The relevance of surveys of expectations for the Deutsche Bundesbank

The expectations of economic agents strongly influence their decisions and actions. Depending on their assessment of future developments, firms may either increase or decrease their investment and households may increase or decrease their saving and consumption. For the Bundesbank, expectations are relevant for two particular reasons. First, expectations influence prices both directly and indirectly via consumption and investment, and stable prices are the primary objective of the Bundesbank and the Eurosystem. Second, expectations play a key role in decisions on risky, often credit-financed purchases – such as real estate purchases – and thus affect financial stability, which the Bundesbank also has a mandate to safeguard.

Given the relevance of expectations, the Bundesbank launched a pilot study in the second quarter of 2019 to identify the expectations of households in Germany by means of an online monthly survey and to gain initial insights into the potential of expectations data, which have not been available for Germany up to now. A total of more than 4,000 individuals were surveyed on their expectations, particularly regarding inflation, interest rates, consumption, rents and real estate prices. Three findings warrant particular attention.

First, the inflation expectations of individuals in Germany are relatively well-anchored. A significant majority of the respondents expect inflation rates to range between 0% and 3% over the next 12 months, with the median in all three survey waves standing at exactly 2%. Second, the individuals' uncertainty about inflation expectations contains information about future changes in the individuals' inflation expectations, and is thus useful for monetary policy and inflation forecasting. Third, the price rises for real estate expected by individuals over the next 12 months are of roughly the same size, on average, as the price increases seen last year; renters tend to expect a stronger hike than homeowners. The disaggregated data reveal significantly different trends, however, which are worthy of more thorough analysis.

After evaluating the pilot study, the Bundesbank decided to regularly survey individuals in Germany on their perceptions and expectations at monthly intervals. The results will be made available to the public promptly. The Bundesbank is thus helping to enhance the volume of information on economic expectations in Germany and is expanding the pool of data it needs to fulfil its mandates.

■ Introduction

Role and relevance of expectations

Expectations about future economic developments play a key role in all economic decisions – from purchases of seasonal goods, with their strong price fluctuations, to acquisitions of durable consumer goods, right down to billion-euro investment decisions of multinational firms. Yet the expectations of households and firms influence not just their own decisions, but also macroeconomic developments. If all agents are expecting prices to increase strongly, many of them will bring forward planned purchases as long as those prices have not yet risen too sharply. This increased demand will usually lead to rising prices – the expectations are self-fulfilling in this scenario.

Expectations also carry weight for the Bundesbank in each of its five core business areas – monetary policy, financial stability, banking supervision, payments and cash management.

Expectations of movements in interest rates and real estate prices affect the willingness to buy a property or take out a real estate loan. These expectations thus have an impact on the stability of the financial system generally, and potentially also on the stability of individual banks. And expectations have an effect on price developments and influence the effectiveness of monetary policy measures. It is no surprise, then, that central banks have recently shown greater interest in gaining a more precise understanding of how households form expectations.[1] Another reason for this is that central banks, like those of the Eurosystem, are ascribing increasing importance to their forward-looking communication, known as forward guidance.[2]

Existing short-comings of surveys on household expectations and Bundesbank pilot survey

Given that measures of expectations are such an important input for monetary policy, data on household expectations in Germany are surprisingly scarce.[3] This shortcoming prompted the Bundesbank to recently launch a pilot study for a comprehensive household survey on expectations, in order to explore the potential of

such data for its own ongoing work as well as for basic research. The Bundesbank Online Pilot Survey on Consumer Expectations in Germany was carried out between April and June 2019 in three consecutive survey waves (the survey concept is outlined in the box on pp. 55 f.). It covered various main topics. Insights of particular interest for monetary policy are the level of the expected inflation rate, its distribution across individuals, the evolution of the inflation expectation over time, and the uncertainty that each person surveyed individually ascribes to inflation developments. Other points of interest are the differences between the expectations of households and those of professional market players, the determinants of expectation formation, and the relationships between households' inflation expectations and their patterns of consumption and saving. The questions of particular relevance to financial stability relate to household expectations about the development of rents, real estate prices and interest rates, as well as the inputs into these expectations. These data can provide indications of imminent abrupt price corrections and hence of risk stemming from real estate loans.

This article outlines the methodology and selected results of the pilot survey. While considering issues of data quality, it assesses the relevance of the results achieved in view of the academic research and taking particular account of the Bundesbank's tasks, before concluding with an outlook for the Bundesbank's intended use of expectations data.

---

1 There have been a host of recent speeches on this topic by high-ranking central bank figures, including Benoît Coeuré on 11 July 2019, Luis de Guindos on 27 August 2019, and François Villeroy de Galhau and Jens Weidmann on 26 September 2019.
2 See the speech given by Jens Weidmann on 2 May 2018.
3 There is one prominent survey on expectations, conducted on behalf of the European Commission. This survey includes both qualitative and quantitative information on inflation expectations. See the European Commission website: https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en. The microdata from the quantitative information are not available to the public, however. Furthermore, recent research has found that more comprehensive household surveys may deliver further valuable information which can aid work in central banks; see Coibion et al. (2018) and the sources cited therein.

Survey concept of the Bundesbank Online Pilot Survey on Consumer Expectations in Germany

In the Bundesbank Online Pilot Survey on Consumer Expectations, approximately 2,000 individuals were surveyed via the internet in each of three successive waves, resulting in more than 6,000 responses. A portion of the respondents were surveyed multiple times, meaning that 4,000 respondents were included in the survey. Conducting the survey online ensures short field periods, quick data processing and thus a high survey frequency. However, population coverage and sampling present certain challenges, particularly in contrast to personal (face-to-face) interviews. The target population of the survey was individuals aged 16 and older living in Germany with internet access. The survey was conducted by forsa using its online panel, which is recruited entirely offline (forsa. omninet). Respondents are recruited by telephone during a forsa.omniTel survey, which is based on a representative sample of the German-speaking population aged 14 and older. The advantage of offline recruitment via telephone is that the online survey then also includes individuals who do not spend a significant amount of time on the internet and, in contrast to panels recruited online excludes individuals who only participate in (online) surveys for financial incentives. This allows distortionary effects in the form of a selection bias to be reduced to a good degree and a representative sample of the German online population to be obtained. The table on p. 56 provides an overview of the methodological framework of the Bundesbank pilot survey.

The questionnaires of the Bundesbank pilot survey consist of a set of core questions and varying question modules that were proposed by the Bundesbank as well as internal and external researchers. These questionnaires focus on surveying expectations and corresponding control variables in order to gain insights into the expectation formation process.[1]

The questions regarding consumer expectations are detailed and take into account a number of measurements as well as the experiences and recommendations from other studies. Questions on inflation expectations are asked in qualitative form (direction of inflation changes), quantitative form (point estimate of inflation expectations) and probabilistic form (evaluation of likelihoods of inflation being within specific ranges). The same applies to the questions on the expected development of real estate prices. Expectations regarding rents and interest rate developments, including rates on mortgages and savings accounts, are analysed in qualitative and quantitative form. A purely qualitative approach is taken to surveying expectations regarding general economic developments, particularly unemployment.

Distortion of survey results due to refusals and break-offs – known as non-response bias – can to some extent be corrected by means of weighting. The Bundesbank survey contains only limited information on the individuals who refuse to participate in the survey. However, by comparing the demographic characteristics of the respondents with those of the target population, weights can be constructed for each surveyed individual. For this survey, the weights were chosen in such a way that the marginal distributions of age, gender, education and region correspond to the data of the forsa.omniTel omnibus survey representative of the German (online) population aged 14 and older.[2]
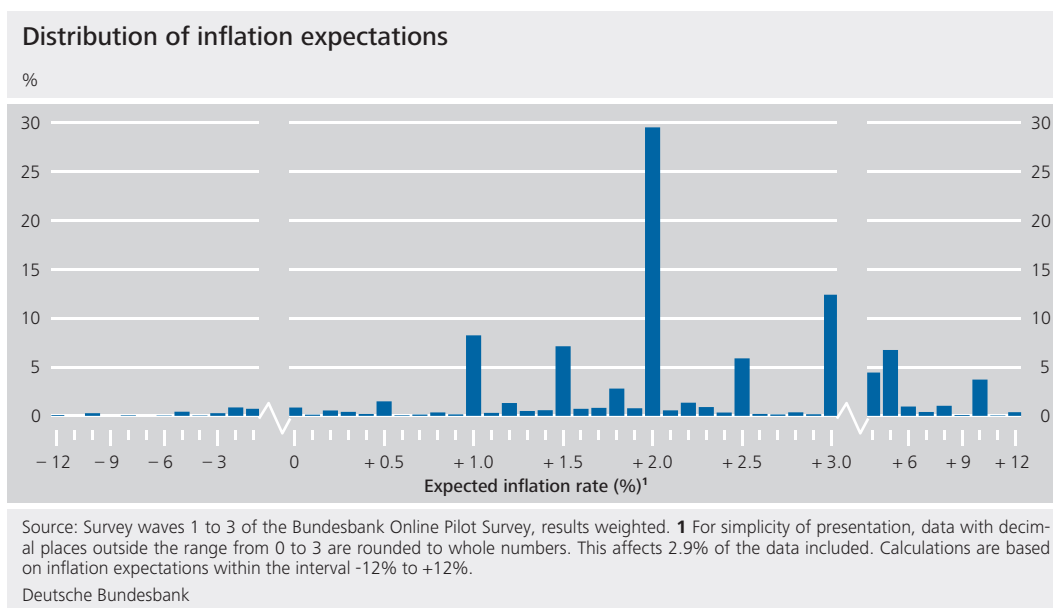
---

1 The questionnaires are available on the web page of the Bundesbank Online Pilot Survey on Consumer Expectations; see https://www.bundesbank.de/en/bundesbank/research/pilot-survey-on-consumer-expectations.
2 A more in-depth account and assessment of the methodology and data quality will be published as part of a technical paper in the first quarter of 2020.

Overview of methodological framework

Geographical scope	Germany
Target population	Individuals aged 16 and older with internet access
Survey company	forsa
Sampling frame	forsa.omninet panel, offline recruitment via forsa.omniTel
Sample	6,652 observations in three waves Wave 1: 2,009; wave 2: 2,052; wave 3: 2,591
Panel design	1,617 observations from 539 respondents in three waves 2,994 observations from 1,497 respondents in two waves 2,041 observations from 2,041 respondents in one wave
Reference period	April to June 2019
Questionnaire	Developed by the Bundesbank and external researchers using some questions from international surveys on consumer expectations; 28 questions in total, 13 core questions and a varying number of specific questions, as well as: – sociodemographic and feedback questions; – paradata captured automatically by forsa; – experiments and sample splits integrated into the questionnaires.
Fieldwork	Standalone survey, not part of a forsa omnibus survey; wave duration: 9 to 15 days; average survey duration: 18 minutes
Fieldwork period	Wave 1: 30 April to 8 May 2019 Wave 2: 29 May to 10 June 2019 Wave 3: 19 June to 3 July 2019
Pretest	Among Bundesbank employees: approx. 450 respondents Conducted by forsa before wave 1: approx. 50 respondents Conducted by forsa before wave 2: approx. 40 respondents Conducted by forsa before wave 3: approx. 50 respondents
Contact strategy	Recruitment for the forsa.omninet panel via telephone; invitation to participate in the Bundesbank Online Pilot Survey via email, no differentiation in invitation text between panel and non-panel respondents
Survey method	Computer-assisted web interviewing (CAWI); no option of returning to previous question and correcting responses; soft prompt: "Don't know" response displayed after respondent clicks on "Proceed" without having answered the question; not possible to proceed to next question without giving a response
Participation incentives	100 bonus points in the forsa reward system
Survey language	German
Aids used during survey	Respondents can use aids to assist in answering the questions; information on which aids were used is collected via the feedback channel
Response rate	Response rate 1 per American Association for Public Opinion Research (AAPOR) definition:[1] Wave 1: 59.7% Wave 2: 58.9% Wave 3: 62.5%
Weighting	Post-stratification weightings for age, gender, region and education based on the forsa.omniTel target population; no weight trimming
Linguistic editing and consistency checks	Post-survey consistency checks, minor edits relating to coding of missing values by forsa

1 The AAPOR response rate 1 is defined as the number of complete interviews divided by the total number of possible interviews (sum of complete interviews, partial interviews and non-interviews).

Deutsche Bundesbank

Distribution of inflation expectations

%

Expected inflation rate (%)[1]

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot Survey, results weighted. **1** For simplicity of presentation, data with decimal places outside the range from 0 to 3 are rounded to whole numbers. This affects 2.9% of the data included. Calculations are based on inflation expectations within the interval -12% to +12%.

Deutsche Bundesbank

Insights for monetary policy and central bank communication

The majority of those surveyed expect inflation rates between 0% and 3%, the median is 2%

More than 60% of surveyed individuals in Germany expect inflation to increase over the next 12 months in all three of the survey months from April to June 2019. Asked about the level of inflation over the next 12 months, the majority of individuals said they anticipated an inflation rate between 0% and 3% (see the above chart). Only a few individuals expect very high inflation or sharply negative inflation rates, in other words high deflation. The median, i.e. the value that splits respondents into two equally sized groups with high and low inflation expectations respectively, is exactly 2% in all three waves.

A comparison with the predictions of professional forecasters, whose forecasts ranged between 1.2% and 2.5% in the period of the survey,[4] makes it clear that the majority of those surveyed in the Bundesbank Online Pilot Survey have largely comparable expectations. And the Bundesbank Online Pilot Survey also delivers comparable and very plausible results compared to other household surveys (see the box on pp. 58 f.).

Previous research has established that past experiences influence inflation expectations,[5] and the analysis based on the Bundesbank Online Pilot Survey supports and adds to these findings. A case in point are the expectations of individuals who lived in East Germany prior to reunification. They expect a higher inflation rate than people who lived in West Germany before reunification. They are also more likely to expect inflation to increase. This difference can be related to the experience of a sudden rise of inflation in East Germany right after reunification.[6]

Disagreement by population group

Other patterns in the Bundesbank Online Pilot Survey data also confirm insights from previous research. An analysis of various sociodemographic groups shows that men are less likely to expect inflation to rise, and generally expect inflation to be lower than women do. Individuals with a higher level of education, homeowners and people in full-time employment also tend to have relatively lower inflation expectations.

4 The highest and lowest figures in the CPI forecast in the Consensus Economics forecast for Germany for March 2020, which was conducted in March 2019.
5 Malmendier and Nagel (2016) document cohort effects in inflation expectations and link them to inflation experienced over the individuals' respective lifetimes.
6 See Goldfayn-Frank and Wohlfart (2019).

A comparison of the results of the Bundesbank Online Pilot Survey with existing surveys

Some of the statistics that are used to describe the expectations of households and individuals are based on mean or average values. These are highly sensitive to distortions from unusual responses – a phenomenon known as outliers. This proves problematic, especially in those questions where respondents are asked to provide a point estimate of how they expect inflation or prices in the residential real estate market to develop. Such questions are known to elicit extreme values from a low number of respondents. In the literature, it is thus common practice to remove extreme outliers before analysing expectations. For inflation expectations, only those observations occurring in the interval of -12% and +12% are usually analysed.[1] This box compares the results of the Bundesbank Online Pilot Survey, particularly the percentage of

outliers, with the results from other surveys on household expectations – notably the New York Fed Survey of Consumer Expectations, on the one hand, and the consumer survey on behalf of the European Commission, on the other hand, which is conducted in Germany by the market research institution GfK.[2]

If inflation expectations of below -12% and above +12% are deemed outliers, the percentage occurring in the Bundesbank Online Pilot Survey (4.8%) is lower than in

---

1 See analyses based on the New York Fed Survey of Consumer Expectations. See also Van der Klaauw et al. (2008).
2 See https://www.newyorkfed.org/microeconomics/sce and https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en.

Comparison of inflation expectations in the Bundesbank Online Pilot Survey with those in the New York Fed Survey of Consumer Expectations[*]
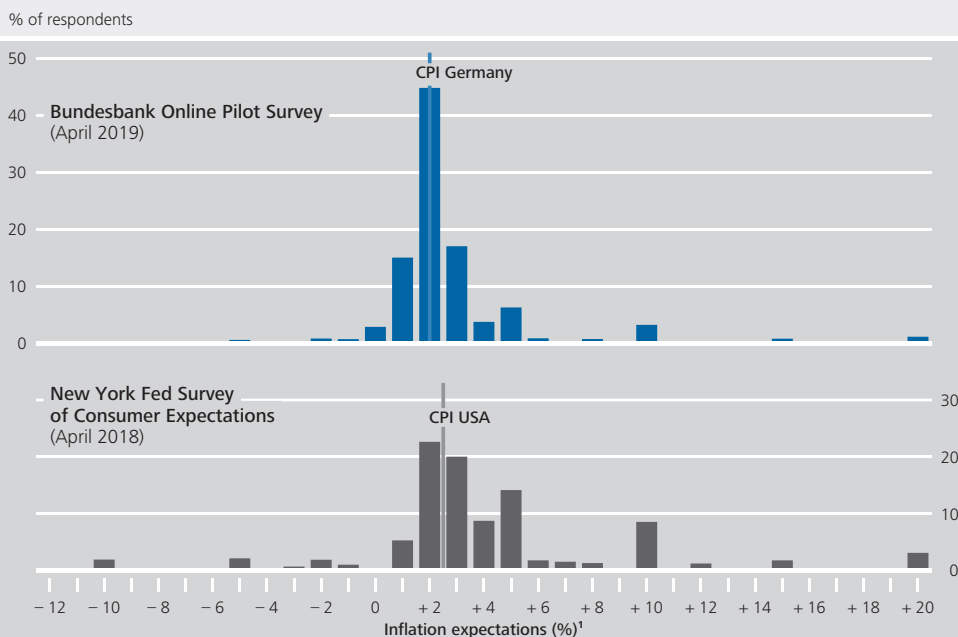
Sources: Survey wave 1 of the Bundesbank Online Pilot Survey as well as the New York Fed Survey of Consumer Expectations (April 2018 wave). ***** The chart shows the distribution of individual responses to the quantitative question on inflation expectations as well as the actual inflation rate (consumer price index: CPI) in the survey month. **1** Calculations are based on inflation expectations within the intervals -12% to +20%.

Deutsche Bundesbank

both the US survey and that conducted by GfK (see the adjacent table).

The chart on p. 58 illustrates the distribution of responses in the first wave of the Bundesbank Online Pilot Survey (fieldwork in April 2019) compared to the responses in the New York Fed Survey of Consumer Expectations (fieldwork in April 2018). Given that both surveys followed a period of low and stable inflation rates and that inflation rates within those periods were very similar in Germany and in the US, it is noticeable that the Bundesbank data for German households are much more tightly distributed with flatter upper and lower tails.[3]

However, due to the low level of outliers, it is currently not possible to find reliable explanations for outlier values based on socio-demographic characteristics.

Inflation expectation outliers – a comparison

Survey	GfK	Bundesbank Online Pilot Survey
Period	April-June 2016	April-June 2019
Method	CATI	CAWI
Formulation	Price	Inflation rate
Mean	4.5	3.4
Standard deviation	7.2	7.6
Outlier in % (<−12% and >12%)	5.5	4.8
Prices expected to decline, % of respondents	0.9	3.8
Number of observations	2,794	6,448

Sources: GfK EURO BUS (GfK), Bundesbank Online Pilot Survey, all figures weighted.
Deutsche Bundesbank

---

3 Observations with responses expecting inflation rates of below -12% and above +20% are not included.

It is also interesting that individuals with higher income tend to expect lower inflation rates (see the chart on p. 60). This effect could be related to differences in experienced inflation: different consumption bundles could mean that low-income households experience higher inflation than high-income households.[7]

Not only the level of inflation expectations but also disagreement about expected inflation matter for monetary policy. The degree of disagreement and how it develops over time may have an important impact on monetary policy transmission, as a current study shows.[8] As an example, the upper chart on p. 61 shows the average expected inflation rate by income group (above or below the median) in the upper panel, and disagreement about expected inflation rates[9] in the lower panel. Not only do individuals with an income above the median exhibit lower inflation expectations than people with lower income, their predictions of future inflation are also more similar to each other.
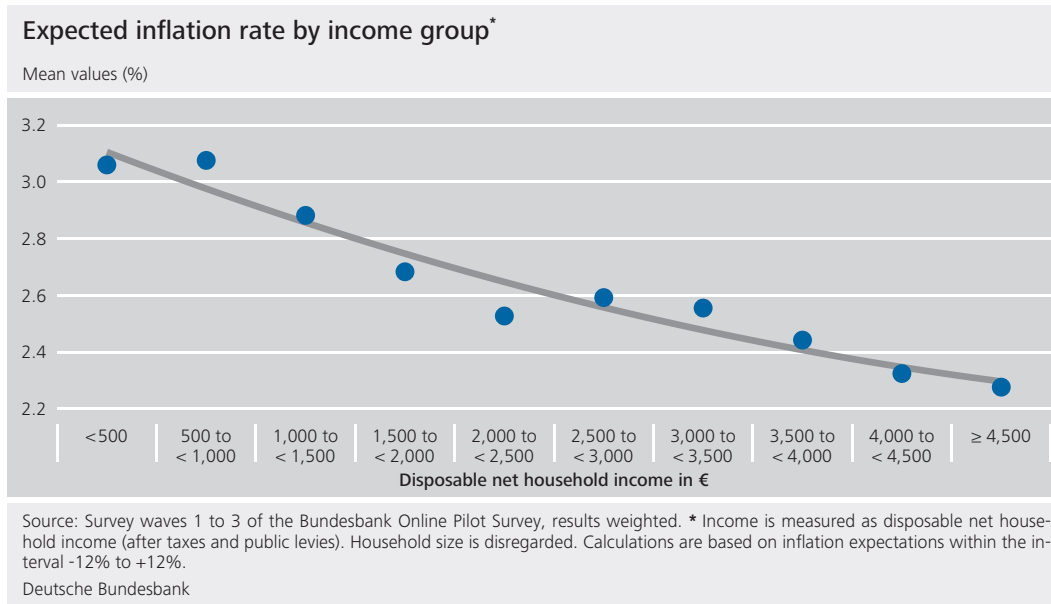
Inflation expectations and individual uncertainty

Another important aspect of inflation expectations is individual uncertainty about the level of expected inflation. In this context, the question arises as to whether higher uncertainty about future inflation is associated with a willingness to revise subjective inflation expectations. In order to assess the question of how certain individuals are about their inflation expectations and to what degree individuals who are especially uncertain revise their expectations

Higher individual uncertainty about future inflation associated with greater revisions of expectations

---

7 See Kaplan and Schulhofer-Wohl (2017) and D'Acunto et al. (2019a). Besides different patterns in terms of experience and consumption, the literature also cites differences in information reception and processing as potential explanations. See, inter alia, D'Acunto et al. (2019b).
8 See Falck et al. (2019). However, longer time series are needed for an in-depth study of the relationship between disagreement about inflation among households and the transmission of monetary policy.
9 Here and in the following, disagreement in terms of the responses of different individuals with a lower (higher) income is measured by the standard deviation.

Expected inflation rate by income group*

Mean values (%)

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot Survey, results weighted. * Income is measured as disposable net household income (after taxes and public levies). Household size is disregarded. Calculations are based on inflation expectations within the interval -12% to +12%.

Deutsche Bundesbank

over time, the Bundesbank Online Pilot Survey includes a question on the subjective probability distribution of the expected inflation rate.[10]

People who expect higher inflation rates as well as those who expect negative inflation rates tend to be more uncertain about their inflation forecasts (see the bottom chart on p. 61).[11]

In the pilot survey, the differences in subjective uncertainty levels and in the levels of expected inflation have significant effects on people's adjustments of their expectations. Using the panel dimension of the dataset, we find that individuals with higher uncertainty about future inflation rates are significantly more likely to revise their inflation forecast from one month to the next. People who expect moderate inflation (in a range between 0% and 3%) tend, on average, to adjust their expectations slightly downwards, and those who expect negative inflation also tend to revise their expectations downwards; individuals who expect higher inflation rates, meanwhile, tend to change their expectations strongly upwards.

Central bank communication can help reduce uncertainty

Central banks usually prefer inflation expectations to remain as stable as possible at around the monetary policy target rate of inflation because as long as this is the case, changes to the policy rate set by the central bank are passed through directly to the real interest rate that applies to investment and consumption. Abrupt changes in individual inflation expectations could signal a de-anchoring of inflation from the monetary policy target rate, which would hinder monetary policy transmission and which the central bank would try to counteract by means of communication.[12] Data from the Bundesbank Online Pilot Survey were used to make two major findings in this regard. First, Coibion, D'Acunto, Gorodnichenko and Weber show that additional information can reduce individual uncertainty about inflation expectations. Second, Conrad and Glas show that people who do not predominantly use classic media channels such as newspapers and television or radio news to access information about monetary policy tend to be particularly uncertain (see the chart on p. 64).[13] This second finding supports the Bundesbank's decision to communi-

10 Respondents were asked to assess the probability of future inflation scenarios by allocating 100 points across the inflation scenarios presented.
11 This phenomenon is not unique to Germany nor indeed to households: Afrouzi and Veldkamp (2019) register similar results for firms' expectations.
12 The impact which central bank communication can have on households' inflation expectations is demonstrated, inter alia, by Lamla and Vinogradov (2019); De Haan and Sturm (2019); Binder (2017).
13 See presentations by Weber and Conrad at the Bundesbank-Banque de France Joint Conference on Household Expectations and Coibion et al. (2019).

cate more via social media, in addition to other channels. Further research findings were presented at a conference on household expectations organised jointly by the Bundesbank and the Banque de France (see the box on p. 62 f.).

Given the importance of firmly anchored inflation expectations for monetary policy, central banks could use prompt, high-quality time series on inflation expectations and the uncertainty surrounding them as a valuable source of information.

## Inflation expectations and intended consumption and saving

People expecting higher inflation say they will save less

Another key aspect for central banks is the relationship between inflation expectations and intended saving and consumption. In theory, households with higher inflation expectations ought to display a lower propensity to save because – all other things being equal – these households are expecting real interest rates to generate lower returns on savings. An analysis of the survey results does indeed show that individuals who are expecting inflation to rise are significantly more likely to save less than other people. Furthermore, people who expect a higher rate of inflation are more likely to plan to increase their spending on durable consumer goods over the next 12 months in comparison to the previous year. And for individuals who expect interest rates to go down, the planned saving rate drops – which is also in keeping with the theory.

These results corroborate earlier studies based, amongst others, on the Bundesbank's Panel on household finances (PHF) study.[14] What they mainly suggest, though, is that the general public do understand basic economic concepts and incorporate their expectations into their consumption and saving behaviour.
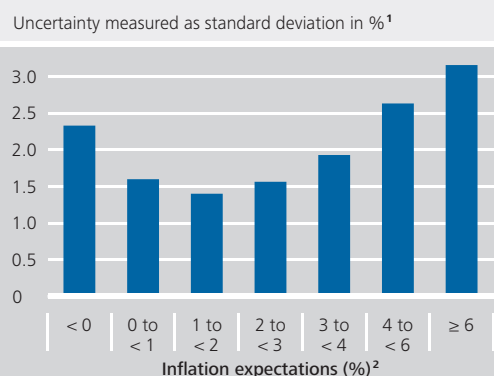
In conclusion, the Bundesbank Online Pilot Survey demonstrates that household inflation ex-

Expected inflation and disagreement by income group*
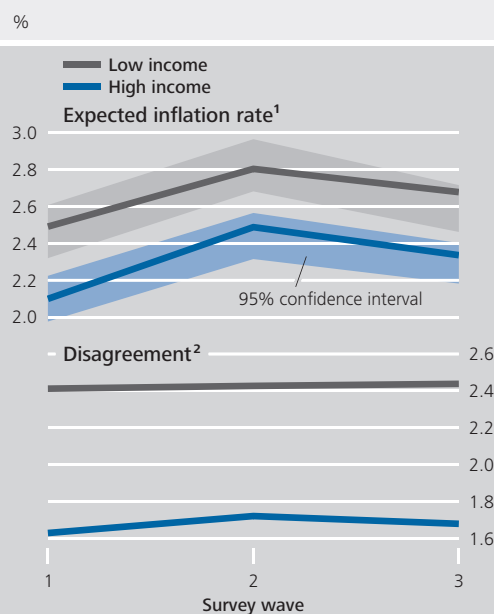
%

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot Survey, results weighted. ***** Income is measured as disposable net household income (after taxes and public levies). Allocation to low or high income is based on value of the median. Household size is disregarded. Calculations are based on inflation expectations within the interval -12% to +12%. **1** Point estimate, measured as mean. **2** Point estimate, measured as standard deviation from the mean.

Deutsche Bundesbank

Expected inflation rate and uncertainty

Uncertainty measured as standard deviation in %[1]

Source: Survey waves 2 and 3 of the Bundesbank Online Pilot Survey, results weighted. **1** Shown as the standard deviation of individual probabilistic distribution to inflation expectations. **2** The expected inflation rate is based on the point estimate. Calculations are based on inflation expectations within the interval -12% bis +12%.

Deutsche Bundesbank

pectations in Germany are mostly moderate, with more than two-thirds of respondents expecting inflation to fall within a range of 0% to 3%. Significant discrepancies do exist, how-

---

14 See Crump and Nghiem (2015); Dräger and Nghiem (2018); Marek (2017).

Insights from the Bundesbank and Banque de France Joint Conference on Household Expectations

At the conference held from 26 to 28 September this year on the topic of household expectations, researchers shared findings which could be of significance for monetary policy, financial stability policy and the communications strategy of the Bundesbank. Amongst other sources, scientific findings from the Bundesbank's Online Pilot Survey on Consumer Expectations in Germany were presented. A selection of the insights from the conference is outlined below.[1]

Insights on monetary policy

The reason for monetary policy's keen focus on inflation expectations is that, in an environment of virtually fixed short-term nominal interest rates, they are the only remaining way to influence real interest rates.[2] Inflation expectations have an effect on household consumption, firms' investment and pricing behaviour and workers' wage demands. When seeking to ascertain causal relationships between inflation expectations and behaviour, researchers are increasingly employing randomised controlled trials, whereby only some of the study participants receive certain pieces of information. This makes it possible to investigate how that information affects expectation formation and actions.[3]

Bottone and Rosolia (2019) find that in Italy firms adjust their inflation expectations on the basis of monetary policy decisions. With regard to the behaviour of firms when inflation expectations are higher, Coibion, Gorodnichenko and Kumar (2018) find, on the basis of data for New Zealand, increases in employment and investment and no change in prices and wages. Coibion, Gorodnichenko and Ropele (2018), however, identify declines in employment and investment plus increases in prices based on data for Italy.[4]

Households in Germany do not behave in line with Neo-Fisherian theory, that is to say, they do not expect that an interest rate rise would lead to a higher inflation rate. This is the finding of Bachmann, Born, Sims and Weber, based on questions posed as part of the Bundesbank Online Pilot Survey. Nor, for the most part, are any Neo-Fisherites to be found in sub-groups of the survey respondents; rather, the established theory according to which interest rate rises bring about decreases in inflation is borne out in the survey data.[5]

Insights on financial stability

Renters expect significantly stronger increases in house prices than homeowners, since they form their expectations based on different sources of information. This is the finding of Kindermann, Le Blanc, Piazzesi and Schneider from analyses of Bundesbank data (PHF study and Online Pilot Survey) as well as from a model with learning agents. Their research found that individual house price expectations can largely be ex-

1 The conference programme and all the presentations are available online at https://www.bundesbank.de/de/bundesbank/forschung/konferenzen/joint-conference-on-household-expectations-794662
2 For economic decisions, the relevant interest rate is the perceived real interest rate: $r_t = i_t - E_t\ (\pi_{t+1})$. If the nominal interest rate i_t is fixed, inflation expectations $E_t\ (\pi_{t+1})$ determine – according to the Fisher equation – the real interest rate.
3 See keynote speech by Coibion (University of Texas at Austin).
4 See poster presentation by Rosolia (Banca d'Italia) and keynote speech by Coibion (University of Texas at Austin).
5 See presentation by Born (Frankfurt School; using data from the Bundesbank Online Pilot Survey).

plained by housing status (renter or owner) and by previous house price growth in the respondent's region.[6]

Household expectations influence purchasing behaviour and can help to explain house price cycles. Drawing on data from the Bundesbank Online Pilot Survey, Abbassi and Beutel investigate the role expectations and in particular heterogeneities in expectations play in the development of house prices and rents. Ludwig, Mankart, Quintana, Vellekoop and Wiederholt examine similar questions using data from De Nederlandsche Bank, and also add data from the Bundesbank Online Pilot Survey.[7]

Households become accustomed to house price increases and extrapolate previous house price increases into future expectations. In doing so, they underestimate the persistence in the longer term, meaning they underestimate the characteristic of house prices reverting to an average rate of growth. This is the finding of Gosselin, Khan and Verstraete (2019) on the basis of a representative household survey in Canada; they observe that excessive real estate price expectations can lead to very strong boom-bust cycles in house prices. Combined with real estate loans, this can give rise to financial stability risk.[8]

Insights on central bank communication

Simple central bank messages impact strongly on household expectations. The more extensive the messages are, the blunter their effect becomes. This is the finding of several studies based on data from the United States. Respondents who were provided with simple messages – the latest realised inflation rate, the central bank's inflation target or inflation forecast – subsequently adjusted their inflation expectation significantly towards more plaus-

ible values. Other respondents were presented with the latest FOMC statement or a press article on the most recent monetary policy decision as "information treatment". The response to the press article was the weakest compared with the other information listed here. However, the adjustment of inflation expectations is only short-lived. Significant effects are no longer recognisable after six months. The same finding is made in a laboratory experiment in which multiple respondents form their expectations based on certain central bank information, resulting in actual values in the laboratory for interest rates, income and inflation – in this experiment, simple central bank information stabilises interest rate expectations most effectively.[9]

Individuals in Germany primarily use classic media to obtain information on monetary policy. The older, the more educated and the wealthier people are, the more this holds true. People who use classic media (radio, television, newspapers or their websites) have significantly lower inflation expectations, lower forecast errors and lower uncertainty regarding future inflation.[10]

---

6 See keynote speech by Piazzesi (Stanford University; using data from the Bundesbank Online Pilot Survey).
7 See presentation by Beutel (Deutsche Bundesbank; using data from the Bundesbank Online Pilot Survey) and poster presentation by Mankart (Deutsche Bundesbank; using data from the Bundesbank Online Pilot Survey).
**8** See poster presentation by Verstraete (Bank of Canada).
9 See keynote speech by Coibion (University of Texas at Austin) and presentation by Petersen (Simon Fraser University).
10 See poster presentation by Conrad (Heidelberg University; using data from the Bundesbank Online Pilot Survey).

Uncertainty surrounding the expected inflation rate by information channel

Uncertainty measured as standard deviation in %[1]
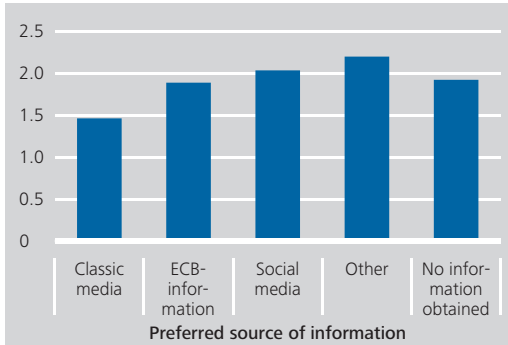
Source: Survey wave 3 of the Bundesbank Online Pilot Survey, results weighted. **1** Measured as the standard deviation of the individual distribution on the basis of the probabilistic question on inflation expectations.
Deutsche Bundesbank

ever, between the different population groups in terms of inflation expectations, disagreement over inflation expectations and individual uncertainty about inflation expectations. Collecting and analysing these measures promises to deliver valuable insights for the Bundesbank.

■ Insights for financial stability

In the household sector, real estate is the largest asset item and the main risk to financial stability

Real estate is usually the most valuable asset a household owns and, for most households, real estate ownership requires taking on substantial debt. Consequently, purchasing a house or flat is a major decision for many households. Expectations of how rents and private residential real estate prices will develop play a key role in households' decisions to buy, and thus have an impact on actual property prices.[15] Property prices have risen sharply across much of Germany in recent years. The Bundesbank is keeping a close eye on this, not least in light of the lessons learned from real estate price developments in the United States at the time of the financial crisis in 2007. Many studies find evidence to suggest that excessive expectations surrounding future rent and price developments were one of the root causes of the US residential real estate market boom and the subsequent real estate crisis in the 2000s.[16]

Data on households' expectations of price developments in the residential real estate market allow differences between expectations and actual price developments to be identified. The Bundesbank Online Pilot Survey therefore contains several questions about the real estate market and, thanks to its good regional coverage, allows such gaps to be identified for individual Federal states or even districts.[17] Overall, the Bundesbank Online Pilot Survey covered respondents from 398 of the 401 districts in Germany. The geographical coverage is particularly important because the significant increase in prices in the market for private residential real estate is no longer confined to urban areas, but is spilling over to districts far away from metropolitan areas.[18]

Expectations about the future growth of real estate prices

As in the case of inflation expectations, the Bundesbank Online Pilot Survey works with different types of questions to also examine expectations about real estate prices. All types of questions concern the expected development of real estate prices over the next 12 months in the region of the respective respondent. In the first question, survey participants are asked to state their expectations about real estate prices on a five-point scale ranging from "decrease significantly" to "increase significantly" (see the table on p. 65). Based on this question, around 80% of all respondents in each of the three survey waves expect prices to increase. Around 35% expect even expect real estate prices to increase significantly, whereas fewer than 1%

Just over one-third of all respondents expect significant increase in real estate prices

15 See, for example, Abildgren et al. (2018); Armona et al. (2019); Burnside et al. (2016); Case et al. (2015).
16 See Adam et al. (2011); Case et al. (2015); Clark and Coggin (2011); Piazzesi and Schneider (2009); Towbin and Weber (2015). For a number of years, expectations surrounding rent and real estate price developments in the United States far outstripped actual rent and price developments.
17 Here and in the following, the term "district" is used as an abbreviation to cover districts and district-free major cities.
18 See Deutsche Bundesbank (2019a), pp. 53-55.

expect prices to decrease. Strong regional differences were found in expectations about how prices in the market for real estate will develop going forward. The chart on p. 66 shows the percentage of respondents at the Federal state level who expect prices to increase significantly.[19] This percentage is lowest in Saarland, Saxony-Anhalt and Thuringia, at around only 20%.[20] The values for Bavaria (43%), Brandenburg (45%) and Hamburg (47%) are significantly higher. In Berlin, as many as 58% of respondents expect real estate prices to increase significantly. A similar picture emerges when the expectations about the future development of real estate prices are aggregated on the basis of the characteristics of the individual districts. The table on p. 66 shows that more individuals in urban districts expect real estate prices to increase significantly than in rural districts.[21] This is consistent with the different price trends observed in recent years. Real estate prices in urban districts have risen more strongly in the last few years than in rural districts, with the strongest price increases recorded for major cities.[22] However, driving this pattern, the settlement structure plays a less important role than demographic and economic developments in the respective districts. Irrespective of whether they live in urban or rural districts, the percentage of respondents expecting a significant price increase is considerably higher in growing than in non-growing districts.[23]

In addition, more renters than homeowners expect a significant price increase.[24] Making a distinction between renters and homeowners is key to understanding the regional differences in real estate price expectations. As a rule, the share of renters in urban districts is greater than in rural districts.[25] Thus, part of the higher house price expectations in cities is attributable to the greater share of renter households there, who, on average, have higher home price expectations than homeowners.

Individual assessment of the development of real estate prices

Qualitative assessment

Wave	Decrease significantly	Decrease slightly	Stay roughly the same	Increase slightly	Increase significantly
Wave 1	0.4	2.0	18.2	43.5	35.9
Wave 2	0.3	2.4	16.6	46.4	34.3
Wave 3	0.4	1.8	16.8	45.9	35.1
All waves	0.4	2.0	17.2	45.3	35.1

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot Survey, results weighted.
Deutsche Bundesbank

Distribution of real estate price expectations

It is reasonable to assume, that when forming real estate price expectations, individuals take their bearings at least partly from past price developments in their environment. However, the results presented above so far say little about

Across Germany, a 5.9% increase in real estate prices is expected over a 12-month period

19 The small sample size does not ensure data are representative at the Federal state level.
20 Generally speaking, the percentage shares are low for Federal states with a low population density. For data on population densities in Federal states, see Federal Statistical Office (2018).
21 The classification of districts is based on the "district type" indicator devised by the Federal Institute for Research on Building, Urban Affairs and Spatial Development. Districts categorised as "urban district" and "district-free major city" were classified as urban districts and all other districts as rural districts; see Federal Institute for Research on Building, Urban Affairs and Spatial Development (2019a).
22 See Deutsche Bundesbank (2019a), pp. 53-55.
23 The classification of districts is based on the indicator "Growing and shrinking of districts/district regions" devised by the Federal Institute for Research on Building, Urban Affairs and Spatial Development and on different demographic and economic indicators; see Federal Institute for Research on Building, Urban Affairs and Spatial Development (2018). Districts classified as "growing" or "growing at an above-average rate" were classified as growing districts, and all other districts as non-growing districts.
24 This applies to all aggregation levels in the table on p. 66. The differences shown in this table are also statistically significant when controlling for income, education, gender, and Federal state.
25 See Statistische Ämter des Bundes und der Länder (statistical offices of the Federation and the Länder) (2015), p. 18.

Real estate price expectations by Federal state
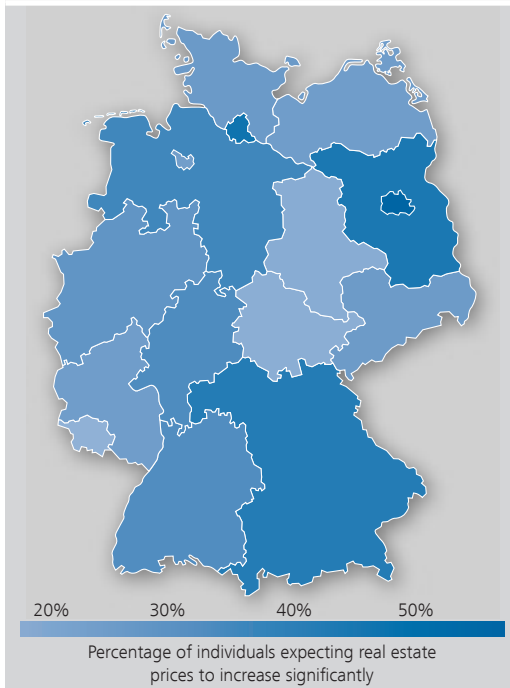
20% 30% 40% 50%

Percentage of individuals expecting real estate
prices to increase significantly

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot
Survey, results weighted.
Deutsche Bundesbank

Percentage of respondents expecting house prices to increase significantly

District	All respondents	Renters	Homeowners
All districts	35.1	42.7	29.0
Rural districts	29.0	34.8	26.1
non-growing	21.6	26.9	18.5
growing	34.6	42.3	31.4
Urban districts	37.7	44.9	30.6
non-growing	23.9	31.6	18.9
growing	40.4	46.9	33.5

Source: Survey waves 1 to 3 of the Bundesbank Online Pilot Survey, results weighted.
Deutsche Bundesbank

whether real estate price expectations correspond with or overshoot past developments. For this reason, individuals participating in the Bundesbank Online Pilot Survey were also asked by what percentage they expect prices for real estate to rise or fall.

According to the responses to this question, individuals on a nationwide average expect prices to increase by 5.9% over the next 12 months. The median is of a similar magnitude, standing at 5%.[26] These values are largely in line with past price developments in the real estate market.[27] According to the house price index of the Federal Statistical Office, residential real estate prices likewise increased by 5.9% between October 2018 and September 2019. Individuals therefore expect, on average, prices to rise at the same rate as previous price increases.[28]

The chart on p. 67 shows the distribution of expectations regarding real estate price growth measured in percent. Although just under 25% of respondents expect prices to rise by 5%, the chart reveals a strong dispersion in the responses.[29] Given the large differences in past price developments in the German market for private residential real estate, this dispersion is not surprising. The chart also shows that 89% of all responses fall within the range of price increases seen in Germany over the last five years; around 10% of all responses are above this range.
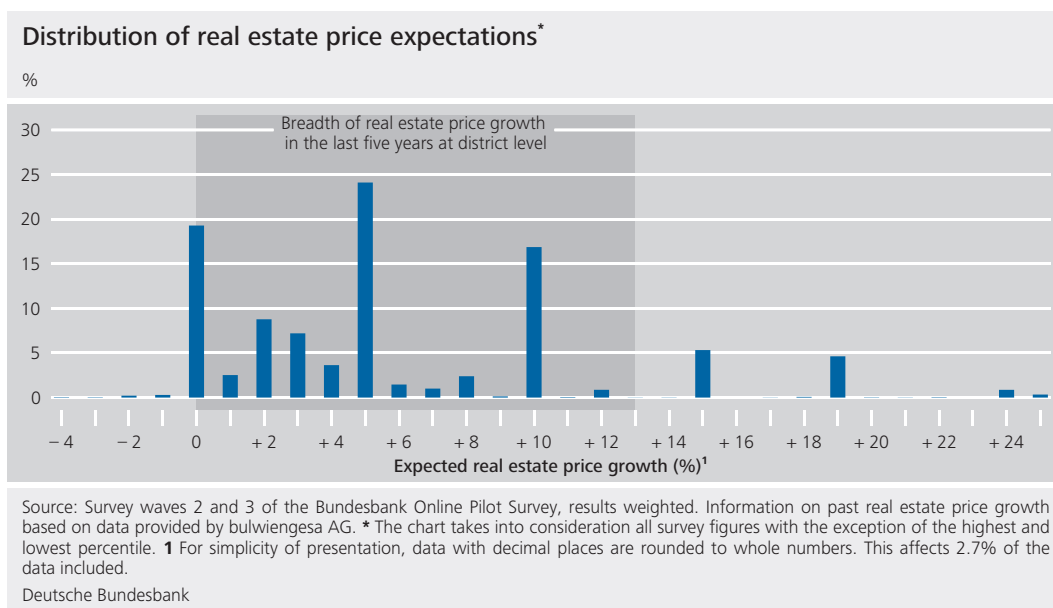
While individuals, on average, expect price growth to be in line with previous price increases, this does not apply at the disaggregate

---

26 Both values are calculated using a weighted design. To prevent outliers from distorting the median, values on or below the 1st percentile and on or above the 99th percentile are left out of the calculation. This means that 68 responses (-5% or lower) and a further 82 responses (30% or higher) do not feed into the calculation. In total, 3.2% of the responses are excluded from the calculation. If the outliers are included in the calculation, the weighted average of the variable rises from 5.9% to 6.5%. The weighted median remains at 5%.
27 See Deutsche Bundesbank (2019a), pp. 53-55.
28 See Federal Statistical Office (2019). Similar results are obtained when the respondents are asked to state the price development they expect, not as a percentage but as a change in euro amounts, as shown in Deutsche Bundesbank (2019b), pp. 47-48.
29 The high share of respondents expecting an increase in real estate prices of 0% is due to the design of the online questionnaire. Respondents who, in response to the first question about real estate prices, stated they expect prices to stay roughly the same were not asked to express in percentage points their expectations about the future growth of real estate prices. Instead, the value of 0% was entered subsequently for these respondents.

Distribution of real estate price expectations*

%

Breadth of real estate price growth
in the last five years at district level

Expected real estate price growth (%)[1]

Source: Survey waves 2 and 3 of the Bundesbank Online Pilot Survey, results weighted. Information on past real estate price growth based on data provided by bulwiengesa AG. ***** The chart takes into consideration all survey figures with the exception of the highest and lowest percentile. **1** For simplicity of presentation, data with decimal places are rounded to whole numbers. This affects 2.7% of the data included.

Deutsche Bundesbank

Divergence in real estate price expectations at the regional level worth further consideration

level of individual districts. The chart on p. 68 shows a comparison of expected and past real estate price developments. For the purposes of this comparison, all respondents were first of all ordered by how prices evolved over the last five years in the district of their primary residence. The blue line shows these past price developments, while the black line plots the real estate price growth expected by respondents. It is clear from this chart that individuals draw on past price developments when forming their expectations of future real estate prices. However, the chart also illustrates a significant divergence in expectations at the regional level: those respondents living in districts where price increases were high in the past tend to expect price increases to fall behind their previous levels. At the same time, those respondents who live in districts where price increases were low in the past tend to expect price increases to outstrip their previous levels. Only time will tell how far this finding should be regarded as a warning sign for excessive price expectations in regions that tend to be structurally weaker, or more as a sign of a regional equalisation of real estate price developments.

Looking at all these findings on financial stability in their entirety, real estate price developments and real estate price expectations can be seen to vary significantly depending on the re-
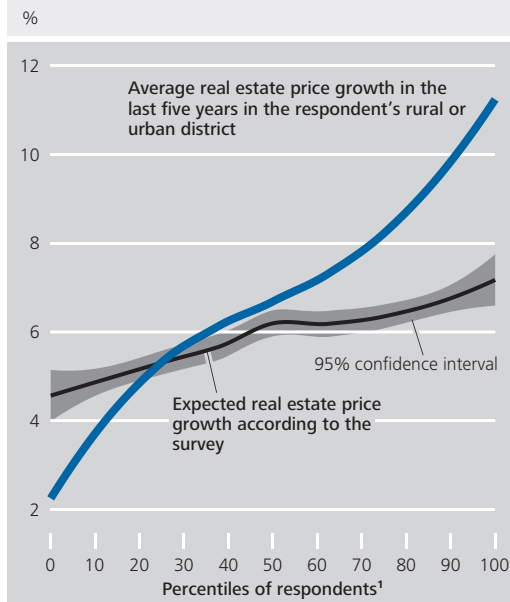
gion observed and household group surveyed. This insight is not new. In the global financial crisis, too, it was a subgroup of households and a subgroup of real estate that served as a catalyst for the crisis. Since then, policymakers and academics have been showing a greater interest in households' real estate decisions and their impact on financial stability. Their focus of interest lies, in particular, on factors that influence the formation of expectations surrounding price developments in the real estate market and on indicators that can be used to assess the risk of abrupt changes in the real estate market. The Bundesbank Online Pilot Survey provides initial evidence on both counts.

■ Outlook

At a time in which inflation expectations and central bank communication are playing an ever more prominent role and in which developments in the real estate market can become risks to financial stability, the Bundesbank is working to improve the volume of information underpinning its recommendations in these areas. By implementing the pilot survey on household expectations in Germany, the Bundesbank has taken a first step towards filling a data gap for Germany. In so doing, it is contributing to the analysis of household expectations

Larger and more precise dataset on expectations required

Comparison of past and expected real estate price growth broken down by region[*]

%

Average real estate price growth in the last five years in the respondent's rural or urban district

95% confidence interval

Expected real estate price growth according to the survey

Percentiles of respondents[1]

Source: Waves 2 and 3 of the Bundesbank Online Pilot Survey. Information on past real estate price growth based on data provided by bulwiengesa AG. ***** The chart takes into consideration all survey figures with the exception of the highest and lowest percentile. **1** Ordered according to average real estate price growth in the last five years in the respondent's rural or urban district.

Deutsche Bundesbank

is greater, as are the differences between the individual inflation expectations in this group. These differences can have substantial consequences for the functioning and effectiveness of monetary policy measures. First, it is shown that individuals who are very uncertain with regard to their inflation expectations are more likely to revise their inflation expectations within a short period of time. Second, as academic research has shown that uncertainty and disagreement surrounding inflation expectations play an important role in monetary policy transmission,[30] the Bundesbank will act on these insights and collect data on how expectations and uncertainty regarding inflation evolve on a monthly basis.

… and into expectations regarding the real estate market

In a similar manner, it has also been shown that data on individuals' expectations provide valuable information on current developments in the real estate market. In particular, data on individuals' expectations of rents and house prices allow granular, regional or household-group-specific analyses to be carried out. These are one factor in the early identification of possible credit-driven developments in the real estate market and thus of risks to financial stability. It is precisely this type of analysis that was found to be crucially needed following the financial crisis of 2007, and by rolling out the pilot survey on household expectations in Germany, the Bundesbank has started filling in one of the existing data gaps.

and the related decisions on consumption, saving and investment.

Bundesbank Online Pilot Survey delivers important insights into inflation expectations …

With regard to inflation expectations, the results of the Online Pilot Survey show that consumers in Germany have relatively realistic expectations that, for a large portion of respondents, do not deviate sharply from the expectations of professional market players. That said, expectations do differ significantly across individual households. In particular, depending on income group, very different values come to light for individual uncertainty and the degree of agreement on inflation expectations. Individuals with higher incomes are less uncertain with regard to their expectations, and there is greater alignment in the inflation expectations of people in this income group. For lower income households, by contrast, individual uncertainty with regard to inflation expectations

After evaluating the results from the pilot survey, the Bundesbank has decided to continue the monthly, internet-based survey of individuals in Germany. It will pool its expertise on expectations surveys in a Bundesbank Expectations Centre and make its services available to not only the research community but also the general public from 2021 onwards.

The Bundesbank will expand its expertise on expectation surveys

30 See Falck et al. (2019).

▪ List of references

Abildgren, K., N. L. Hansen and A. Kuchler (2018), Overoptimism and house price bubbles, Journal of Macroeconomics, Vol. 56, pp. 1-14.

Adam, K., P. Kuang and A. Marcet (2011), House Price Booms and the Current Account, NBER Working Paper No 17224, July 2011.

Afrouzi, H. and L. Veldkamp (2019), Biased Inflation Forecasts, Meeting Papers No 894, Society for Economic Dynamics.

American Association for Public Opinion Research (2016), Standard definitions: Final dispositions of case codes and outcome rates for surveys.

Armona, L., A. Fuster and B. Zafar (2019), Home Price Expectations and Behaviour: Evidence from a Randomized Information Experiment, The Review of Economic Studies, Vol. 86 (4), pp. 1371-1410.

Binder, C. C. (2017), Measuring uncertainty based on rounding: New method and application to inflation expectations, Journal of Monetary Economics, Vol. 90, pp. 1-12.

Bottone, M. and A. Rosolia (2019), Monetary policy, firms' inflation expectations and prices: causal evidence from firm-level data, Banca d'Italia Temi di discussione No 1218.

Burnside, C., M. Eichenbaum and S. Rebelo (2016), Understanding Booms and Busts in Housing Markets, Journal of Political Economy, Vol. 124 (4), pp. 1088-1147.

Case, K. E., R. J. Shiller and A. Thompson (2015), What Have They Been Thinking? Home Buyer Behavior in Hot and Cold Markets, NBER Working Paper No 18400, March 2015.

Clark, S. P. and T. D. Coggin (2011), Was there a U.S. house price bubble? An econometric analysis using national and regional panel data, The Quarterly Review of Economics and Finance, Vol. 51 (2), pp. 189-200.

Coibion, O., Y. Gorodnichenko and S. Kumar (2018a), How Do Firms Form Their Expectations? New Survey Evidence, American Economic Review, Vol. 108 (9), pp. 2671-2713.

Coibion, O., Y. Gorodnichenko, S. Kumar and M. Pedemonte (2018b), Inflation expectations as a policy tool?, NBER Working Paper No 24788.

Coibion, O., Y. Gorodnichenko and T. Ropele (2018c), Inflation Expectations and Firm Decisions: New Causal Evidence, NBER Working Paper No 25412.

Coibion, O., Y. Gorodnichenko and M. Weber (2019), Monetary Policy Communications and their Effects on Household Inflation Expectations, NBER Working Paper No 25482.

Crump, R. K., S. Eusepi, A. Tambalotti and G. Topa (2015), Subjective Intertemporal Substitution, Federal Reserve Bank of New York Staff Report No 734, revised on 1 March 2019.

D'Acunto, F., U. Malmendier, J. Ospina and M. Weber (2019a), Exposure to Daily Price Changes and Inflation Expectations, NBER Working Paper No 26237.

D'Acunto, F., D. Hoang, M. Paloviita and M. Weber (2019b), Cognitive Abilities and Inflation Expectations, American Economic Review Papers and Proceedings, Vol. 109, pp. 562-566.

De Haan, J. and J.-E. Sturm (2019), Central Bank Communication: How to Manage Expectations?, in The Oxford Handbook of the Economics of Central Banking, pp. 231 ff.

Deutsche Bundesbank (2019a), Housing prices in Germany in 2018, Monthly Report, February 2019, pp. 53-55.

Deutsche Bundesbank (2019b), Financial Stability Review 2019, November 2019.

Deutsche Bundesbank (2018), Financial Stability Review 2018, November 2018.

Dräger, L. and G. Nghiem (2018), Are Consumers' Spending Decisions in Line With an Euler Equation? Gutenberg School of Management and Economics and Research Unit "Interdisciplinary Public Policy" Discussion Paper No 1802.

Falck, E., M. Hoffmann and P. Hürtgen (2019), Disagreement about inflation expectations and monetary policy transmission, Journal of Monetary Economics, forthcoming.

Federal Agency for Cartography and Geodesy (2018), Verwaltungsgebiete 1:250 000 (VG250), available at https://gdz.bkg.bund.de/index.php/default/open-data.html (last accessed on 12 August 2019).

Federal Institute for Research on Building, Urban Affairs and Spatial Development (2019a), INKAR, available at https://www.inkar.de/ (last accessed on 13 November 2019).

Federal Institute for Research on Building, Urban Affairs and Spatial Development (2019b), Raumabgrenzungen: Referenzdateien und Karten, available at https://www.bbsr.bund.de/BBSR/DE/Raumbeobachtung/Downloads/downloads_node.html (last accessed on 13 November 2019).

Federal Statistical Office (2019), Häuserpreisindex, Preisindex für Bauland. Veränderungsraten zum Vorjahresquartal in %, available at https://www.destatis.de/DE/Themen/Wirtschaft/Konjunkturindikatoren/Basisdaten/bpr410j.html (last accessed on 13 November 2019).

Federal Statistical Office (2018), Bundesländer mit Hauptstädten nach Fläche, Bevölkerung und Bevölkerungsdichte am 31.12.2018, available at https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ/02-bundeslaender.html (last accessed on 13 November 2019).

Goldfayn-Frank, O. and J. Wohlfart (2019), Expectation Formation in a New Environment: Evidence from the German Reunification, Journal of Monetary Economics, forthcoming.

Gosselin, M.-A., M. Khan and M. Verstraete (2019), The Formation of House Price Expectations in Canada: Evidence from a Randomized Information Experiment, Staff Analytical Note 2019-24, Bank of Canada.

Kaplan, G. and S. Schulhofer-Wohl (2017), Inflation at the Household Level, Journal of Monetary Economics, Vol. 91 (C), pp. 19-38.

Kuchler, T. and B. Zafar (2019), Personal Experiences and Expectations about Aggregate Outcomes, The Journal of Finance, forthcoming.

Lamla, M. J., and D. V. Vinogradov (2019), Central bank announcements: Big news for little people?, Journal of Monetary Economics, forthcoming.

Malmendier, U. and S. Nagel (2016), Learning from Inflation Experiences, The Quarterly Journal of Economics, Vol. 131 (1), pp. 53-87.

Marek, P. (2017), Saving patterns in the low-interest-rate setting – results of the 2016 PHF summer survey, Deutsche Bundesbank Research Brief No 12, April 2017.

Piazzesi, M. and M. Schneider (2009), Momentum Traders in the Housing Market: Survey Evidence and a Search Model, American Economic Review, Vol. 99 (2), pp. 406-411.

Statistische Ämter des Bundes und der Länder (2015), Zensus 2011. Gebäude- und Wohnungsbestand in Deutschland, available at https://www.zensus2011.de/SharedDocs/Downloads/DE/Publikationen/Aufsaetze_Archiv/2015_12_NI_GWZ_endgueltig.pdf (last accessed on 13 November 2019).

Towbin, P. and S. Weber (2015), Price Expectations and the U.S. Housing Boom, IMF Working Paper WP/15/182, July 2015.

Van der Klaauw, W., W. Bruine de Bruin, G. Topa, S. Potter and M. Bryan (2008), Rethinking the measurement of household inflation expectations: Preliminary findings, Federal Reserve Bank of New York Staff Report No 359.