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A Household Perspective from Germany

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Abstract

Despite a growing academic literature on the distributional effects of monetary policy (MP), little is known about how laypersons perceive the effects of MP on their own economic situation and national economic inequality. This study examines laypersons' perceptions in Germany of the impact of the ECB's MP on (i) their personal economic situation and (ii) national economic inequality, using representative survey data collected in 2018. I review the existing academic literature, which identifies various characteristics of individuals that could potentially render them susceptible to the effects of monetary policy, such as savings, wealth, home ownership, debt, unemployment, or age. I then investigate whether these characteristics align with layperson's perceptions. Ordered logit analysis shows that, contrary to the economic literature, most variables - with the exception of 'savers' - appear to be irrelevant to laypersons' perceptions. Instead, factors such as objective knowledge of monetary policy, trust in the ECB, party affiliation and residence in East Germany emerge as significant factors.

1. Introduction

The issue of economic inequality has become a hot topic in mainstream academic literature. A major contributor to this discussion is Piketty (2014), who claims that, historically, economic inequality is the norm rather than the exception and that after a massive reduction in economic inequality following World War II, it is rising again. He also puts forward several mechanisms explaining why a market economy necessarily generates economic inequality, for example, because the return on capital is larger than the national income growth rate. However, other researchers (Acemoglu and Robinson 2014; Goés 2016) do not agree with this hypothesis and related empirical research shows no positive relationship between economic freedom and market inequality (Sturm and de Haan 2015). Bernanke (2015) claims that long-term economic factors, such as globalisation or technological progress, play a crucial role in the rise in inequality, whereas economic policy does not have much influence. In contrast, Atkinson (2015) argues that the increase in inequality is due to a roll-back of the welfare state in the 1980s and sees a lot of potential for economic policy as a way of achieving a more equal economic distribution.

Monetary policy, however, is rarely considered a major determinant of economic inequality. For instance, in line with the dominant view of money's long-term neutrality Bernanke (2015) states that 'the effects of monetary policy on inequality are almost certainly modest and transient'. However, this view has recently been challenged along several dimensions, as signalled by an unprecedented increase in mainstream academic research analysing the relationship between monetary policy and economic inequality. Summarising the extant literature, Colciago et al. (2019) mention three general propagation mechanisms and a number of specific transmission channels for how monetary policy could affect the relative economic position of individuals.

Paralleling the academic debate is a public debate, which is also characterised by contrasting viewpoints. For instance, an article in the *Financial Times* (Marshall 2015) argues that monetary policy exacerbates inequality; Bryant (2019) asks whether quantitative easing (QE) contributed to income inequality. Focussing on the European situation, Aizawa and Bradlow (2016) demand that ECB President Draghi acknowledge QE's (partial) responsibility for greater European inequality. Similar positions can be found in the German media.

However, we know almost nothing about how laypersons view the effects of monetary policy on their own economic situation or on national economic inequality. Filling this gap is the focus of the present paper. Using representative survey data collected in 2018, I investigate how people in Germany perceive the effects of the ECB's monetary policy (ECB's MP) on their personal financial situation and on economic inequality. It is worth noting that the ECB's MP was highly expansionary at the time. It is therefore not clear whether the results of the analysis can simply be reversed when examining situations of contractionary monetary policy. Moreover, although the ECB's MP is described to the respondents, it is not clear to what extent they perceive this policy as expansionary. This study thereby contributes to the growing literature on how laypersons perceive economic policies (see, e.g., Blinder and Krueger 2004), especially with respect to monetary policy (see, e.g., van der Cruijsen et al. 2015; Hayo and Neumeier 2020).

I include a conceptual framework illustrating how laypersons form perceptions about the effects of monetary policy and relate the channels through which monetary policy affects economic inequality, as identified in the academic literature, to individual characteristics of survey respondents. This study provides central banks, specifically the ECB, with unique knowledge about how monetary policy after the financial crisis is viewed by the population and whether there is potential for increasing the public's support for it. Finally, discovering how individual economic decision makers assess the situation may provide valuable input in the controversy among experts regarding the actual effects of the ECB's MP.

I find that almost 40% of Germans think that their economic situation is unaffected by the ECB's MP, whereas 20% and 6% believe that the ECB's MP has made them worse off or better off, respectively. In terms of economic inequality, about one-third of the population is of the opinion that the ECB's MP contributes to inequality, only 10% think it does not, and 13% cannot perceive an impact. The respective views are characterised using multivariate ordered logit models. First, respondents who feel that their personal economic situation has deteriorated as a result of the ECB's MP tend to be savers, those with better objective knowledge about monetary policy affairs, and older people, whereas those who feel their situation has improved have more trust in the ECB and support conservative (CDU/CSU) parties. Second, the view that the ECB's MP increases economic inequality in Germany is favoured by Left Party supporters, East Germans, and those with a relatively high level of monetary policy knowledge, whereas those who have more trust in the ECB have the opposite view. Third, persons with a high level of monetary policy knowledge, more formal education, and clear preferences for political parties are more likely to answer the questions on the effects of the ECB's MP.

It is interesting that only one of the variables that typically receive a lot of attention in the study of economic literature on the distributional consequences of monetary policy—namely, being a saver— is robustly associated with laypersons' perceptions. Presumably, the low interest rates associated with European monetary policy make savers feel worse off in terms of their personal economic situation. However, other potentially relevant variables from the point of view of the extant economics literature, such as income, homeownership, age, and unemployment, are insignificant. Thus, inasmuch as the economic studies' conclusions are correct, there seems to be some sort of disconnect between the actual and the perceived factors influencing the distributional impact of monetary policy. In other words, laypersons' mindsets appear to be different to what is typically assumed in the economics literature on the distributional effects of monetary policy.

This study stands out in terms of its originality, addressing a unique research question and tackling the scarcity of systematic survey data on people's attitudes towards the distributional effects of monetary policy. By focusing on the ECB and the German population as a case study, it pioneers the examination of how laypersons perceive the impact of monetary policy on both their personal economic position and aggregate economic inequality. Notably, this research represents the first attempt to analyse and understand the perspectives of individuals regarding these aspects. By filling this gap, it contributes significantly to the field of social science studying laypersons' perceptions of monetary policy. However, inasmuch the results can be generalised to different central banks, populations, and economic situations is left for future research.

The remainder of the paper is structured as follows. Section 2 discusses research on the relationship between monetary policy and inequality and shows how economic inequality developed in Germany. A conceptual framework and economic hypotheses are presented in Section 3. In Section 4, the survey is described and analysed descriptively. Multivariate ordered logit models are used in Section 5 to study the characteristics of respondents who associate themselves with specific positions regarding the effects of the ECB's MP on their income situation and economic inequality more generally. Section 6 concludes.

2. Literature and Background

In their survey of the literature on how monetary policy affects inequality, Colciago et al. (2019) mention three ways in which monetary policy could affect economic inequality. The three general mechanisms are: (i) an income effect due to changes in interest rates affecting borrowers and savers in opposite directions, (ii) a wealth effect resulting from changes in financial market prices, and (iii) a substitution effect arising from an alteration in the relative price between current and future

consumption. The reader is directed to Colciago et al.'s (2019) comprehensive survey of this branch of the literature; I highlight only a few of the contributions to this field.

Using sectoral and household data for the euro area, Adam and Zhu (2016) show that unexpected price-level movements lead to wealth redistribution, with German households reaping the highest per capita gains. Decomposing the effects within the household sector, the authors find that relatively young middle-class households are the net losers when there is deflation, whereas older and richer households are winners. Adam and Tzamourani (2016) study asset price changes in the euro area and discover that capital gains from bond and equity price hikes are concentrated within a small group of rich households, whereas it is the median households that appear to especially benefit from higher house prices. Using VAR models, Lenza and Slacalek (2018) study the impact of quantitative easing on income and wealth of individual euro-area households. They report that income inequality decreases in this situation, as lower-income households tend to move out of unemployment, whereas wealth inequality appears to be almost unaffected. To assess the distributional effects of US monetary policy, Davtyan (2017) applies contemporaneous and long term identification methods. She finds evidence suggesting that contractionary monetary policy decreases income inequality. However, the transmission mechanisms bringing about this result remain rather opaque.

Cravino et al. (2018) show that the prices of goods consumed by high-income households are less volatile than those of the goods consumed by middle-income households. Inasmuch as monetary policy affects the relative prices of the goods consumed at different points on the income distribution, such policy can have distributional consequences. In their analysis of the distributional effects of monetary policy, Bunn et al. (2018) employ UK-household panel data. They conclude that monetary policy has had but a small effect on income and wealth inequality. Albert and Gómez-Fernández (2021) combine micro and macro data from the US and find that expansionary monetary policy shocks increase the wealth of both the richest and the poorest households: the relatively rich profit from soaring stock prices; the relatively poor experience an improvement in their debt position. The middle class tends to benefit the least from this sort of shock.

Combining macro and micro data in a sample of euro-area countries, De Luigi et al. (2019) study the influence of the ECB's unconventional monetary policy on the wealth distribution of households. When using wealth inequality indicators, which are sensitive to changes at the tails of the wealth distribution, the authors report an inequality-increasing effect for the majority of the countries. However, only very small effects are found when using Gini coefficients. In their study, an important factor influencing the inequality impact of monetary policy is that about one-third of European households do not have any financial or housing wealth and, thus, are not directly affected by the asset price channel.

Using a long time series on France, Berisha et al. (2019) analyse factors influencing within-group and between-group income inequalities. With regard to capital income, inflation initially leads to higher inequality but decreases it in the long term. In terms of labour income, they find that higher inflation leads to lower inequality. Employing data from the Japan Household Panel Survey, Israel and Latsos (2019) study the effect of conventional and unconventional monetary policy on income inequality in Japan. They discover that expansionary monetary policy in Japan reduced the gender pay gap, but increased the education pay gap; there was no significant impact on the age pay gap. At a theoretical level, Ferrara and Tirelli (2020) investigate disinflation and inequality in a two-agent New Keynesian model, finding two main transition channels. First, lower inflation softens the cash in advance constraint on firms' working capital, which raises labour demand and lowers inequality. Second, disinflation raises dividends, which increases inequality.

Mumtaz and Theophilopoulou (2020) employ monthly household-level data from the UK to construct measures of wealth inequality. The authors' analysis of the dynamic relationship between monetary

policy and wealth inequality suggests that expansionary monetary policy shocks are transmitted through changes in net property and financial wealth and, thereby, lead to higher wealth inequality and contribute to its fluctuations. Evginides and Fasianos (2021), also using UK-household data, conclude that unconventional monetary policy shocks have long-lasting effects on wealth inequality.

Ma (2020) constructs a heterogeneous-agent New Keynesian economy with indivisible labour and shows that monetary policy shocks can have distributional consequences due to substantial heterogeneity in labour supply elasticity across households. Using US-state-level panel data, Ma finds empirical evidence supporting his theoretical finding. Slacalek et al. (2020) study the effects of monetary policy on household consumption expenditures. They analyse several transmission mechanisms and conclude that the strength of these mechanisms depends on households' marginal propensities to consume, balance-sheet composition, and sensitivity to aggregate earning fluctuations. The most important of these mechanisms appear to be the earnings channel and the housing wealth effect. To examine how differences in the wealth distribution in European countries affect the impact of monetary policy, Fadejeva and Kantur (2023) develop a theoretical life-cycle New Keynesian model for two groups of European countries. They calibrate the model using the European Household Finance and Consumption Survey. At the aggregate level, it is found that a shift of the wealth distribution towards the older age groups reduces the effectiveness of monetary policy. At the individual level, they report evidence that monetary policy is more effective for younger individuals in the Eastern EU economies.

Focussing on a monetary dynamic general equilibrium model with endogenous credit market participation, Ait Lahcen and Gomis-Porqueras (2021) discover that limited access to basic financial services can lead to consumption inequality. By providing liquidity, monetary policy creates a pecuniary externality, which can result in an inefficiently high consumption level by those agents who have access to this liquidity. Tzamourani (2021) studies the extent to which euro-area households are exposed to changes in real interest rates. He finds that poorer households (in terms of wealth), younger households, and mortgage holders would suffer from an increase in interest rates. Wealthy and higher-income households, homeowners, and older households would benefit. Adjustable mortgage rates play an important role in this respect. However, Germany is characterised by fixed-rate lending and, hence, households tend to benefit, on average, from higher interest rates.

Finally, using structural vector autoregressions, Davtyan (2023) examines the impact of unconventional monetary policy on economic inequality in the US. She finds that it increases both income and wealth inequality; with the latter rising more than the former. The concrete transmission mechanisms are not revealed, though. Domonkos et al. (2023) take the opposite perspective and ask how the monetary policy transmission to bank interest rates is affected by income inequality. They conjecture that higher inequality is correlated with a larger share of credit-constrained households, which are characterised by higher borrowing costs. Based on a panel analysis of euro area countries during the period of unconventional monetary policy, they report that, over the long term, income inequality negatively influences the transmission of standard monetary policy to consumer loan rates and housing loan rates.

Moving from the academic perspective to the media perspective, the distributional aspects of monetary policy are also widely discussed in the popular German press (German titles translated into English by the author). One of the main newspapers, the *Frankfurter Allgemeine Zeitung* (2016) carried the headline: 'Monetary policy: Bundesbank downplays distributional effects'. A headline found in another important newspaper, the *Süddeutsche Zeitung* (2016), read: 'Monetary policy: Cheap money increases inequality'. Emphasising the ECB's contribution to inequality, the *Frankfurter Rundschau* (2014) called the ECB the 'bank of the rich'. In contrast, *Die Welt* (2016) published an article entitled 'The fairy tale of evil cheap money', in which the idea that ECB monetary policy fosters inequality was

criticised. In a column in the weekly newspaper *Die Zeit*, Fratzscher (2018) took an even stronger position in that direction by writing that ECB monetary policy has contributed to a reduction in economic inequality. In the economic and business newspaper *Handelsblatt*, a featured guest comment by Guillaume Duval (2019) argued that the ECB's unconventional monetary policy, even if it is necessary due to the German focus on fiscal stability, mainly hits the poor and the middle class.

Nonetheless, we still know very little about how the population perceives these effects. I am aware of only one study that considers households attitudes on these issues. Bunn et al. (2017) briefly analyse UK households' perceptions from a survey conducted by the Bank of England in April 2017. Older households appear to be the main group that feels that lower interest rates have made them worse off. As a reason for why their income situation was affected, respondents primarily mention lower interest payments (about 75%) or lower receipts (about 90%). Changes in pensions and house prices are noted by about 30% of the UK population.

For some background on the debate in Germany, a quick look at its income distribution will be helpful. Based on the socio-economic panel (SOEP), Corneo (2015) sets out the development of gross and net equivalent household income for East and West Germany over the period 1983–2012. Several conclusions can be drawn. First, there is a roughly 40% lower inequality in net incomes compared to gross incomes. Hence, income redistribution has strong effects in Germany. Second, there are notable regional differences in income inequality, which, however, switch position when moving from gross income inequality, which is higher in East Germany, to net income inequality, which is higher in West Germany. Third, for Germany as a whole, gross income inequality rose from the early 1990s until the mid-2000s, whereas net income inequality only visibly increased over the period 2000 to 2005. However, note that both gross and net inequality in East Germany continued to rise.

Biewen and Juhasz (2012), without explicitly taking monetary policy into account, put forward three explanations for the observed increase in German net income inequality: a rise in unemployment, greater dispersion of market incomes, and a reduction in income tax. Biewen et al. (2019) claim that income inequality did not increase any further after 2005 and argue that the reduction in unemployment and a lower dispersion of annual market incomes contributed to breaking the trend. The Institute of Economic and Social Research (Wirtschafts- und Sozialwissenschaftliches Institut 2019), which studied SOEP data up through 2016, reached a different conclusion. It argues that income inequality continued rising even after 2005. None of these studies take monetary policy into consideration.

Figure 1 shows the Gini coefficient during and after the financial and economic crisis period.

Figure 1: Gini coefficient (based on net equivalent income) in Germany from 2008 to 2018
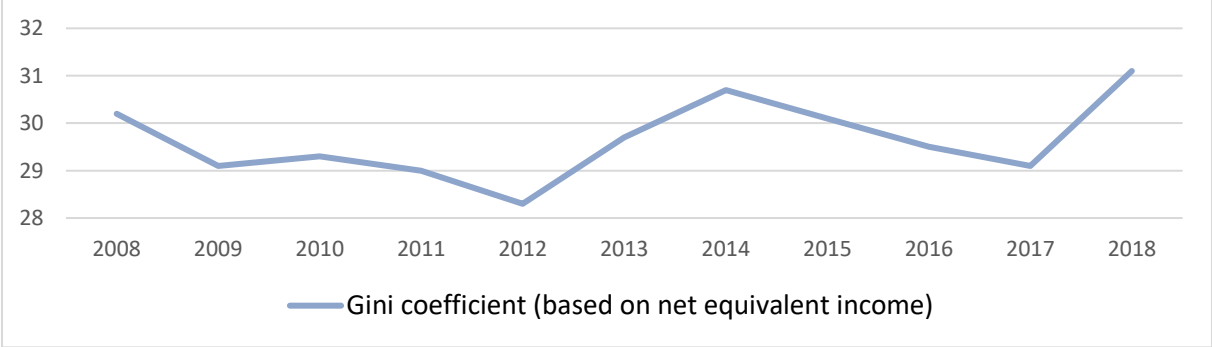

Source: Destatis (2019).

There appears to be a downward trend in net income inequality until 2012 and then a see-saw movement. Assuming that the value of the (still preliminary) last data point is correct, then there was a notable hike in inequality from 2017 to 2018, that is, right before the population survey used in this paper was conducted.

Finally, we take a look at the slowly changing wealth distribution using SOEP data. Focussing on the period before and after the financial crisis, Figure 2 compares wealth centiles in 2007 and 2017.

Figure 2: German wealth distribution (based on net total personal wealth of persons who are 17 years or older) in 2007 and 2017
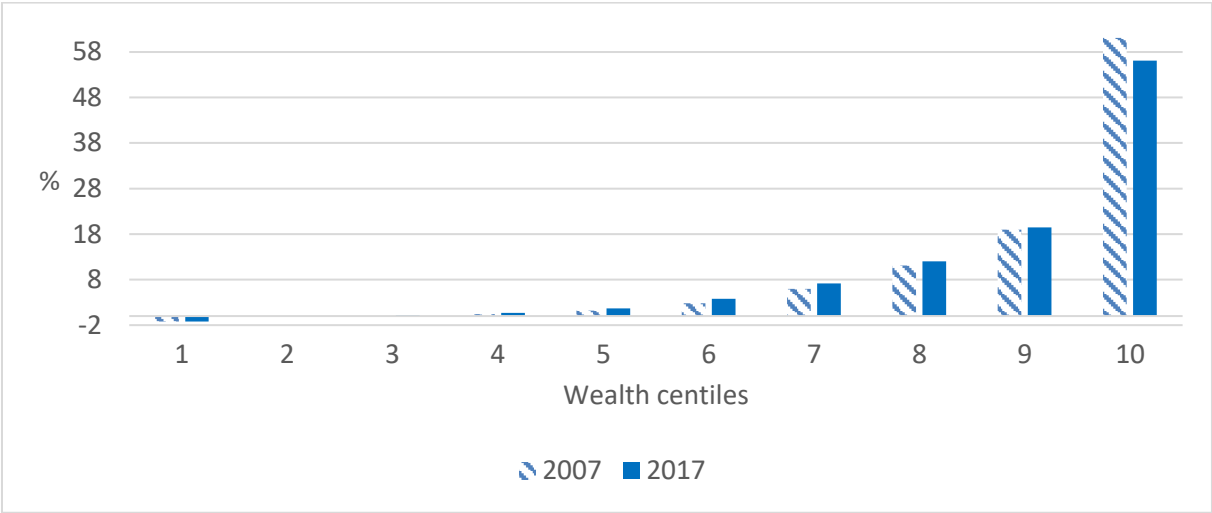
Source: DIW Berlin SOEPv34 (1984-2017).

We find that the wealth distribution is very unequal, with about 60% of wealth owned by the richest 10%. Over time, there is no change in the wealth situation of the bottom centiles, an improvement for the middle centiles, and a visible decrease for the richest centile. Thus, the German wealth distribution has become slightly more equal over the course of the financial crisis.

Bellani et al. (2021) survey the German population with respect to individual perceptions of inequality in general and discover that misperceptions of inequality are common. Specifically, respondents have a strong tendency to place themselves in the middle of the income distribution, which causes the rich to underestimate their relative position and the poor to overestimate theirs. Moreover, respondents tend to believe that income inequality is greater than wealth inequality although, as shown above, it is in fact the other way around.

3. Conceptual Framework and Economic Hypotheses

My analysis is based on a conceptual framework for studying how individuals form perceptions and expectations, and decide to take economic action, on matters related to monetary policy. This framework was originally developed by Ranyard et al. (2008), extended by Hayo and Neumeier (2022) so as to understand households' inflation perceptions and expectations, and has been further adjusted for the purposes of this paper. Figure 3 illustrates the two main dimensions of the framework: the individual level and the socio-economic environment. In this paper, I focus on the individual level and people's perceptions of the effects of monetary policy, specifically the impact on their personal income situation and aggregate economic inequality. I consider different types of influence on people's perceptions of the distributional effects of monetary policy. Individuals' perceptions of monetary policy are affected by their personal environment, particularly their economic situation, their socio-demographic situation, and psychological factors. Some people may be better (or worse) informed

about monetary policy, which may affect their perceptions. Different types of searching for information about monetary policy can contribute to different degrees of knowledge about monetary policy: subjective knowledge and/or objective knowledge. An information search that contributes to objective knowledge can be thought of as learning about monetary policy. Otherwise, information search will contribute, if at all, only to people's subjective knowledge. People's degree of trust in the central bank and their political views may further influence their perceptions of monetary policy and its effects. The following seven types of influences are operationalised by various variables contained in the survey: (i) *Economic situation*, (ii) *Socio-demographic situation,* (iii) *Psychological factors,* (iv) *Information search and interest in monetary policy issues,* (v) *Monetary policy knowledge,* (vi) *Central Bank Trust*, and (vii) *Political preferences and attitudes.*

Although Figure 3 can be interpreted as providing a structural framework, the empirical analysis does not estimate a fully fledged structural model. Instead, it is mainly descriptive and concentrates on how the individual groups of factors (i) to (vii) are associated with Germans' perception of how monetary policy affects their personal income situation and aggregate economic inequality.

Figure 3: Extended and adjusted conceptual framework for understanding the formation of individuals' perceptions, expectations, and economic actions related to monetary policy
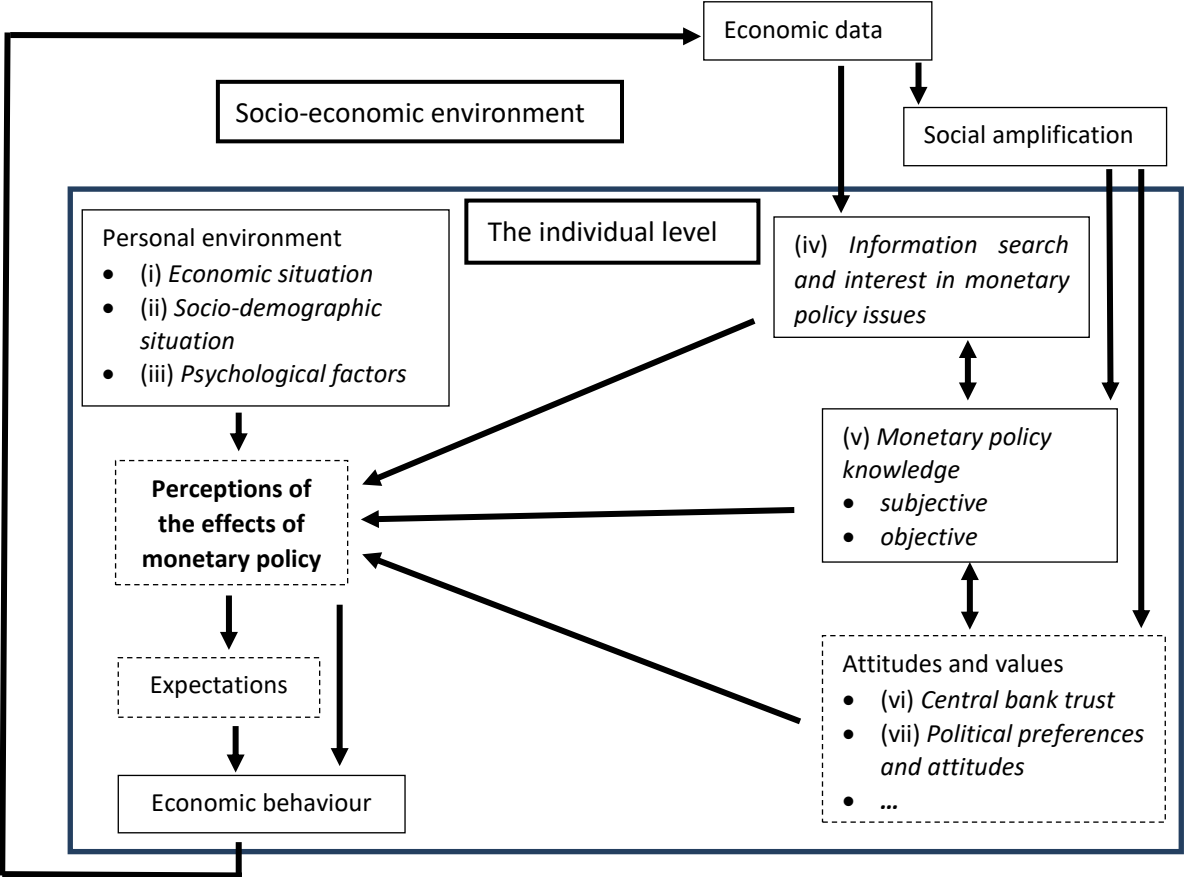
To further motivate specific indicators, the economics literature discussed above is used as a basis for deriving hypotheses about how specific groups in society should be affected by the expansionary conventional und unconventional monetary policy measures implemented by the ECB. Table 1 sets out the hypotheses, lists some of the studies that develop them, and shows how the hypotheses can be operationalised using indicators from the survey at hand.

Table 1: Deriving hypotheses as to which groups of households will benefit from expansionary monetary policy

Households benefitting from expansionary monetary policy	Literature and transmission channels	Indicator in survey
High income	Adam and Zhu (2016): Unexpected price-level movements; Cravino et al. (2018): monetary policy affects the relative prices of the goods consumed at different points on the income distribution; Slacalek et al. (2020): earnings channel and housing wealth; Ait Lahcen and Gomis-Porqueras (2021): monetary policy creates a pecuniary externality	Household income per capita, income quartiles
High wealth	Adam and Tzamourani (2016): asset prices and housing wealth; Albert and Gómez-Fernández (2021): asset prices and changes in real debt; De Luigi et al. (2019): asset prices and unequal wealth distribution; Berisha et al. (2019): labour income vs. capital income; Ferrara and Tirelli (2020): labour demand and capital income; Mumtaz and Theophilopoulou (2020): financial and housing wealth; Evginides and Fasianos (2021): monetary policy affects wealth distribution; Slacalek et al. (2020): earnings channel and housing wealth; Ait Lahcen and Gomis-Porqueras (2021): monetary policy creates a pecuniary externality; Tzamourani (2021): changes in real interest rates	House/flat ownership, saver
Low wealth	Tzamourani (2021): changes in real interest rates	Renting, borrower
House owners	Adam and Tzamourani (2016): asset prices and housing wealth; Mumtaz and Theophilopoulou (2020): financial and housing wealth; Slacalek et al. (2020): earnings channel and housing wealth	House/flat ownership
Debtors	Albert and Gómez-Fernández (2021): asset prices and changes in real debt; Tzamourani (2021): changes in real interest rates	Borrower
Unemployed	Lenza and Slacalek (2018): unemployment; Berisha et al. (2019): labour income vs. capital income; Ferrara and Tirelli (2020): labour demand and capital income; Ma (2020): heterogeneity in labour supply; Slacalek et al. (2020): earnings channel and housing wealth	Unemployed
Women	Israel and Latsos (2019): pay gaps	Women
Well-educated	Israel and Latsos (2019): pay gaps	Formal education level

Table 1 continued

Older	Adam and Zhu (2016): unexpected price-level movements	Age
Younger	Tzamourani (2021): changes in real interest rates; Fadejeva and Kantur (2023): monetary policy more effective for younger individuals	Age

For most hypotheses, there is a fairly tight link between the variables identified in the economics studies and the ones available in the dataset. Unfortunately, household wealth situation is not described in the questionnaire in as much detail as would have been desirable, given how many macroeconomic studies emphasise this channel.

4. Data and Descriptive Statistics

I measure Germans' appraisal of the distributional consequences of the ECB's expansionary and unconventional monetary policy with unique and novel survey data. More information about the survey can be found in the documentation paper (Hayo et al. 2018). The survey questions were part of an omnibus survey administered between 6 February and 2 March 2018 by Gesellschaft für Konsumforschung (GfK). GfK is the largest private survey research company in Germany. The sample consists of 2,015 representatively selected persons from the German population aged 14 or above. Methodologically, the survey is based on quota sampling. The survey questions were asked in face-to-face interviews using pen-pads, which, in light of the topic's complexity, is the preferred choice. Pen-pads make it possible for interviewees to enter sensitive information, for example, income or political preferences, without the interviewer's knowledge, leading to more reliable answers. The questions were pre-tested and GfK's survey quality control encompasses contact checks, address comparisons, sampling tests, and qualitative checks of the final interviews. Thus, as shown in Hayo et al. (2018) for the typical dimensions, the distribution of the sample data is very close to the distribution of the population. Details about the coding of variables can be found in Table A1 of the Online Appendix and Tables A2 to A7 provide answer frequencies for those variables that are relevant in output Tables 3 and 5.

Taking into account the difficulty of the topic, we introduce it at the beginning of the relevant part of the questionnaire (Hayo et al. 2018 contains the original German questions). Pre-testing indicated that providing context information is important for eliciting meaningful answers.

> **Introduction:** *During and after the financial crisis, the European Central Bank (ECB) markedly changed its monetary policy. For instance, the interest rate that commercial banks pay for borrowing money from the ECB has been lowered substantially. This interest rate fell from 4% in June 2007 before the financial crisis to 0% in March 2016, which is also the current value. Moreover, since March 2015, the ECB purchases a substantial number of government bonds as part of its 'unconventional' monetary policy measures and thus increases the available liquidity in the economy.*

Still, such an introduction can provide only a partial picture. For instance, the phrase 'and thus increases the available liquidity in the economy' covers only one aspect of the ECB's MP. However, in public opinion surveys, it is important to keep questions and context as simple as possible; otherwise, laypersons become overtaxed. Put differently, there is always a trade-off between scientific and everyday language. For instance, it is hard for people to consider their economic situation before and after the financial crisis and relate the changes to the adjustment in monetary policy. Note that

respondents have the chance to answer 'don't know'. For complex topics, providing this option is crucial to avoid biases due to 'non-attitudes' (Zaller 1992). In principle, there could be at least two reasons for answering 'don't know'. First, respondents may simply not know anything about the topic. Second, they are sophisticated enough to understand how difficult it is to provide an educated answer to a complex question. Studying the characteristics of respondents answering 'don't know' suggests that the former group dominates the latter (see Table A8 of the Appendix).

To arrive at a better understanding of how laypersons perceive the impact of expansionary and unconventional monetary policy on inequality, I asked two questions. The first question centres on the issue of how people assess the impact of the ECB's MP on their personal economic situation. It asks them to compare the ECB's MP with a (counterfactual) situation of no monetary policy change. Emphasising the importance of personal circumstances for individual attitudes and decisions is often called an 'egotropic' approach.

Q1) After implementation of these monetary policy measures, has your economic situation become better or worse compared to a situation where the ECB continued to conduct its normal (that is, pre-crisis) monetary policy? In particular, when the ECB was charging 4% interest and had not implemented 'unconventional' monetary policy measures.

a) As a result of the ECB's measures, my economic situation is better compared to how it would have been under a continuation of the pre-crisis monetary policy.

b) The ECB's monetary policy measures have no influence on my economic situation.

c) As a result of the ECB's measures, my economic situation is worse compared to how it would have been under a continuation of the pre-crisis monetary policy.

d) Don't know.

Figure 4 shows the answer frequencies for Q1. The largest share of respondents, almost 40%, think that their economic situation is unaffected by the ECB's MP. Almost 20% believe that it has made them worse off, whereas less than 6% have the opposite impression. More than one-third of the population (36%) is unsure about the impact of the ECB's MP on their economic situation.

Figure 4: Answer frequencies to Q1: Has the ECB's MP made the personal economic situation better or worse?
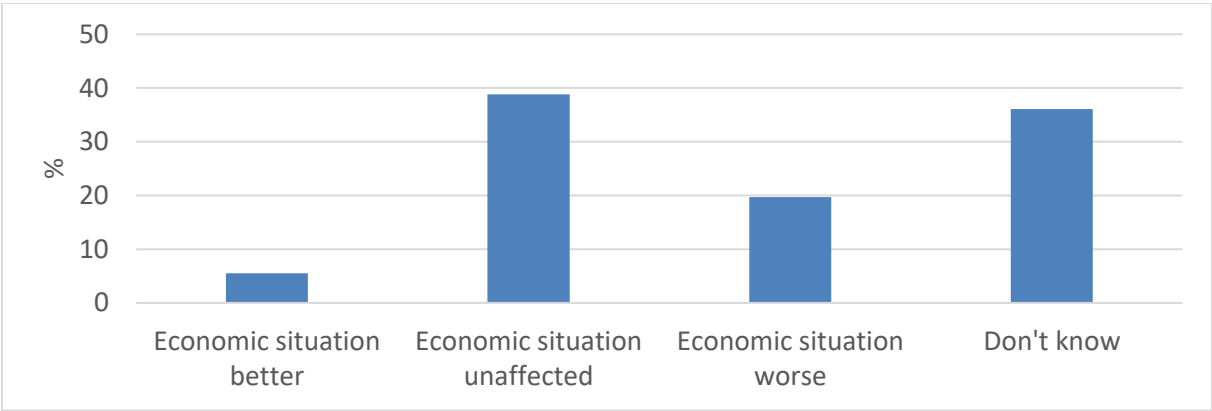
It would have been interesting to learn how households' financial position *actually* changed during the period of interest. However, 'Subjective economic satisfaction' is measured for each respondent and, presumably, persons who have gone through a difficult period financially are likely going to report a

lower level of economic satisfaction than those whose recent economic experience was positive. I believe this is a relevant argument, as research on people's life satisfaction shows that they tend to evaluate their current situation conditional on the experiences of the recent past (Easterlin 2001). Here, this human tendency leads to the expectation that people suffering from negative financial shocks should have reported a lower level of economic satisfaction, as they would have compared their current situation with the one prevailing before they were hit by the negative financial shock.

The second question approaches the issues from a 'sociotropic' perspective, that is, it enquires into the individual's assessment of the situation for society at large. Respondents were requested to provide their assessment of whether the ECB's MP contributed to income and wealth inequality in Germany. It is important to emphasise that Question Q2 does not distinguish between income and wealth effects, which is potentially problematic, as some respondents may think about income inequality when answering the question and others about wealth inequality. Bellani et al. (2021) report that Germans perceive wealth inequality as less severe than income inequality, although, as shown in Section 2 of this paper, the former is much more pronounced than the latter. Hence, it appears that Germans underestimate the extent of wealth inequality relative to that of income inequality.

Compared to Q1, answering this question may be even more demanding, as not even professional observers agree on the issue (see the discussion above).

> *Q2)* *Do you have the impression that the ECB's monetary policy during and after the financial crisis affects the income and wealth distribution in Germany and, if yes, how?*
>
> a) *It contributes to increasing economic inequality.*
>
> b) *It has no influence on economic inequality.*
>
> c) *It contributes to reducing economic inequality.*
>
> d) *Don't know.*

Figure 5 shows the results for Q2. One in three respondents is of the opinion that the ECB's MP contributed to inequality. Roughly 10% think that it helped lower inequality and 13% cannot perceive an impact. The largest share of respondents (43%) selected 'don't know', perhaps not surprising, considering the complexity of the question. This stands in contrast to Section 2, where we reported evidence that the wealth distribution has become somewhat less unequal after the financial crisis.

Figure 5: Answer frequencies to Q2: Has the ECB's MP contributed to general economic inequality?
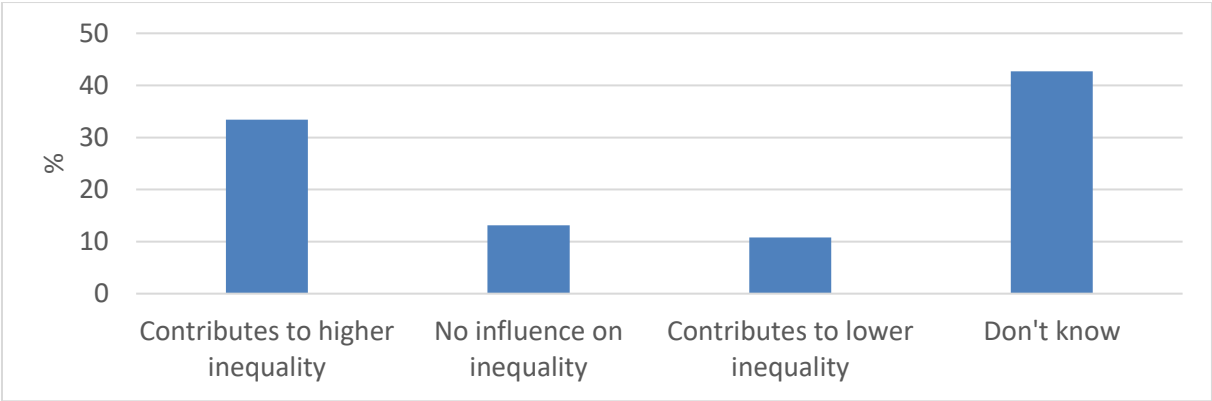
5. Analysing Attitudes Towards the Effects of the ECB's MP

Using multivariate ordered logit regression models, this section studies which types of people have the opinions presented above. Please note that the results presented below should be interpreted as multivariate associations rather than causal effects.

Before commencing with the actual analysis, it seems prudent to investigate the large shares of respondents who could not answer questions about the impact of the ECB's MP on their personal economic situation or on economic inequality. To learn more about this large group, I use logit regressions, with those answering 'don't know' coded as 1 and those providing an answer coded as 0. Table A8 of the Appendix sets out the estimation results after the general-to-specific modelling process. Overall, the interpretation of these results is straightforward: less sophisticated and politically engaged persons—as proxied by low monetary policy knowledge, little formal education, and unspecific political party preferences—tend not to be able to answer the relevant questions. Thus, we have a specific set of respondents, which is a non-random selection of the original representative sample, who are able to provide meaningful answers rather than non-attitudes.

Another relevant consideration is how much respondents actually know about monetary policy and the ECB. Q2 is especially difficult to answer when a respondent has a little, if any, information about monetary policy issues. The questionnaire contains four objective knowledge questions, taken from Hayo and Neuenkirch (2014), which ask people to state: 1) the ECB's main objective, 2) the interest rate the ECB charges commercial banks, 3) an appropriate interest rate setting in light of rising prices, and 4) who is responsible for setting interest rates (see Tables 3a to 3d in the Appendix for details). To summarise the answers, about 50% of the respondents know that price stability is the ECB's main objective, less than 20% recall the value of the main refinancing rate, about 30% understand that interest rates should be increased in light of rising prices, and about 35% know that the ECB sets the interest rate independently of other institutions. Adding the number of correct answers given by a respondent yields an objective knowledge indicator, which is shown in Figure 6.

Figure 6: Objective monetary policy knowledge indicator based on the sum of correct answers to objective knowledge questions
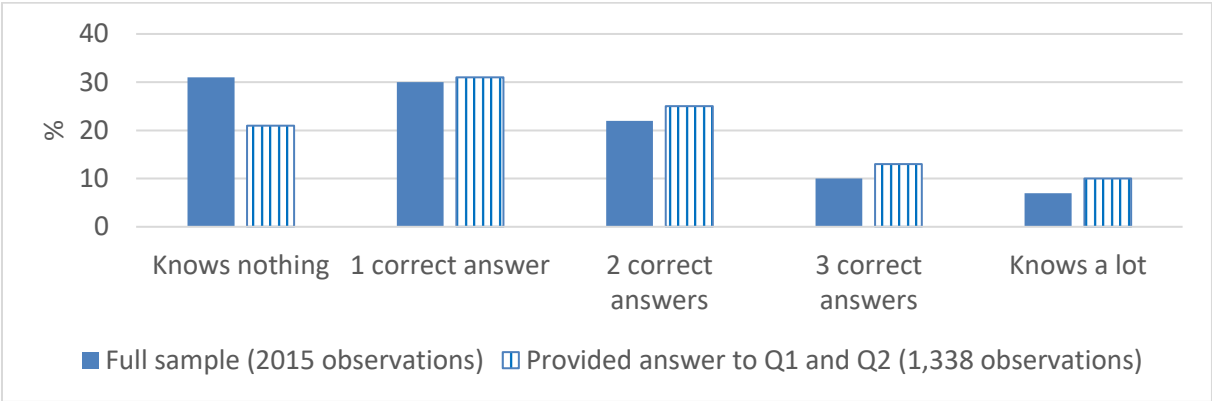
The frequencies referring to the full sample (the solid-coloured bars in Figure 6) suggest that Germans have a fairly low level of knowledge about monetary policy. The second series (the striped bars) concentrates on those respondents who provided an answer to Q1 or Q2. Comparing the means of the two indicator series shows that the average knowledge level of the population (average value: 1.3) is significantly lower (at the 1% level) than that of the subgroup answering Q1 or Q2 (average value: 1.6). In contrast, the difference in terms of variation between the two samples, as measured by the standard deviation, is not statistically significant. Thus, these results reflect the discussion of 'don't know' answers above. Figure 6 also reveals that the subgroup demonstrates higher knowledge values across

all categories of the objective knowledge indicator. The biggest difference is with regard to the 'knows nothing' category, which is 10 pp lower in the subgroup of more knowledgeable respondents. Still, even when focusing on this subgroup, objective knowledge about MP is rather low. Thus, the respondents' knowledge base for assessing the linkage between the ECB's monetary policy and their income position or economic inequality is not particularly good, thus suggesting that many people answering Q1 and Q2 relied on economic intuition rather than factual knowledge about monetary policy.

The econometric analysis relies on two dependent variables. The egotropic dimension reflecting Q1 is defined as 'ECB's MP Improves Personal Situation' and coded as 1 'Economic situation is worse after ECB's MP', 2 'No change in my economic situation', and 3 'Economic situation is better compared to monetary policy not reacting to the crisis'. The sociotropic dimension captured by Q2 is used as the dependent variable 'ECB's MP Increases Inequality' and coded as 1 'Contributes to higher economic inequality', 2 'No influence on economic inequality', and 3 'Contributes to lower economic inequality'.

Since the analysis is primarily exploratory, I start with a very general model containing a variety of potentially relevant factors and then reduce the model size using a consistent general-to-specific modelling approach (Hendry 1993) so as to improve estimation efficiency. Given the sample size, statistical inference takes place at a 5% nominal significance level, which strikes a compromise between Type I and Type II errors (Leamer 1978). Up to 54 indicators spanning six dimensions are employed, the influence of which is estimated jointly in a general model. Considering all possibly relevant variables takes into account both omitted variable bias and standard-error-decreasing complementarity (Hayo 2018). The indicators cover the following dimensions (see Table A1 in the Appendix for a more detailed description):

(i) *Economic situation*: (1) Household net income per capita (alternatively net personal income);[1] (2) Lower-middle income quartile; (3) Upper-middle income quartile; (4) Upper income quartile; (5) Saver; (6) Borrower; (7) Satisfaction with his/her economic situation; (8) Own house; (9) Own flat.

(ii) S*ocio-demographic situation*: (10) Female; (11) Age; Marriage status: (12) Single; (13) Partner; (14) Married; Formal education: (15) Certified apprenticeship; (16) Secondary school; (17) University-entrance diploma; (18) University degree; (19) Trade union member; Employment categories: (20) Blue collar; (21) White collar; (22) Public servant; (23) Self-employed; (24) Farmer; (25) Employed full time; (26) Employed part time; (27) Unemployed; (28) Nonworking; (29) Housewife; (30) Apprenticeship; (31) Community size; (32) East Germany; (33) No Internet access; (34) Number of children.

(iii) *Psychological factors*: (35) Risk propensity; Time preferences: (36) Future-oriented time preference; (37) Short-run impatience.

(iv) *Information search* (information channels specifically refer to inflation): (38) Newspaper; (39) Radio/TV; (40) Friends, family, or colleagues; (41) Internet or social networks; (42) Other source; (43) Does not keep up-to-date with the inflation rate; (44) Inflation information treatment.

(v) *Monetary policy knowledge*: (45) Objective knowledge; (46) Subjective knowledge.

(vi) *Central bank trust:* (47) Trust in ECB.

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[1] Since about 20% of the observations are missing for household and personal income, they are imputed using a regression approach and five rounds of imputations. All results are robust to using personal income rather than household per capita income (available on request).

(vii) *Political preferences and attitudes*: Vote intention for (48) Alternative for Germany (AfD); (49) Conservatives (CDU/CSU); (50) Greens; (51) Left Party; (52) Liberals (FDP); (53) Social-Democrats (SPD); (54) Public choice view of the political process.

Model 1 in Table 2 provides estimates of the reduced model resulting from the testing-down process (restriction: F(47,2.2e+06)=1.2). Seven variables are significant predictors of how respondents assess the impact of the ECB's MP on their personal economic situation.

Table 2: Explaining Q1, the perceived effect of the ECB's MP on the respondents' economic situation

| Variables | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
| | Robust SEs | | Normal SEs | | Population weights | | Larger sample | |
	Coef.	SEs	Coef.	SEs	Coef.	SEs	Coef.	SEs
i) *Economic situation*								
Saver	-0.46**	0.13	-0.46**	0.13	-0.54**	0.14	-0.41**	0.13
ii) *Socio-demographic situation*								
Age	-0.01**	0.003	-0.01**	0.004	-0.01**	0.004	-0.01**	0.003
Community size	0.06*	0.02	0.06*	0.02	0.03	0.02	0.06*	0.02
iii) *Psychological factors*								
iv) *Information search* Internet/social networks	-0.53**	0.21	-0.53**	0.22	-0.39	0.23	-0.58**	0.20
v) *Monetary policy knowledge*								
Objective knowledge	-0.21**	0.05	-0.21**	0.05	-0.19**	0.06	-0.21**	0.05
vi) *Central bank trust*								
Trust in ECB	0.75**	0.06	0.75**	0.06	0.82**	0.07	0.78**	0.06
vii) *Political preferences and attitudes*								
Conservatives (CDU/CSU)	0.61**	0.14	0.61**	0.14	0.68**	0.15	0.59**	0.14
Cut value 1	0.22	0.28	0.22	0.28	0.23	0.30	0.28	0.28
Cut value 2	3.82	0.31	3.82	0.31	3.93	0.33	3.92	0.31
No. of observations	1,261		1,261		1,261		1,338	
Test of joint significance	Chi^2(7)=227**		Chi^2(7)=253**		F(7,1254) = 28**		Chi^2(7)=244**	
Pseudo-R^2	0.11		0.11		n.a.		0.12	

Notes: Estimator: ordered logit. White (1980) robust standard errors are employed, except for Model 2, which uses normal standard errors, and Model 3, which uses population weights. * and ** indicate significance at a 5% and 1% level, respectively.

King and Roberts (2015) argue that sizable deviations between normal standard errors and robust standard errors are a sign of model misspecification. Model 2 of Table 2 shows that employing normal rather than robust standard errors makes no difference. Model 3 applies population weights to the observations and 'Inflation information source: Internet/social networks' and 'Community size' lose significance. Eliminating 47 variables made 77 additional observations available for estimating the reduced model. In Model 4, the increased sample size is used to check whether the model is robust to

including these out-of-sample observations. The resulting coefficients are similar to the previous ones. Thus, five indicators are robustly significant across the different models and I will concentrate on those when interpreting the estimation results.

For estimation efficiency reasons, average marginal effects are based on Model 4 and set out in Table 3. A saver has a 8 (4) percentage point (pp) higher (lower) probability of selecting that her/his personal economic situation is worse (better). As discussed above, savers being made worse off by the ECB's MP is in line with arguments put forward by economists and has been very much in the focus of German media reports.

Respondents favouring the conservative parties (CDU/CSU) are 11 pp less likely to feel worse off. With a 6 pp greater likelihood, they claim to be better off than supporters of other parties or non-voters. This suggests that the perceived impact of the ECB's MP on personal economic situation is related to a respondent's political stance. In particular, conservatives feel relatively better off. While this seems to be a somewhat astonishing result seeing that the ECB's MP has received a great deal of criticism from this side of the political spectrum (see, e.g., WirtschaftsWoche 2016), note that all of the presented results are conditional on the influence of the other included variables. This implies, for instance, that conservatives feel relatively better off after taking into account that the position of savers has worsened.

To proxy the magnitude of a realistic change in the variables that are not dummies, I consider a one standard deviation change. A one standard deviation higher level of 'Trust in ECB' (roughly one unit) decreases (increases) the probability of feeling worse (better) off as a consequence of the ECB's MP by 14 pp (6 pp). This finding supports the conjecture in Hayo and Neuenkirch's (2014) study of central bank trust in Germany that people view a central bank's policy more positively if they have a higher degree of trust in the bank.

Table 3: Average marginal effects for the robustly significant variables from Model 4 of Table 2 (in percentage points)

Variables	Worse after ECB's MP	No change after ECB's MP	Better after ECB's MP
Saver	8	-4	-4
Objective knowledge	4	-2	-2
Trust in ECB	-14	7	6
Conservatives (CDU/CSU)	-11	6	5

Notes: The significance levels for the marginal effects are the same as the ones for the variables in Model 4 of Table 2.

However, 'Trust in ECB' is a variable that might be especially endogenous with regard to the perceived impact of the ECB's MP. To assess whether the significance of 'Trust in ECB' is driven by endogeneity, I re-estimate Model 4 using a two-stage least square regression. As instruments, I employ the variables identified by Hayo and Neuenkirch (2014) as relevant for explaining Germans' ECB trust.[2] The first-stage regression yields a fairly large and significant joint F-test ($F_{(9,1322)}=14^{**}$), which suggests the instruments are reasonably strong. Moreover, the Sargan test cannot reject orthogonality of the

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[2] Instruments used in addition to the exogenous variables in the respective equations are: 'Female', 'Number of children', 'Community size', and Formal education: 'Certified apprenticeship', 'Secondary school', 'University-entrance diploma', 'University degree'. Due to its unavailability in the current survey, an indicator for 'Institutional trust' was not included as an instrument. I rely on a linear model, as instrumental variable regressions in the case of ordered logit models are extremely difficult. An OLS regression of Model 4 confirms that signs and significances remain unchanged.

instruments (Chi^2(8)=8.5) and neither can Wooldridge's (1995) robust score test for endogeneity (Chi^2(1)=0.16). After instrumenting 'Trust in ECB', the variable remains significantly positive at a 1% level of significance. Thus, the relationship between central bank trust and the respondents' perception of the impact of the ECB's MP on their economic situation is unlikely driven by endogeneity.

A one standard deviation increase in 'Objective knowledge' (roughly one unit) is associated with a 4 pp (2 pp) higher (lower) likelihood of choosing 'worse off' ('better off'). Hence, the more sophisticated segment of the German population with regard to monetary policy views the impact of the ECB's MP on personal financial situation rather negatively. However, while statistically very significant, the magnitude of this effect is relatively small, not least because the variance of that variable is not particularly high. Finally, a one standard deviation increase in 'Age' (roughly 18 years) increases (decreases) the probability of feeling worse (better) off as a consequence of the ECB's MP by less than 4 pp (2 pp). Hence, the effect of age is relatively small, too.

Very limited support is found for the economic hypotheses listed in Table 1. Only 'Saver' is robustly significant and its estimated negative sign is consistent with the economic argument that savers are worse off in a situation of loose monetary policy. 'Age' is sometimes significant in Table 2, but not robustly so. According to Abadie (2020), it is also instructive to list the variables that were considered relevant in the economic studies, but turned out to be statistically insignificant in the current study; in this study, these include: income, house ownership, debtor, unemployed, sex, and education. Moreover, when considering the level of 'Subjective economic satisfaction' as an indicator for whether respondents recently experienced economic shocks, we find no evidence that negative financial shocks have an impact on respondents' evaluation of the effects of monetary policy.

Moving to the sociotropic perspective, I analyse the perceived impact of the ECB's MP on economic inequality. Applying the testing-down restriction (F(50,100225.9) = 1.0) results in Model 5 of Table 4. As before, the robustness of the estimates is ascertained. In interpreting the estimated relationships using average marginal effects in Table 5, I draw on the results from Model 8, which is based on 91 additional observations compared to the sample utilised in estimating the general model.

Three characteristics make it more likely that respondents choose the answer that the ECB's MP increases economic inequality. Favouring the Left Party leads to an 11 pp (7 pp) higher (lower) probability of adopting that position, which is the largest effect in this regression. This perception of respondents is in line with the Left Party's stance on the ECB as an institution, which is that it acts in the interests of the richer part of society and financial markets. For East Germans, the corresponding values are 7 pp and 5 pp, respectively. This subjective perception of ECB monetary policy increasing inequality is consistent with the development of income inequality shown in Figure 1. Although net income inequality has been stable in the western part of Germany after 2005, it continued rising in the east even after the financial crisis.

Increasing 'Objective knowledge' by one standard deviation yields a 5 pp (3 pp) higher (lower) likelihood of agreeing that the ECB's MP facilitates higher economic inequality. In contrast, respondents characterised by a high degree of trust in the ECB have a greater likelihood of believing that the ECB's MP reduces inequality. A one standard deviation increase in 'Trust in ECB' lowers (increases) the likelihood of selecting 'Increases inequality' ('Reduces inequality') by 8 pp (5 pp). As before, I employ instrumental variable estimation to investigate whether this result might be due to endogeneity (see Footnote 2). There is no evidence of particularly weak instruments (first-stage regression joint F-test: F(10,1225)=14**). Moreover, the Sargan test is insignificant (Chi^2(9)=10) and so is Wooldridge's (1995) robust score test for endogeneity (Chi^2(1)=2.7). 'Trust in ECB' remains significantly positive at a 1% level of significance in the instrumental variable model. However, in

contrast to the findings on the personal economic situation above, here, the significance of 'Trust in ECB' in the IV regression depends on the inclusion of 'Subjective Knowledge' as an instrument.

Table 4: Explaining Q2, the perception that the ECB's MP reduces economic inequality

Variables	Model 5 Robust SEs		Model 6 Normal SEs		Model 7 Population weights		Model 8 Larger sample	
	Coef.	SEs	Coef.	SEs	Coef.	SEs	Coef.	SEs
i) *Economic situation*								
ii) *Socio-demographic situation*								
East Germany	-0.31*	0.15	-0.31*	0.14	-0.31*	0.16	-0.32*	0.14
iii) *Psychological factors*								
iv) *Information search*								
v) *Monetary policy knowledge*								
Objective knowledge	-0.25**	0.05	-0.25**	0.05	-0.23**	0.05	-0.23**	0.05
vi) *Central bank trust*								
Trust in ECB	0.38**	0.06	0.38**	0.06	0.37**	0.07	0.36**	0.06
vii) *Political preferences and attitudes*								
Left Party (Die Linke)	-0.54*	0.23	-0.54*	0.23	-0.67*	0.25	-0.49*	0.22
Cut value 1	0.77	0.26	0.77	0.20	0.20	0.29	0.72	0.19
Cut value 2	2.09	0.28	2.09	0.21	1.56	0.30	2.00	0.21
No. of observations	1,148		1,148		1,148		1,239	
Test of joint significance	Chi^2(4)=77**		Chi^2(4)=87**		F(5,1143)=14**		Chi^2(4)=76**	
Pseudo-R^2	0.04		0.04		n.a.		0.04	

Notes: Estimator: ordered logit. White (1980) robust standard errors are employed except for Model 6, which uses normal standard errors, and Model 7, which uses population weights. * and ** indicate significance at a 5% and 1% level, respectively.

The direction of association of the two variables that are significant in both egotropic and sociotropic perspectives with the perception of the ECB's MP is consistent. People with greater objective knowledge feel worse off in terms of their economic situation and perceive greater social inequality, too, whereas those with higher trust in the ECB report the opposite. As to the hypotheses set out in Table 1, we find no support whatsoever for any of the variables put forward in the economics literature. Thus, it seems that laypeople do not perceive the effect of monetary policy in the same way as do economists.

I conclude this section by considering the robustness of my results. First, to gauge whether the *a priori* separation of survey participants into the response and non-response groups is important for the estimation results set out in Tables 2 and 4, I estimate Heckman selection models for Q1 and Q2. The variables in the models presented for Q1 (Q2) in Table 2 (Table 4), in conjunction with the results on 'don't know' answers in model 2 (model 4) of Table A8, are all significant in the Heckman specification.[3]

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[3] There are only a few insignificant selection variables for Q2, namely Public choice view of the political process, Community size, and Age. Full estimation results are available on request.

Thus, the *a priori* distinction between respondents and non-respondents to Q1 and Q2 appears to be statistically admissible.

Table 5: Average marginal effects for the robustly significant variables from Model 8 of Table 4 (in percentage points)

Variables	Increases inequality	No effect on inequality	Reduces inequality
Objective knowledge	5	-2	-3
Trust in ECB	-8	3	5
Left Party (Die Linke)	11	-4	-7
East Germany	7	-3	-5

Notes: The significance levels for the marginal effects are the same as the ones for the variables in Model 7 of Table 4.

Second, it might be that explanatory variables other than 'Trust in ECB' are endogenous with respect to the dependent variables of interest. However, including more than one variable as endogenous in the regressions exhausts the list of strong instruments and the resulting estimates become unreliable. Thus, in light of potential remaining endogeneity, the results of the regressions reported above should be interpreted with some caution and the respective relationships regarded mainly as associations and not necessarily as causal.

Third, the answers to Q1 and Q2 could be related—their correlation coefficient is 0.15. Under the assumption of exogeneity, including Q1 in the Q2 equation and *vice versa* yields significantly positive results in both cases, while all other explanatory variables listed in Tables 2 and 4 remain significant. However, when assuming endogeneity and using the respective variables from the reduced models as instruments, Q1 becomes insignificant in the Q2 equation and *vice versa*. Moreover, in the Q2 regression explaining the impact of monetary policy on inequality, two explanatory variables ('Left Party' and 'Age') are no longer significant.

6. Conclusion

There is widespread debate over the effects of monetary policy on economic inequality, both within academia and in the general media. To date, there is no consensus on the issue. Using representative survey data collected in Germany in 2018, the present study investigates how *laypersons* perceive the effects of the ECB's MP on their personal financial situation as well as with regard to economic inequality. In the period prior to the data collection, the ECB's MP can be considered very expansionary from an economic point of view.

Descriptive analyses show that almost 40% of Germans do not think that their economic situation is affected by the ECB's MP. In contrast, about 20% believe that it has made them worse off and only 6% think that it has made them better off. As to whether the ECB's MP has contributed to economic inequality in Germany, about one-third of the population is of the opinion that it contributed to inequality, only 10% think the opposite, and 13% cannot perceive an impact.

The analysis then proceeds to employ multivariate ordered logit models to characterise the respective groups. A wide variety of potentially relevant dimensions are considered by means of 48 individual indicators: (i) Economic Situation, (ii) Monetary Policy Knowledge, (iii) Central Bank Trust, (iv) Political Preferences and Attitudes, (v) Socio-Demographic Indicators, and (vi) Psychological Indicators.

Those respondents who feel that their economic situation has deteriorated as a result of the ECB's MP are, on average, savers, those with better objective knowledge about monetary policy, and older people. While the negative effect of the ECB's MP on savers is frequently mentioned in the economics

literature and media discussions, it is noteworthy that more monetary-policy-literate laypersons also perceive themselves worse off. The result on older people is consistent with findings reported by Bunn et al. (2017) for UK households. However, here, the magnitude is relatively small. Those Germans who believe that they are personally better off have relatively more trust in the ECB and are supporters of conservative (CDU/CSU) parties. When measuring the magnitude of the influence of non-dummy explanatory variables by a one standard deviation change, the effects are of medium size. However, when considering extreme constellations, the size of the effects can be quite large. For instance, a saver with 'perfect' monetary policy knowledge has a 30 pp higher probability of feeling worse off as a result of the ECB's MP compared to a non-saver who has zero monetary policy knowledge, whereas a CDU/CSU supporter with maximum trust in the ECB has an 80 pp greater likelihood of feeling better off compared to a supporter of another political party with minimum trust in the ECB.

Left Party supporters and East Germans tend to believe that the ECB's MP contributes to economic inequality in Germany. This perception coincides with rising economic inequality in East Germany, as measured by the Gini index. Thus, it is conceivable that people attribute this hike to the ECB's MP. Again, respondents with higher objective monetary policy knowledge believe that the ECB's MP contributes to economic inequality. As before, the magnitudes are of medium size when proxying the influence of non-dummy variables by one standard deviation. However, if we allow for the full range of variation, the size of these effects is notable. For instance, a Left Party supporter with 'perfect' monetary policy knowledge living in East Germany has a roughly 45 pp higher likelihood of saying that the ECB's MP contributes to economic inequality compared to a West German who does not vote for the Left Party and has no monetary policy knowledge. Quite the reverse perception is found for respondents characterised by a high degree of trust in the ECB, also consistent with regard to the findings on personal economic situation, with maximum trust decreasing the likelihood of stating that the ECB's MP contributes to inequality by about 20 pp compared to minimal trust. Thus, the direction of association of ECB trust and monetary policy sophistication with the distributional consequences of the he ECB's MP is consistent across egotropic and sociotropic perspectives.

A substantial number of people—roughly 40%—did not answer the questions relating the ECB's MP to their personal economic situation or to national inequality. Such a high percentage of missings is likely due to the difficulty and complexity of the topic, that is, this is not a subject about which ordinary people often think. Another possibility is that people do not pay much attention to what the central bank does. For instance, Hayo and Neumeier (2020) report that only a small share of the New Zealand population knows the inflation target, although an explicit inflation targeting strategy was introduced as early as 1990. This lack of interest in monetary policy issues may be conditional on a situation of low inflation rates, however, and so it would be interesting to study whether people pay more attention to monetary policy after the inflation rate has increased substantially.

I discover clear evidence that more sophisticated and politically engaged persons—described by a high level of monetary policy knowledge, more formal education, and clear political preferences—tend to be able to answer the questions on the effects of monetary policy. Not only is the statistical significance of the estimated effects high, but also their potential magnitude. For instance, a person with a university degree, 'perfect' objective knowledge, and a Left Party preference has a roughly 80 percentage point greater likelihood of answering the questions of interest compared to a person who received only basic education, knows nothing about monetary policy, and has no clear party preference. This suggests that mainly those respondents who have a clear view on the matter answered the question, which is reassuring, as it suggests that the answers are not strongly contaminated by non-attitudes. Still, even respondents who were able and willing to provide an answer to questions on the distributional aspects of European monetary policy do not know much

about monetary policy in an absolute sense and may, indeed, have been relying more on economic intuition than on factual monetary policy knowledge.

Thus, among the group of Germans who can form an opinion on the distributional aspects of European monetary policy, there is clear evidence in favour of the position that monetary policy contributes to economic inequality. Moreover, this position is particularly supported by the best-informed laypersons, which will make it hard for the ECB to change this perspective with education programmes. The central bank could try to increase people's trust in itself, but, as shown in Hayo and Neuenkirch (2014) for Germany and Hayo and Neumeier (2021) for New Zealand, objective knowledge appears to be an important factor for central bank trust, too. Therefore, it is not obvious how the ECB could change the current perception of its monetary policy as contributing to economic inequality. On the other hand, the economic situation in Germany in 2018 was very different than that of the Mediterranean members of the euro area and it is unclear whether the findings reported here are representative for the euro area as a whole. Hence, it would be insightful to compare the perceptions of these populations with those of the Germans.

Finally, following Abadie (2020), it is interesting to mention some of the variables that were *not* significant in either the egotropic or sociotropic perspective on the ECB's MP. First, there is no evidence that absolute or relative per capita income matters, so the perception of the ECB's MP's impact appears to be independent of households' income level or position in the income distribution. Second, it does not seem to matter whether people are homeowners, that is, hold real assets, as only their net saving position is significant. Third, an information treatment in the form of a graph showing the ECB's performance with regard to inflation has no impact on respondents' evaluations. Fourth, potentially relevant variables, such as gender or job-related variables, are insignificant. Fifth, age appears to be irrelevant for people's assessment of the ECB's MP's impact on national inequality. Sixth, none of the psychological factors—risk attitude or time preferences—survive the testing-down process. And, seventh, neither does the source of information about inflation. Thus, a number of variables that are deemed relevant by economists do not appear to be relevant in the eyes of the population.

Moreover, only one of the variables noted in the economic literature on the distributional consequences of monetary policy—namely, saver—is robustly associated with laypersons' perceptions of the impact of monetary policy on their personal economic situation. Hence, inasmuch as the conclusions of the economic studies are correct, there seems to be some sort of disconnect between the actual and the perceived distributional impact of monetary policy. This specific disconnect is consistent with the German population's biases, as reported by Bellani et al. (2021), in regard to the perception of general economic inequality.

Given that the ECB's MP was expansionary at the time of the study, it is unclear to what extent the (reversed) conclusions apply to periods of contractionary monetary policy. I think this could be an interesting question for further research.

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Appendix

Table A1: Variable definitions and descriptive statistics

Variable	Coding	Mean	Std. Dev.	Min	Max
Dependent variables					
Q1: Perceived Effect of QE on the Respondents' Economic Situation	Coded as 1 'Economic situation worse after QE', 2 'No change after QE', 3 'Economic situation better after QE'.	1.81	0.59	1	3
Q1: Don't Know	Dummy. Coded as 1 when respondent answered 'don't know' to Q1.	0.34	0.47	1	0
Q2: Perception that QE Reduces Economic Inequality	Coded as 1 'Increases economic inequality', 2 'No effect on economic inequality', 3 'Reduces economic inequality'.	1.63	0.78	1	3
Q2: Don't Know	Dummy. Coded as 1 when respondent answered 'don't know' to Q2.	0.34	0.47	1	0
Explanatory variables					
(i) *Economic situation*					
(1) Household net income per capita	Per capita household net income in euro per month. Based on an ordinal 11-point scale. 508 observations were added through 5 rounds of imputations using: Age, Female, Household size, Number of children, Head of household, Current occupation of head of household, Family status, Education of respondent, Education of head of household, Occupational situation of head of household, Occupational situation of respondent, Homeownership, Social class, Community size, Household income as estimated by interviewer. Descriptive statistics for imputation round 5 (similar for Personal net income in robustness check).	1265	600	62	4500
(2) Upper-middle-income quartile	Based on Household net income per capita (and Personal net income in robustness check).	0.12	0.32	0	1
(3) Lower-middle-income quartile	Based on Household net income per capita (and Personal net income in robustness check).	0.18	0.38	0	1
(4) Upper-income quartile	Based on Household net income per capita (and Personal net income in robustness check).	0.21	0.41	0	1

(5) Saver	Dummy.	0.64	0.48	0	1
(6) Borrower	Dummy.	0.20	0.40	0	1
(7) Satisfaction with economic situation	Likert scale from 'absolutely dissatisfied' (coded 1) to 'absolutely satisfied' (coded 5).	2.67	0.92	1	5
(8) Own house	Dummy.	0.44	0.50	0	1
(9) Own flat	Dummy	0.07	0.25	0	1
(ii) *Socio-demographic situation*					
(10) Female	Dummy. Coded as 1 when respondent is female.	0.53	0.50	0	1
(11) Age	Age in years.	50.6	18.3	14	94
(12) Single	Dummy. Coded as 1 when this is the respondent's marriage status.	0.23	0.42	0	1
(13) Partner	Dummy. Coded as 1 when this is the respondent's marriage status.	0.11	0.31	0	1
(14) Married	Dummy. Coded as 1 when this is the respondent's marriage status.	0.48	0.50	0	1
(15) Certified apprenticeship	Dummy. Coded as 1 when this is the respondent's formal education.	0.30	0.46	0	1
(16) Secondary school	Dummy. Coded as 1 when this is the respondent's formal education.	0.41	0.49	0	1
(17) University-entrance diploma	Dummy. Coded as 1 when this is the respondent's formal education.	0.13	0.33	0	1
(18) University degree	Dummy. Coded as 1 when this is the respondent's formal education.	0.10	0.30	0	1
(19) Trade union member	Dummy. Coded as 1 when respondent is a member of a trade union.	0.08	0.26	0	1
(20) Blue collar	Dummy. Coded as 1 when this is the respondent's employment category.	0.12	0.33	0	1
(21) White collar	Dummy. Coded as 1 when this is the respondent's employment category.	0.35	0.48	0	1
(22) Public servant	Dummy. Coded as 1 when this is the respondent's employment category.	0.02	0.13	0	1
(23) Self-employed	Dummy. Coded as 1 when this is the respondent's employment category.	0.06	0.24	0	1

(24) Farmer	Dummy. Coded as 1 when this is the respondent's employment category.	0.002	0.05	0	1
(25) Employed full time	Dummy. Coded as 1 when this is the respondent's employment category.	0.44	0.50	0	1
(26) Employed part time	Dummy. Coded as 1 when this is the respondent's employment category.	0.13	0.33	0	1
(27) Unemployed	Dummy. Coded as 1 when this is the respondent's employment category.	0.03	0.16	0	1
(28) Nonworking	Dummy. Coded as 1 when this is the respondent's employment category..	0.29	0.45	0	1
(29) Housewife	Dummy. Coded as 1 when this is the respondent's employment category.	0.04	0.19	0	0.04
(30) Apprenticeship	Dummy. Coded as 1 when this is the respondent's employment category.	0.02	0.15	0	0.02
(31) Community size	Number of inhabitants of community where respondents lives, coded 1 '0–1,999', 2 '2,000–2,999', 3 '3,000–4,999', 4 '5,000–9,999', 5 '10,000–19,999', 6 '20,000–49,999', 7 '50,000–99,999', 8 '100,000–199,999', 9 '200,000–499,999', 10 '500,000 +'.	5.98	2.60	1	5.98
(32) East Germany	Dummy. Coded as 1 when respondent is from East Germany.	0.24	0.43	0	0.24
(33) No Internet access	Dummy. Coded as 1 when respondent has no Internet access.	0.15	0.36	0	0.15
(34) Number of children	Number of respondent's children.	1.14	1.16	0	6

(iii) *Psychological factors*

(35) Risk propensity	Continuous variable that varies between −1 (maximum risk aversion) and +1 (maximum risk propensity). We assessed the interviewees' risk preferences by confronting the interviewees with the choice of either receiving a safe payoff or taking part in a lottery (see Hayo et al. 2018).	0.11	0.67	-1	1
(36) Future-oriented time preference	Continuous variable running from 0 (completely impatient) to 1 (completely patient). Based on a survey experiment (see Hayo et al. 2018).	102.97	86.54	0	200
(37) Short-run impatience	Continuous variable, higher values indicate a greater degree of hyperbolic discounting. Based on a survey experiment (see Hayo et al. 2018).	10.77	38.41	-67	200

(vi) *Information search*					
(38) Newspaper	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.12	0.34	0	1
(39) Radio/TV	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.26	0.44	0	1
(40) Friends, family, or colleagues	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.08	0.27	0	1
(41) The Internet or social networks	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.06	0.23	0	1
(42) Other source	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.02	0.14	0	1
(43) Does not keep up-to-date with the inflation rate	Dummy. Coded as 1 when this is the respondent's main source of information for forming expectations about the future rate of inflation.	0.18	0.38	0	1
(44) Inflation information treatment	Dummy. A graph with ECB inflation performance was shown to one-half of the respondents on a random basis.	0.50	0.50	0	1
(v) *Monetary policy knowledge*					
(45) Subjective knowledge	Likert scale from 'very poor' (coded 1) to 'very good' (coded 5).	1.33	1.21	0	4
(46) Objective knowledge	Sum of correct answers on questions about the monetary policy objective of the ECB, the main refinancing rate, conduct of monetary policy, and responsibility for interest rate setting.	2.25	0.99	1	5
(vi) *Central bank trust*					
(47) Trust in ECB	Likert scale from 'no trust' (coded 1) to 'very much trust' (coded 5).	2.62	1.00	1	5

(vii) *Political preferences and attitudes*

(48) Alternative for Germany (AfD)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.11	0.31	0	1
(49) Conservatives (CDU/CSU)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.24	0.43	0	1
(50) Greens (Die Grünen)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.10	0.30	0	1
(51) Left Party (Die Linke)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.08	0.27	0	1
(52) Liberals (FDP)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.07	0.25	0	1
(53) Social-Democrats (SPD)	Dummy. Coded as 1 if the respondent would vote for this party if federal elections were held this Sunday.	0.17	0.37	0	1
(54) Public choice view of the political process	Public expenditures are spent according to the actual needs of the population vs. the mayor uses public money to increase his/her re-election chances. Coded from (–2) 'definitely public needs' to (2) 'definitely re-election chances'.	3.12	1.17	1	5

Table A2: What is your main source of information for forming expectations about the future rate of inflation?

Answers	Sample	
	Freq	Per cent
Newspaper/magazine	241	15
Radio/TV	515	33
Internet	137	9
Social networks	21	1
Conversations with friends/family/colleagues	113	7
Other sources	41	3
I do not keep up to date with the inflation rate	361	23
Don't know	137	9
	1,566	100

Note: Only those respondents who provided an answer about what the future inflation rate might be. Multiple answers were possible when answering 'other sources'.

Table A3: Objective monetary policy knowledge indicator based on the sum of correct answers to the questions listed in Tables A3a to A3d

Answers	Sample	
	Freq	Per cent
Knows nothing	615	31
1 correct answer	608	30
2 correct answers	444	22
3 correct answers	201	10
Knows a lot	147	7
	2,015	100

Table A3a: Which of the following do you think is the main objective of the ECB? The main objective of the ECB is to …

	Sample	
Answers	Freq	Per cent
Promote growth in the euro area	236	12
Fight unemployment in the euro area	45	2
Maintain price stability in the euro area	983	49
Provide credit to European Union member states	266	13
Control the euro/US dollar exchange rate	52	3
Don't know	433	22
	2,015	100

Table A3b: In the euro area, commercial banks (e.g., Deutsche Bank, Commerzbank, Sparkassen, Volksbanken, etc.) borrow money from the European Central Bank (ECB) at a given interest rate (Main Refinancing Rate). The commercial banks then lend this money at a higher interest rate to households and firms. Do you know, roughly, the interest rate the ECB charges the commercial banks? Please write the percentage here:

	Sample	
Main Refinancing Rate	Freq	Per cent
0	389	19
0.01	2	0.1
0.02	2	0.1
0.05	4	0.2
0.1	22	1.1
0.15	1	0.0
0.2	6	0.3
0.23	1	0.0
0.25	4	0.2
0.3	7	0.3
0.4	2	0.1
0.5	59	2.9
0.65	1	0.0
0.7	2	0.1
0.8	1	0.0
0.9	1	0.0
1	109	5.4

1.2	2	0.1
1.25	1	0.0
1.5	10	0.5
2	65	3.2
2.2	1	0.0
2.5	5	0.2
3	32	1.6
3.5	1	0.0
3.8	1	0.0
4	24	1.2
4.2	1	0.0
4.5	1	0.0
5	29	1.4
5.1	1	0.0
5.5	1	0.0
5.6	1	0.0
6	7	0.3
7	8	0.4
8	2	0.1
10	7	0.3
11	1	0.0
12	5	0.2
15	1	0.0
17	1	0.0
20	1	0.0
25	1	0.0
40	2	0.1
Don't know	1,190	59
	2,015	100

Table A3c: Private banks borrow liquidity from the European Central Bank (ECB) at a given interest rate. Assume that prices in the euro area are expected to increase strongly. How do you think the interest rate should be set?

Answers	Sample	
	Freq	Per cent
Decrease interest rate	247	12
Keep interest rate constant	428	21
Increase interest rate	589	29
Don't know	751	37
	2,015	100

Table A3d: Who is responsible for setting this interest rate?

Answers	Sample	
	Freq	Per cent
The ECB, independently of euro-area governments	726	36
The ECB; euro-area governments have to agree afterward	234	12
The ECB together with euro-area governments	320	16
The euro-area governments, with the ECB executing the decisions	106	5
Don't know	629	31
	2,015	100

Table A4: East/West Germany

Answers	Sample	
	Freq	Per cent
West	1,533	76
East	482	24
	2,015	100

Table A5: Think about the value of your total wealth, such as bank savings, equity, fixed-income securities, and real estate. Would you describe yourself as a …

	Sample	
Answers	Freq	Per cent
Saver	1,294	64
Person who has debt	410	20
Don't know	311	15
	2,015	100

Table A6: Which party would you vote for if federal elections were held this Sunday?

	Sample	
Answers	Freq	Per cent
CDU/CSU	480	23.8
SPD	339	16.8
AfD	213	10.6
FDP	132	6.6
Linkspartei/PDS	161	8.0
Bündnis 90/Die Grünen	207	10.3
Other party	118	5.9
Would not vote	365	18.1
	2,015	100

Table A7: To what extent do you trust the European Central Bank (ECB)? Value 1 means that you have very much trust. Value 5 means that you have no trust at all. You may rate your trust with the values in between

	Sample	
Answers	Freq	Per cent
(1) Very much trust	57	2.8
(2)	236	11.7
(3)	972	48.2
(4)	393	19.5
(5) No trust at all	357	17.7
	2,015	100

Table A8: Explaining 'don't know' answers to Q1 and Q2: average marginal effects (in percentage points)

Variables	Model 9	Model 10	Model 11	Model 12
	Q1: Don't know answer		Q2: Don't know answer	
	Marginal effect	Marginal effect	Marginal effect	Marginal effect
i) Economic Situation				
ii) Monetary Policy Knowledge				
Objective knowledge	-10**	-10**	-10**	-10**
Subjective knowledge	-4**	-4**	-4**	-4**
iii) Central Bank Trust				
Trust in ECB	-3*	-3*	-3*	-3**
iv) Political Preferences and Attitudes				
CDU/CSU	-11**	-11**	-11**	-11**
AfD	-12**	-11**	-11**	-11**
Left Party (Die Linke)	-16**	-16**	-16**	-17**
Greens	-7*	-8*	-7*	-8*
Public choice view of the political process	3**	2**	3**	2*
v) Socio-Demographic Indicators				
Age	-0.2*	-0.1*	-0.2**	-0.1*
Certified apprenticeship	-10*	-11**	-10**	-11**
Secondary school	-15**	-15**	-15**	-16**
University-entrance diploma	-19**	-20**	-20**	-21**
University degree	-22**	-25**	-23**	-26**
Community size	n.a.		1*	1*
vi) Psychological Indicators				
No. of observations	1,845	2,015	1,817	2,015
Test of joint significance	Chi^2(13) = 294**	Chi^2(13) = 281**	Chi^2(14) = 240**	Chi^2(14) = 284**
Pseudo-R^2	0.13	0.14	0.13	0.14

Notes: Estimator: logit. White (1980) robust standard errors are employed. * and ** indicate significance at a 5% and 1% level, respectively.