneity is largely eliminated through an experimental design. The results have far-reaching practical implications for housing policy and for ways to solve the problem of housing affordability.

Key words

House prices, real interest rate; COVID-19

JEL Classification

E43, R30, E31

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Introduction

Since the global financial crisis, the affordability of housing has begun to be investigated (Wetzstein 2017, Haffner und Hulse 2021). Previous pre-crisis macroeconomic models have not taken into account satisfactory links between the real economy, credit markets, and asset prices (Duca et al. 2021). The IMF found that house prices are synchronized across countries, and they claimed that this is caused by global interest rate shocks (Hirata et al. 2013, Katagiri 2018). The COVID-19 pandemic offers a quasi-experiment to test their hypothesis.

Since the beginning of 2020, a contagious disease of a new coronavirus called COVID-19 by the WHO has been spreading around the world. It has led to many deaths and a global recession. Many companies also have significant difficulties in maintaining proper business operations due to supply chain problems. As a result, economic growth has fallen significantly behind the good results of recent years. The unemployment rates of many developed economies have risen noticeably for the first time in years because of the pandemic. The unemployment rate in Germany rose to 6,3% in 2020, as reported by the Federal Statistical Office. Contrary to general expectations, however, real estate prices in many countries, including Germany, have skyrocketed rather than fallen in this catastrophic event.

Opposite to the traditional theoretical prediction of a negative impact of a pandemic on the housing market (Francke und Korevaar 2021) house prices rose significantly in many countries after the outbreak of COVID, including Germany. The development was also observed when business operations were disrupted, GDP growth rates were negative and unemployment rates were unprecedentedly high (Wang 2021).

The hypothesis is plausible that the counterintuitive increases in house prices worldwide after the outbreak of COVID might be the result of a synchronized countercyclical interest rate cut by central banks. Most of these took place in the first quarter of 2020 when central banks tried to prop up the economy by lowering interest rates; some even fell to historic lows. Yiu (2021) found empirical evidence in 2021 through his examination of the monetary policy hypothesis in the pandemic era. This hypothesis was tested by a cross-border panel regression analysis, as the synchronization of central bank interest rate cuts worldwide after the outbreak of COVID is practically an experiment to test the monetary policy hypothesis. This study looked at five countries where property prices have risen sharply since the outbreak of COVID. These are Australia, Canada, New Zealand, the United Kingdom, and the USA.

In this study, the residential property market in Germany is examined based on Yiu's research design. It is examined whether there is also a causality between interest and real estate prices. Unlike the countries studied by Yiu, Germany has historically had a culture of long-term secured interest rates. Thus, not only the short-term interest rate but also the long-term interest rate level of the central banks is considered.

Hypothesis:

H0: There exists no good relationship between the HPI and the explanatory variables.

H1: There exists a good relationship between the HPI and one or more of the explanatory variables.

The paper is structured as follows. Section 2 is a literature review of studies on the monetary policy hypothesis. Section 3 outlines the research materials and methods used. Section 4 reports on the results of the empirical tests. Section 5 discusses the results and implications. Section 6 concludes with a conclusion.

1 Methods

1.1 Data

In this study, data from the Federal Statistical Office are used to collect quarterly data on house prices in Germany. Germany is a developed OECD country with a market-oriented capitalist system. This makes the German real estate market efficient and transparent. The collected house prices are aggregated as a house price index (HPI).

Quarterly GDP growth rates, unemployment rates, nominal short-term and long-term interest rates as well as the inflation rate were taken from the Central Bank, Deutsche Bundesbank. Real interest rates were calculated by subtracting the inflation rate from the nominal interest rate. They show that real interest rates and GDP change were stationary in levels, while house prices and unemployment rates were stationary in the first differences.

1.2 Research Design

In this study, a quasi-experiment was carried out for the German real estate market. This research examined the effects of certain determinants on property prices. The aim was to determine which determinants are strongly correlated with real estate prices. Due to the environment of the quasi-experiment, it was possible to investigate not only correlations but possibly also causalities.

Based on this analysis, multiple linear regression was performed by using the real estate price index as a response variable and the variables short- and long-term real interest rates, GDP growth, and unemployment rate as explanatory variables.

Conducting linear regression starts by importing the dataset and conducting a Principal Component Analysis so that the variables to be included in the regression model can be obtained by looking at the factors in the Prin matrix. Moreover, to conduct the linear regression in E views 12 student lite, the data importation procedure plays a crucial role and after the importation, the selection of response and explanatory variables was done as in the regression analysis. The design enabled to get the coefficients which include

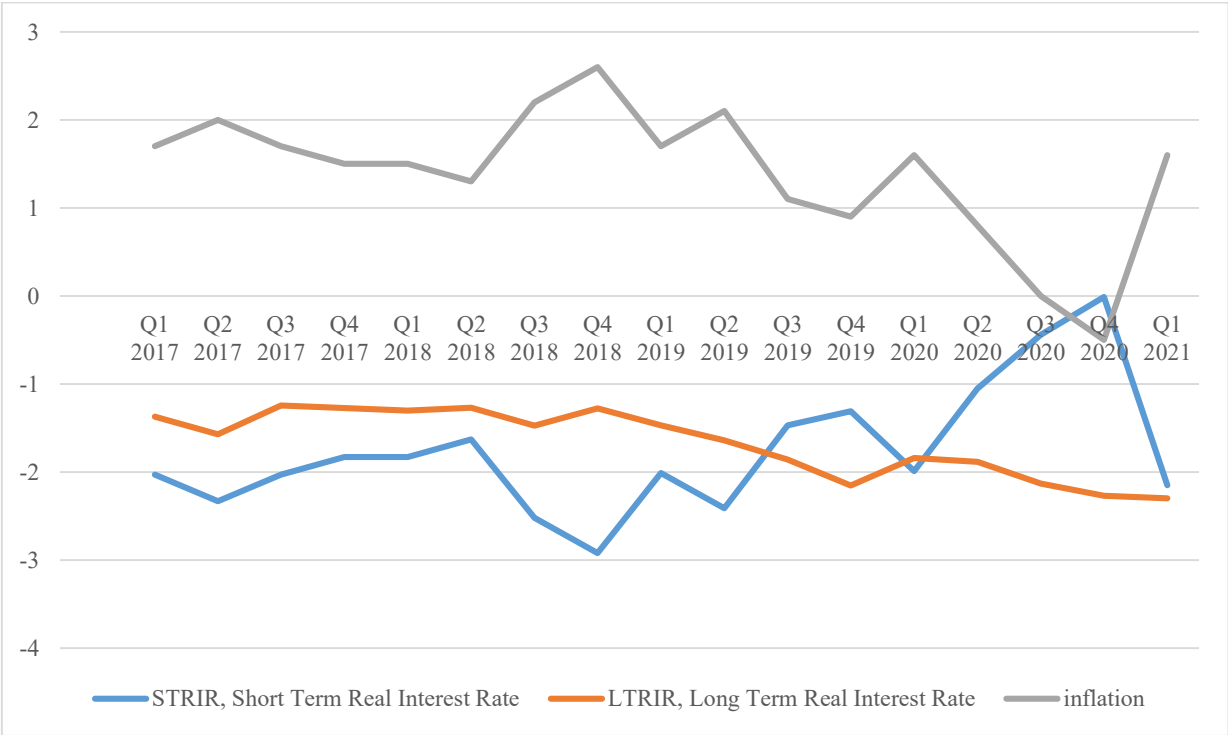
the R squared values as well as the p-value to determine which variables were significant and would be included in the regression equation to predict HPI.

1.3 Controls by Quasi-Experiment

The pandemic situation creates the environment of a quasi-experiment. The recession phase (continuous negative GDP growth rates) controls the positive effect of economic growth and the negative effect of unemployment on real estate prices. Historically, for example, there have been periods of real estate price growth that coincided with economic growth and negative real interest rates. Since the explanatory variables are not independent but linked to each other, their individual effects on real estate prices cannot be easily distinguished.

In this study, the period of global recession after the outbreak of COVID was used as a quasi-experiment to investigate the monetary policy hypothesis in Germany. The pandemic has caused a global recession. It is a unique situation in which the GDP growth rates of many countries, including Germany, have been negative, unemployment rates have increased, and central banks have significantly lowered interest rates in a concerted action to save economies. In other words, after the outbreak of COVID, two of the three main factors (recession and unemployment) drove property prices down, and only one factor (the real interest rate) caused property prices to rise.

Figure No. 1: Real Short- and Long-Term Interest Rates, 2017Q1–2021Q1



Sources: Federal Statistical Office (Statistisches Bundesamt (Destatis)), Deutsche Bundesbank

Real short-term interest rates are determined by using nominal short-term interest rates less inflation. With the outbreak of COVID-19, there was initially a decline in inflation. This result in a rather atypical development compared to the development of other countries, which was also observed by Yiu. Real short-term interest rates rise initially. The long-term interest rates, on the other hand, which are regularly decisive for the financing of real estate in Germany, are determined by the Bundesbank based on expectations. This gives a picture that corresponds to Yiu's study. This situation most likely led to a more negative long-term real interest rate regime, as shown in Figure No. 1. House prices then rose again almost simultaneously with strong momentum. This works as an intervention experiment: If economic growth and the effects of unemployment are controlled to negatively affect house prices, only real interest rates are lowered to test the reactions of house prices worldwide.

2 Results

Based on the regression model, House Price Index was the response variable and when it was regressed against the explanatory variables (STRIR, Short Term Real Interest Rate, LTRIR, Long Term Real Interest Rate, Gross Domestic Product, Unemployment Rate), the results showed that efficient to explain the variations of up to 81.25% according to the R-squared coefficient. Since the Prob of F statistics was 0.000255 when the model was created at $\alpha=0.05$, the null hypothesis was rejected and it was to conclude that there exists a good relationship between the HPI and the explanatory variables, as shown in Table No. 1.

Table No. 1: Regression model, 2017Q1–2021Q1

Dependent Variable: House Price Index				
Method: Least Squares				
Included observations: 17 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTRIR, Long Term Real Interest Rate	-29.57710	5.406081	-5.471079	0.0001
STRIR, Short Term Real Interest Rate	1.191473	2.909154	0.409560	0.6893
Unemployment Rate	-2.125819	3.420788	-0.621441	0.5459
Gross Domestic Product	-0.268276	0.470700	-0.569950	0.5792
R-squared	0.812522	Mean dependent var		151.3882
Adjusted R-squared	0.750029	S.D. dependent var		12.75891
S.E. of regression	6.379090	Akaike info criterion		6.783856
Sum squared resid	488.3134	Schwarz criterion		7.028919
Log likelihood	-52.66278	Hannan-Quinn criter.		6.808216
F-statistic	13.00184	Durbin-Watson stat		0.990505
Prob(F-statistic)	0.000255			

Sources: own work

The result of the correlation confirms most likely the fact that long-term real interest rates are negatively correlated with house prices. Contrary to Yiu's examination, however, only long-term real interest rates in Germany are strongly negatively correlated. Short-term interest rates are even positively correlated. On the one hand, the result supports the observation that the relevant interest rates for real estate financing in Germany are the long-term real interest rates due to the preference for interest rate security. On the other hand, this shows the rather unusual situation in international comparison that after the outbreak of the COVID-19 pandemic, inflation is initially healthy before an increase occurs. As a result, short-term real interest rates initially rose before falling.

The significance of the results of long-term real interest rates provides to a great extent evidence for the monetary policy hypothesis in the form of a quasi-experiment. The model found most probably a negative correlation between long-term real interest rates and house price changes.

Therefore, since interest rates were lowered during this particular period and the economic growth effect and the unemployment effect were controlled to have a negative impact on house

price changes, the relationship between long-term real interest rates and house price changes implies presumably a causal relationship between real interest rates and house price changes.

3 Discussion

This study is the first attempt to apply a quasi-experiment to investigate the monetary policy hypothesis in Germany. It differs from previous studies, which rely on econometric methods to avoid confusion and distorting effects. Analogous to Yiu's study, the special time after the outbreak of the COVID-19 pandemic, when the global economy was negatively affected, is used instead. Central banks in most countries took concerted action to cut interest rates synchronously, among other easing measures, to support the economy. In Germany, on the other hand, central bank-controlled interest rates have remained constant, while long-term interest rates have risen. As a result, real estate prices rose most presumably with strong momentum, also in Germany. These phenomena offered a unique opportunity to empirically test the monetary policy hypothesis, i.e., that an expansionary monetary policy, such as a negative real interest rate, *ceteris paribus* causes probably an increase in real estate prices. On the other hand, the application of a quasi-experimental approach during this period can rule out the reason for economic growth, as the global economy has been hit hard by the pandemic and most developed countries experienced an economic recession with high unemployment rates in 2020. Furthermore, the unemployment rate has risen slightly, so an exclusion could also be made here.

The use of a time lag would be useful to expand the analysis. After all, it is not unrealistic to assume that the change in interest rates will only have an impact on the real estate market. The real estate market is not as transparent as, for example, the stock market. There are also certain legal deadlines that must be considered when purchasing real estate in Germany. In this way, greater significance could be achieved.

Furthermore, a shadow rate could also be used as the real interest rate. The shadow rate is an interest rate in some financial models. It is used to measure the economy when nominal interest rates come close to the zero lower bound. The shadow rate derives from Fischer Black's insight that currency is an option and offers advantages in a phase of severely negative real interest rates.

The empirical results seem to confirm the monetary policy hypothesis, more precisely the real interest rate hypothesis in Germany, through the quasi-experiment in the COVID period. The real drop in interest rates during the COVID-19 period, as reported by Kingsly

and Henri (2020), acts arguably as an intervention approach to test the causality relationship in addition to the correlation association.

Intuitively, it is widely believed that cheap credit and relaxed lending regulations should boost the economy during the pandemic. It is also believed that this has attracted investors back to the market. In theory, Ryan-Collins (2019) argued that when unlimited credit and money flow into a naturally finite supply of real estate, it causes rising house prices. Empirically, there is some evidence that unusually low real interest rates may be associated with high real estate prices (Yiu 2009), but causality has not been proven until this study.

Conclusions

With the help of a time series regression model, this work aims to test the hypothesis of the effect of the real interest rate on the change in house prices on the data shortly before and after the COVID-19 pandemic. The pandemic was used as a quasi-experiment to test the hypothesis, as it was able to rule out two key factors associated with an increase in house prices, firstly, positive economic growth and, secondly, a low unemployment rate. The rise in property prices in Germany following the outbreak of the COVID-19 pandemic suggests that it was likely caused by a shock rather than an insufficient supply of real estate and building plots or other individual factors such as tax policies or stimulus measures.

In Contrast to many other OECD countries, interest rate risk in Germany is in general hedged over the long term. Consequently, it can be assumed that the long-term real interest rate level in particular influences real estate prices more than the short-term interest rate. After the outbreak of COVID, long-term interest rates fell to unprecedented low levels. The pandemic situation led to negative real interest rates in Germany and almost all developed economies. This provided a unique opportunity to test the real interest rate hypothesis using a time series regression model as an intervention approach in a quasi-experiment.

The results of the regression model show a negative influence of the real interest rate on property price developments. This fulfills the aim of the investigation, the confirmation of the real interest rate hypothesis. The results of this study can be of great political and practical importance. However, it is difficult to take all local aspects into account in a single-country analysis.

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