

What people believe about macro policies and what we can('t) do about it

Evidence from a large-scale multi-country survey experiment*

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Abstract We conduct a large-scale multi-country survey on households' understanding and beliefs about public funding policies. We measure macroeconomic literacy and find that more knowledgeable respondents support more central bank (CB) independence and fiscal discipline, less monetary-financed proposals and expect more inflation if these proposals were to be implemented. A CB communication piece opposing monetary financed stimulus can shift respondents' opinions in these directions no matter their level of macroeconomic literacy. However, prior beliefs matter and contradictory information may be polarizing. Information affects the respondents' views by shifting their inflation and tax expectations associated to these policies. (100 words)

Keywords Macroeconomic policies, expectations, large-scale household survey, information provision experiment.

JEL classification E70; E50; E58; E62; E60; H3

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1 Introduction

This paper reports on a large-scale multi-country survey experiment that assesses households' beliefs about government funding options and measures the effect of central bank (CB, hereafter) communication on the support for various associated policies, in particular monetary finance.

CBs have been devoting more and more efforts to engage with the public. They regularly and extensively survey people's views to evaluate whether their policies are well-understood and generate the intended reactions.¹ This is because expectations are a key component of the transmission channel of policies, but steering these expectations requires the public to have a fair amount of understanding of the economic mechanisms underlying policy decisions.² Limited levels of macroeconomic literacy in the population, together with the perceived complexity of monetary policy, may prevent CB communication from reaching a wide audience.

The higher uncertainty and macroeconomic volatility in the aftermath of the COVID-19 pandemic have reinforced this role as 'managers of expectations'. In particular, the strong complementarities in the policy mix response may have blurred the lines between the governments' fiscal policy and the CBs' independent mandates to conduct monetary policy. Whether in the media or in the political space, the public has been repeatedly confronted

¹Two recent CB initiatives well illustrate their efforts to reach a wider audience: the *Fed Listens* events, a series of meetings held since 2019 throughout communities in the U.S. to gauge how monetary policy decisions affect peoples' daily life, and the Reggae music videos released in 2020 by the Bank of Jamaica to communicate about inflation and the conduct of monetary policy to the public.

²Higher financial literacy and deeper knowledge of the monetary policy framework have been associated with lower inflation forecast errors, more anchored expectations and higher trust in the CB; see [Bruine de Bruin et al. \(2010\)](#), [Burke & Manz \(2014\)](#), [Van der Crujzen et al. \(2015\)](#), [Hayo & Neumeier \(2021\)](#), [Brouwer & de Haan \(2022\)](#).

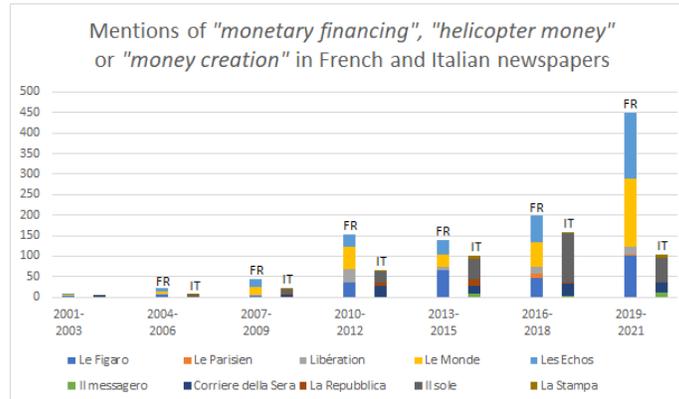
with contradicting messages regarding the feasibility and desirability of the options to finance these policies. The unprecedented scale and speed of the policy interventions has even revived support for groundbreaking proposals such as monetary finance;³ see Figure 1. This idea in fact germinated among economic experts within the context of the pre-COVID-19 persistently low inflation. The narrative around this concept, and the seemingly implied idea that public money may be ‘free’, ‘magic, or ‘unlimited’ went then viral in the wake of the COVID-19 pandemic, especially in Europe (we borrow this terminology from the study of narratives presented in [Shiller 2017](#)).⁴ In parallel, most of the opposition to this narrative seem to have originated from the institutions themselves, in particular the CBs, which face the challenge of reaching a wide audience to spread an alternative narrative on such complex topics.⁵

Among experts, the loss of control on inflation in the short run and the ensuing loss of anchorage of long-run expectations and CB credibility are widely acknowledged risks associated to monetary finance. Yet, in the context of the COVID-19 pandemic governmental rescue packages, it has also been argued that agents would perceive a monetary-financed fiscal stimulus as an increase in disposable income, which would entail an increase in consumption and, hence, a larger fiscal multiplier than a traditional debt-financed stimulus, which would

³Here, and in the sequel, we use the term ‘monetary finance’, ‘helicopter money’ and ‘money creation’ inter-changeably to designate fiscal expenses that result in an increase in the take-home nominal income of some private agents and are funded by the expansion of the monetary base, that is the liabilities of the CB, as opposed to government-bond issuance. We borrow this definition from [Reis & Tenreyro \(2022\)](#).

⁴Examples of pre-COVID-19 discussions include the president of the influential German think-tank DIW Berlin ([Fratzcher 2016](#)), the former Vice Chair of the Federal Reserve Stanley Fischer ([Elga et al. 2019](#)); the former European Central Bank (ECB) president Mario Draghi who described helicopter money as a ‘very interesting concept’ ([The Economist 2016](#)). See, *inter alia*, [Galí \(2020b\)](#), [Yashiv \(2020\)](#), [Buiter \(2020\)](#) or [De Grauwe \(2020\)](#) for opinion columns during the onset of the COVID-19 pandemic. See also, *inter alia*, [Galí \(2020a\)](#), [Reis & Tenreyro \(2022\)](#), [Cochrane \(2022, chap 14\)](#) for academic accounts.

⁵See, in particular, [Reuters \(2016\)](#), [Barthelemy & Penalver \(2020b\)](#) and [Business Insider \(2016\)](#). See also [Issing \(2016\)](#), [Ghebrihiwet et al. \(2021\)](#) for a former central banker’s view.



Notes: Europresse and Factiva.

Figure 1: Numbers of occurrences of monetary-finance-related concepts in the main French and Italian newspapers

be offset by an increase in future tax expectations per Ricardian equivalence (Galí 2020b, Benigno & Nisticò 2020).

On the political economy front, even a one-time monetary-financed initiative may risk opening the Pandora's box by fueling political opportunism and developing the unrealistic perception among the citizens that the government resource constraint is irrelevant (Barthelemy & Penalver 2020b). Such an initiative could present a risk to sound governance and undermine support for budget discipline, tax collection and CB independence.

Where does the public stand in this debate? What do people know about the financing of macroeconomic policies and trade-offs in public finances in general? What do they believe about the specific advantages and risks associated to debt issuance versus monetary finance? Do people relate these advantages and risks to a rationale for fiscal consolidation programs or independent CB mandates? Importantly, how does information provision affect their opinions and can targeted communication manage their expectations? Does the effect of information depend on people's macroeconomic literacy, the source of information, or the

medium used? Last but not least, how do people react in the presence of contradictory narratives?

This paper is the first to investigate these questions and does so by using a unique dataset from a large-scale multi-country household survey conducted in France, Italy and The Netherlands. More than 8,500 respondents participated in the survey. We measure people's macroeconomic literacy, elicit their opinions on fiscal options and then systematically vary the information provided with a randomized controlled trial (RCT) involving three pieces of information. The main piece represents CB communication in the form of a summary of a CB educational blog post on the irrelevance of the monetary financing option. In another treatment, we add to the CB piece a summary of a newspaper article by a prominent European economist arguing the opposite, namely in favor of monetary finance to finance the pandemic rescue packages. The third piece of information that we provide to some respondents is an educational video about the government intertemporal budget constraint. The information-provision treatments are designed to produce exogenous shifts in the expectations associated to the various funding options of fiscal policies to observe whether such shifts may cause changes in the support for these policies, fiscal-consolidation programs and CB independence. Our survey design allows us to do so by controlling for macroeconomic literacy, prior beliefs and a wide range of socio-economic variables.

We bring three main findings. First, we document people's factual knowledge about monetary and fiscal policies and uncover the socio-demographic determinants of this knowledge. Knowledge is limited, with an average score around 40% and we find a particularly striking gender-knowledge gap. More knowledgeable respondents uniformly support more CB independence and fiscal discipline, less monetary-financed proposals and perceive inflation as a

risk if these proposals were to be implemented. Higher future taxes, on the other hand, are not often spontaneously mentioned as a potential risk, neither of debt issuance nor of monetary finance, no matter the level of macroeconomic literacy.

Second, no matter their level of macroeconomic literacy, CB communication, in particular accompanied by an educational content, can shift respondents' opinions in these directions – more support for CB independence and fiscal discipline, less for monetary-financed proposals and a higher perception of its inflation-related risk. However, the effect of CB information is stronger among people who already have negative prior views on such policy options than among people who do not express any prior or express a positive one. The exposure to opposite views results in polarization rather than convergence of opinions: respondents tend to react to the information that aligns with their pre-treatment beliefs, which reinforces the latter, in particular on monetary finance and CB independence. These treatment effects persist several weeks later in a follow-up obfuscated survey.

Third, we uncover how the information provided in the survey affects the respondents' opinions about policy options by shifting their inflation and tax expectations associated to monetary-financed or debt-financed proposals. In particular, we find that higher inflation expectations strongly and significantly result in lower support for monetary finance and both higher expected inflation and taxes result in more support for fiscal discipline. Expectations are the essential transmission channels of these policies in macroeconomic models and our survey sheds light on these mechanisms. The related literature, surveyed hereafter, has extensively discussed the effects of information on expectations and, somewhat less often, the effects of these expectations on economic and financial decisions. The role of preferences on opinion formation regarding economic policies has also been regularly studied and we add

to the literature by shedding light on the effects of information on expectations and, in turn, on public support for various government funding options.

Finally, while the two pieces of information debating monetary finance do so in the context of the pandemic government rescue plans, it is important to note that the relevance of the questions addressed in this paper goes well beyond this particular, albeit far-reaching, episode. There is no shortage of challenges potentially requiring large government intervention, such as the financing of the environmental transition or the reinforcement of health care capacities amid aging populations and the risks of future pandemics.

The rest of the paper is organized as follows. After discussing the related literature, Section 2 introduces the experimental design and gives an overview of our survey. Section 3 analyzes the macroeconomic literacy, beliefs and opinions of the respondents and Section 4 discusses the effects of the information provision treatments on these views. Section 5 concludes.

Related literature Our work builds on a growing literature exploiting surveys to study people’s understanding and beliefs about economic questions, in particular within the context of information-provision experiments in random-controlled trials (RCTs hereafter); see [Haaland et al. \(2021\)](#) for a methodological account. An important strand of this literature focuses on the study of expectation dynamics, and in particular the effect of CB communication on inflation expectations; see the recent survey of [D’Acunto, Malmendier & Weber \(2022\)](#) and the references herein. The evidence collected emphasizes that simple communication – such as the provision of the inflation target – has a greater impact on agents’ expectations and their ensuing financial and economic decisions, than more exhaustive, technical or detailed

forms of communication; see, *inter alia*, [D’Acunto et al. \(2020\)](#) on a survey of Finnish households, [Coibion, Gorodnichenko & Weber \(2022b\)](#) on a US household survey; [Coibion et al. \(2018, 2019\)](#) on, respectively, a survey of New Zealander and Italian firms; [Binder & Rodrigue \(2018\)](#) for a focus on long-run inflation expectations of US households.⁶ Furthermore, [Coibion, Gorodnichenko & Weber \(2022b\)](#) show that the source of the information matters, insofar as newspaper pieces appear to be discounted by most households compared to the pieces of information originating directly from the CB. Within the context of the Bank of England’s inflation reports, adding a simplified summary to the Bank’s statements ([Haldane & McMahon 2018](#)) and simplifying the language and relating its messages to people’s daily life ([Bholat et al. 2019](#)) has been found to enhance the public’s understanding and trust in the CB. [Ehrmann et al. \(2013\)](#) also underline the need for the CB to be judged credible by households for them to be willing to integrate its information. [Coibion, Georgarakos, Gorodnichenko & Weber \(2020\)](#) report that information-provision experiments about future interest rates in a survey of US households can jointly affect their inflation expectations and their expectations of other macroeconomic variables.

Besides expectations and CB communication, several contributions look into households’ understanding of the transmission mechanisms of shocks and macroeconomic policies. [Carvalho & Nechio \(2014\)](#) show that only some households in the Michigan survey form expectations that are consistent with a Taylor rule, and this depends on education and income levels. Using a survey of Dutch households, [Coibion, Georgarakos, Gorodnichenko & Van Rooij \(2022\)](#) show that they tend to have a supply-side view, where higher inflation ex-

⁶There also exists a strand of the experimental literature studying the expectation channel of macroeconomic policies in the laboratory, see [Hommes \(2021\)](#) for a survey. This literature has also emphasized the importance of simple and relatable information to influence subjects’ macroeconomic forecasts, see, e.g., [Mokhtarzadeh & Petersen \(2021\)](#), [Kryvtsov & Petersen \(2021\)](#).

pectations are associated with more pessimistic outlooks and negatively affect spending. [Andre, Haaland, Roth & Wohlfart \(2022\)](#) survey a panel of US households and measure the narratives that they associate to the 2021-2022 inflation surge. [Hayo & Neumeier \(2017\)](#) find noticeable deviation from Ricardian equivalence in the attitudes of German households. [Roth & Wohlfart \(2020\)](#) examine how beliefs about the likelihood of a recession affect households' expectations and their economic decisions. [Andre, Pizzinelli, Roth & Wohlfart \(2022\)](#) compare the effects of various shocks on unemployment and inflation forecasts of experts and households and find a greater discrepancy between the two groups when it comes to inflation forecasts than unemployment forecasts. These authors also report that education achievements and age also influence the accuracy of the households' forecasts, while [D'Acunto, Hoang, Paloviita & Weber \(2022\)](#) rather emphasize the role of cognitive abilities and [Coibion, Gorodnichenko & Weber \(2020\)](#) and [Kamdar & Ray \(2022\)](#) the influence of political affiliation in shaping individuals' beliefs and economic decision-making in the US population. [D'Acunto et al. \(2021\)](#) study the role of the identity of the messengers and find that more diverse policy committees may be better at reaching underrepresented groups. Furthermore, several studies have also found policy announcements to have little impact on households' expectations and spending plans, whether these announcements concern the Fed regime change towards average-inflation targeting in August 2020 ([Coibion, Gorodnichenko, Knotek & Schoenle 2020](#)) or the monetary and fiscal policy responses to COVID-19 ([Coibion, Gorodnichenko & Weber 2022a](#)).

Our work is also related to recent studies on beliefs about economic questions and support for policies. [Roth et al. \(2022\)](#) show how beliefs about the debt-to-GDP ratio and the perceived sustainability of the US public debt affect people's support for government spending cuts. [Stantcheva \(2021\)](#) reports that people's support for taxation reflects pref-

erences for redistribution and fairness rather than efficiency concerns; see also [Kuziemko et al. \(2015\)](#) on the link between perceived income inequality and support for tax policies. Other information-provision experiments within household surveys that focus on support for policies include [Alesina et al. \(2018\)](#) on perceived social mobility opportunities and support for redistribution, [Tella & Rodrik \(2020\)](#) on trade protection policies and [Settele \(2022\)](#) on the government interventions against the gender-wage gap.

Our ‘macroeconomic-literacy score’ is closely related to the survey literature that aims to measure people’s factual knowledge about macroeconomic questions. An early contribution by [Blinder & Krueger \(2004\)](#) reports on a phone survey of households with nine questions on key economic figures of the US economy. They find that most respondents score well, with most frequent errors about the size of US budget deficit. By contrast, focusing on questions related to the monetary-policy framework, [Hayo & Neuenkirch \(2014\)](#), [Van der Cruysen et al. \(2015\)](#), [Bottone et al. \(2021\)](#) and [Hayo & Neumeier \(2021\)](#) find overall large shortcomings by surveying factual knowledge of households in, respectively, Germany, the Netherlands, Italy and New Zealand. For instance, [Bottone et al. \(2021\)](#) find that most Italian households believe that the ECB is primarily concerned with economic growth rather than price stability.

Our paper stands out from this literature along several important dimensions. To the best of our knowledge, this is the first survey of what people perceive about the government budget constraint and know about monetary finance.⁷ We also provide new evidence about how these beliefs may relate to inflation and tax expectations and affect support for CB

⁷[Van Rooij & de Haan \(2019\)](#) investigate whether a hypothetical monetary-financed fiscal stimulus would affect inflation expectations of Dutch households and do not find any evidence of any impact, while the effect on the trust in the ECB is not clear-cut.

independence and fiscal discipline. Furthermore, we explore a unique RCT design that uses a blog post from a CB as a main treatment variable, mixes an educational video with textual content and, crucially, exposes respondents to contradictory messages in order to emulate the tone of the public debate in the survey experiment.

2 The survey

We first detail how the data is collected, then how the different information provision treatments are elaborated, and we give an descriptive overview of the dataset.

2.1 The data collection

We run a survey of households in France, The Netherlands and Italy. We chose these countries to reflect the diversity of Western European economies. The survey was conducted by *Kantar*, a major multinational marketing research company.

The survey consists in two waves: a main wave (Wave 1) and a recontact wave (Wave 2). A pilot for the first wave involving 100 respondents per country was first launched on November 23rd, 2021. The main wave of the survey was then conducted from January 14th, 2022 until February 17th, 2022, hence before the start of the war in Ukraine and the latest surge in inflation.⁸ A total of 8,601 respondents took part in the main wave of the survey:

⁸The yearly inflation rates in 2021 in France, The Netherlands and Italy were, respectively, 1.6% (source: INSEE), 2.7% (source: CBS) and 1.8% (source: Istat). In December 2021 and January 2022 respectively, the annualized year-over-year inflation rate in France was still 2.8 and 2.9%, 5.7 and 6.4% in The Netherlands and 3.9 and 4.8% in Italy according to the same sources.

2,200 respondents in the Netherlands, 2,201 in Italy and 4,200 in France. The larger sample size in France is used in anticipation of the second wave, which consists of a recontact form to measure the potential persistence of the treatment effects. The second wave was conducted in France about a month later, from March 4 to 21st, 2022 and involved two thirds of the respondents of the first wave (2,809 respondents in total).⁹

The survey was conducted online using the **Kantar Profiles proprietary panels** and was device-agnostic, i.e. respondents could fill it up using a PC, a tablet or a smart phone.¹⁰ We elaborated the questionnaire in English, which we report in Appendix C. As native speakers, and hopefully trained macroeconomists, we translated the questions in Dutch and French and two Graduate students in macroeconomics with Italian mother tongue proceeded to the translation for Italy.

We took precautions when designing and implementing the survey to maximize the quality of the data including: stressing the academic background of the study and anonymity of the data collected; using categorical answer keys for financial variables to maximize the response rate while allowing for a ‘rather-not-disclose’ option; obfuscating the Wave-2 questionnaire to hide the connection with the one of Wave 1; eliciting feedback from the respondents about clarity and difficulty in the pilot and varying the format of the answers to keep participants engaged while measuring their attention level.

⁹For budgetary and practical reasons, only France could be used for the recontact wave.

¹⁰Evidence from the pilot shows that the choice of the device does not correlate with the time the respondents spent on the text content of the survey.

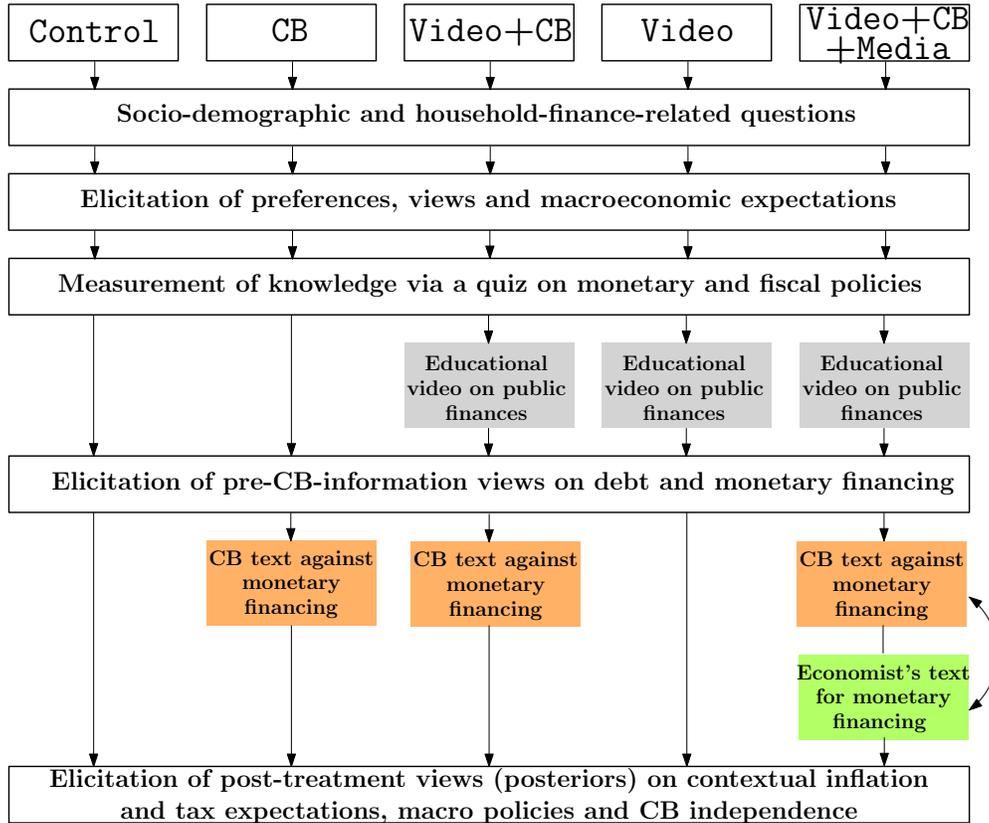


Figure 2: Structure of the survey experiment

Notes: Respondents are randomly assigned to one of the five treatment arms with equal probability upon starting the survey. 1,720 respondents per treatment (1,721 for Tr. Video+CB+Media). In this last treatment, the order of display of the CB communication and the economist’s opinion piece is randomized, with an equal probability for each respondent to see one or the other first.

2.2 The experimental design

Figure 2 displays the general structure of the survey experiment. Upon starting the survey, respondents were randomly assigned to one treatment arm and no respondent could take part to the survey more than once.

In all treatments, the respondents were first presented with usual socio-demographic and

household-finance related questions and were asked about their habits and general opinions, including their macroeconomic expectations. The respondents then took a quiz consisting of five multiple-choice questions, three concerning monetary policy and two concerning fiscal policy (the exact questions are given along with Figure 3 thereafter). Participants could also choose the ‘I don’t know’-option. This quiz aims to *ex-ante* measure the level of knowledge of the respondents regarding macroeconomic policies. We informed the respondents that this section of the survey was designed like a quiz with wrong and right answers.¹¹

After the quiz, the information that is presented to the respondents differs depending on the treatment to which each respondent had been assigned. The key treatment variable is the provision of a CB communication piece arguing against monetary-financed fiscal policies. We use a blog post published online on May 20, 2020 on the *Bloc-notes Eco* blog, i.e. the blog of the Bank of France dedicated to the publication of educational content concerning the Bank’s research studies and expertise. In their words, the blog ‘targets an audience of students, professionals, journalists and scholars.’ We use this information source to convey a negative view on monetary finance. We do not name the Bank of France but refer to a CB of a Euro-area country.

Because the text may appear long and technical, at least at a first glance, the information treatment first presents a three-sentence summary that stresses the two major flaws of such policies, namely inflation and devaluation of the domestic currency, and highlights that the ‘money created by central banks has nothing of magical’ (see Box 2.2). The respondents had to spend at least 10 seconds on this summary before being able to scroll down through

¹¹Precisely, we state that: ‘*We are interested in learning whether economic information find their way to the general public. These are questions for which there are right or wrong answers but they are not designed to catch you out.*’

the full text to access the ‘Next’ button at the end of the text and proceed further with the survey. This procedure was designed to keep the cognitive load reasonable and enforce some attention to the information while letting to the respondents the option of reading the full text. The entire text can be found in Appendix C. It explains the mechanics of money creation and CBs’ balance sheets and why money may not be created without any counterparts or costs. Note that there is no reference to the ECB’s independent mandate.

The first two columns of Figure 2 describe, respectively, the **control** group and Treatment **CB**: the control group, where no information is displayed, serves as benchmark, while in Tr. **CB**, the CB blog post opposing monetary-financed initiatives is displayed to the respondents between the elicitation of their prior and posterior views on debt issuance and monetary finance. More precisely, the posterior questions, common across all respondents, survey opinions on fiscal consolidation, CB independence, exceptional and permanent monetary financing of government expenses as well as expectations of taxes and inflation in thought experiments where debt or monetary-financed policies would be chosen to fund public expenditures. At the end of the survey, all participants had the opportunity to sign a petition for the ECB to remain independent from the government, which allows us to not only measure expectations and views but also actual actions based on these.

Despite the simplified summary, the topic of the CB communication piece is arguably not trivial once we step out of our expert shoes and acknowledge the point of view of lay people.¹² To address this concern, we introduce the possibility of a second piece of information: a short educational video about the financing of public expenditures.¹³

¹²Before the actual data collection, we have tried out the survey questions on many non-expert respondents in our entourage and a fair share of them considered the topic of government funding options, debt issuance and monetary finance quite technical.

¹³The video in the three languages along with an English version (not used in the survey) can be found

Box 2.2 – Information provision treatment: Central bank’s communication (see [Barthelemy & Penalver 2020a](#) for the full text)

Before answering the last part of the survey, you will be randomly assigned to read a piece of information from a set with different views on economic policies. We now invite you to read the article below. It is a piece from a central bank from the euro area. It states that “**the money created by central banks has nothing of magical**”. It has been written at the beginning of the pandemic (in the first semester of 2020). We invite you to skim through it yourself but an external expert has also summarized it for your convenience:

“The article argues that if the European Central Bank were to create money to fund government expenses, this would be illegal and it could entail **very high social and economic costs** in the future. Looking at historical experience, creating money to fund government expenses has often led to a **loss of confidence in the currency** and a **loss of control over the general level of the prices** in the economy. A situation where prices start increasing rapidly refers to **inflation** or even hyperinflation.”

We designed this video to convey didactic content, while abstracting from any macroeconomic jargon and ideological connotations. Such a stylized presentation aims to provide context to the trade-offs associated to each public funding options and maximize survey engagement on this complex matter. The video illustrates in lay terms the accounting consistency in the government flow budget constraint that links the monetary-policy-related choice of the money supply and the fiscal-policy options of spending, taxation, and borrowing across time.

Precisely, the video successively reviews, in lay and apolitical terms, the different options for financing a public expense, namely raising taxes, issuing debt or expanding the monetary base and states for each option that there are downsides and upsides. The video concludes by stating that because the risks associated with monetary financing are usually considered as high, CBs like the ECB are independent from governments. The risks and advantages are in the replication package [The replication package will be cited here](#).

not spelled out. In particular, there is no mention of any inflationary bias.

We wrote the text of the video and translated it in Italian, French and Dutch. All videos are subtitled and we outsourced the direction and making to the team of *La Cité de l'Eco*, an educational museum on economics in Paris that works in a close relationship with the Bank of France.

The third column of Figure 2 summarizes a treatment called **Video+CB** where both supports, the video and the CB blog post, are displayed. Respondents watch the educational video before being asked about their pre-CB information views on debt and monetary-financed options because the video provides context associated to these options to help them structure their thoughts but does not name any advantage or risks of each. Hence, the video allows us to test whether providing context influences the respondents' priors on different public financing options, while the CB piece is used to assess whether CB communication is effective at negatively affecting their opinion of monetary-financed fiscal stimulus. The fourth column describes **Tr. Video**, where respondents only watch the video.

A last treatment arm aims to test whether the CB message, if effective at shifting views against apparently 'easy and free financing option', can resist opposing views in the public debate. This treatment is named **Video+CB+Media** – see Column 5 of Figure 2 – and adds to the **Video+CB** treatment a newspaper opinion column from Prof. Paul de Grauwe, who holds the John Paulson Chair in European Political Economy at the London School of Economics and Political Science. The opinion piece presented to the respondents argues for a one-time monetary-financed fiscal stimulus in the wake of the COVID-19 pandemic (De Grauwe 2020). This piece was chosen because the author is a prominent economist in Europe and often

Box 2.2 – Information provision treatment: Economist’s newspaper piece

The second article below is a piece from a renowned European economist. It states that “**the European Central Bank (ECB) must finance COVID-19 deficits**”. It has been written at the beginning of the pandemic (in the first semester of 2020). We invite you to skim through it yourself but an external expert has also summarized it for your convenience:

“The article argues that if the European Central Bank were to create money to fund government expenses, this would create a **relief for countries’ budgets** and make them **avoid potential indebtedness problems**. It also argues that this would **not induce any risk of large increase in the level of the prices** in the current context. It proposes to find the appropriate way to make this option legal.”

contributes to the economic debate in general-audience English, Dutch and French-language newspapers.

The order in which respondents see the two texts in Tr. **Video+CB+Media** is randomized and the same procedures as for the CB communication are implemented for De Grauwe’s piece. The summary of the text is reproduced in Box 2.2, and the respondents may read the whole text that can be found in Appendix C. This text argues that legal matters could be easily overcome to allow for a monetary-financed fiscal stimulus in the Euro area and that the long-run trend there is rather deflationary, hence leaving room for monetary finance, also described as thinking ‘outside the box’.

Additionally, Tr. **CB+Video+Media** tests which of the two pieces, the opinion piece or the CB blog post, can influence respondents’ views the most, and whether being exposed to contradicting messages may generate uncertainty or confusion or, on the contrary, polarization of ideas. This treatment is empirically relevant because in the real world, people are frequently confronted with contradicting messages.

A recontact wave was conducted in France in the form of a unique shorter questionnaire designed to evaluate the persistence of the treatment effects, if any. This follow-up survey was conducted three weeks after the completion of the first wave. To hide the connection with the first wave, the questionnaire was obfuscated: the first questions relate to proximity of essential services and EU-funded local projects, before turning to questions about the EU institutional framework and then about support for CB independence, monetary-financed initiatives, fiscal consolidation policies and worries about taxes and inflation in case of various public-spending options.

The experimental design is essentially exploratory. The treatments involving the CB blog post aim to test whether CB communication may alter people’s opinions on macroeconomic policies, particularly by manipulating their inflation expectations in case of monetary-financed public expenses. With the video, we aim to assess whether a short educational content may help people clarify their opinions about fiscal options and may help the CB information affect these opinions. Treatment **Video+CB+Media** explores people’s reaction in the presence of contradictory information. The extensive socio-demographic questionnaire and the five-question quiz allow us to address these questions while controlling for a wide range of potential factors, in particular people’s knowledge on macroeconomic matter. A exhaustive list of these control variables is given in [Appendix A](#). Before answering these questions, we provide a short description of our data.

2.3 Data overview

Our data is representative of the general population of the three countries in terms of gender, age, region of residence and, as much as possible given the sample size required, education levels and income (see Table 8 in Appendix A.1). In detail, our data are representative in terms of education level in The Netherlands and the French and Italian respondents have slightly higher education achievements than the general population in these two countries. The middle-income earners are well represented in each country but our sample involves fewer high-income earners than the general population.¹⁴ In Table 8, we also show that our sample is fairly representative in terms of unemployment and involves fewer one-person households than the general population, resulting in an average household size slightly larger. Most importantly, the distribution of any of these characteristics does not significantly differ across the five treatments (see last column of Table 8).

The median completion time is about 14 minutes, with a 20-minute average, ranging from 17 minutes in the `Control` treatment to more than 21 in the `Video+CB+Media` treatment and close to 19 minutes in the three other treatments.¹⁵ Given that the video lasts for one minute and 20 seconds, the time spent by respondents on the information treatments is substantial. The vast majority of respondents (86%) did not find the survey biased, and the rest is divided equally between finding a left or a right-wing bias. About one out of eight participants found the survey too technical, ranging from 9% in the `Video` treatment to 13.5% in the `Control` treatment, which shows that the information provided in the different treatments was approachable for most participants and the educational content successfully

¹⁴Low-education and high-income quotas are a common challenge of online panels.

¹⁵In the recontact wave, the median completion time is 3:30 minutes, with an average of 5.30 minutes.

tamed the perceived technicality.

In the next section, we provide a roadmap of respondents' knowledge, expectations and beliefs.

3 Macroeconomic literacy and opinions

3.1 What do people know?

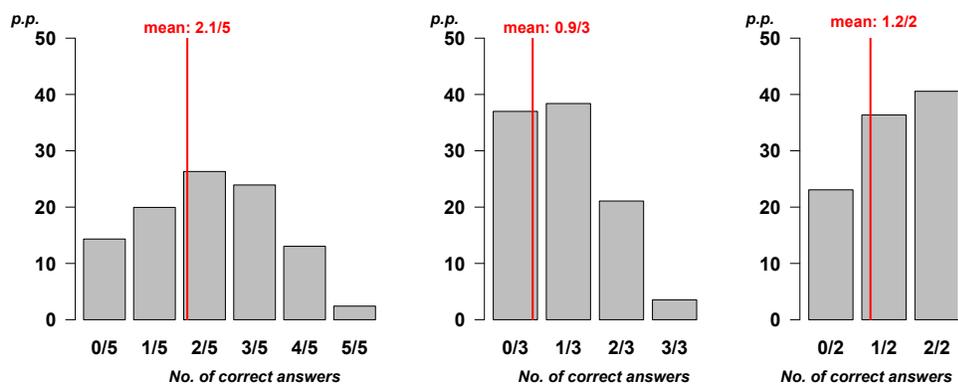
Five questions in the survey are designed to measure objective knowledge about macroeconomic policies, three pertain to monetary policy in the Euro area and two to fiscal policy and public finances. These questions correspond to Questions 27 to 31 in Appendix C. The resulting metric for our analysis is a macroeconomic literacy score ranging from 0 (in the absence of any correct answers) to 5 (if all questions are correctly answered), along with two sub-scores, one for monetary policy (with a maximum of 3 points) and one for fiscal policy (with a maximum of 2 points). Respondents are aware that these questions have right and wrong answers.

Figure 3 displays the distribution of these scores. We can make two striking observations. First, scores are low: respondents only answer correctly an average of two questions out of five, and fewer than 5% obtain the maximum score (see Figure 3a). This is despite considerable effort devoted to these questions since, on average, respondents spent a minimum of 17 seconds (for the first and the fourth questions) up to 29 seconds (for the second question) on each quiz question. Reducing the sample to respondents who spent more than 10 seconds per

macroeconomic-literacy question does not strikingly improve the average score (see Figure 3d).

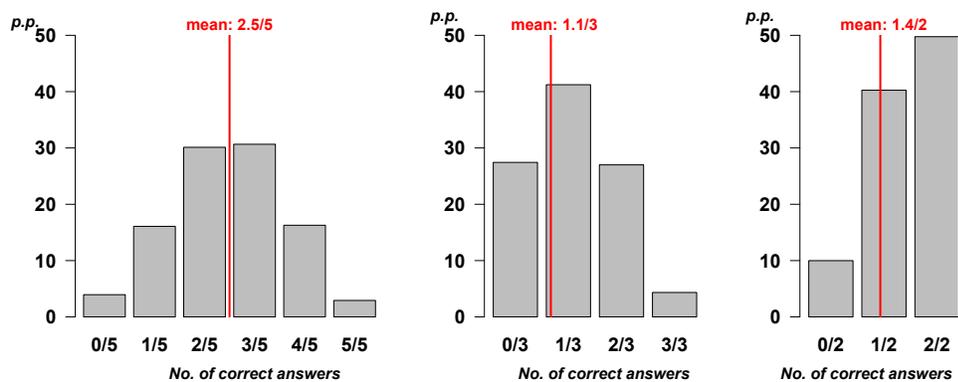
Second, it is clear from the comparison of Figures 3b and 3c that respondents are more knowledgeable about fiscal policy than about monetary policy: about a quarter of the respondents answer correctly at least two out of the three monetary-policy questions, while more than 40% obtain a score of 2/2 with the fiscal-policy questions. Of course, given the number of answer keys and questions in each sub-score, it is easier to obtain the maximum fiscal-policy score than the maximum monetary-policy score. Nevertheless, the significantly stronger fiscal-policy knowledge persists when performing comparisons of each pair of scores among the five questions and of each monetary-policy question against the fiscal-policy score as a whole (the p-values of the corresponding rank-sum tests are always < 0.001).

Panel A -- Full sample



(a) Total score (b) Monetary-policy score (c) Fiscal-policy score

Panel B -- Attentive respondents only



(d) Total score (e) Monetary-policy score (f) Fiscal-policy score

Notes: The whole sample involves 8,601 observations. The attentive sample involves only the 2,052 respondents who spent at least 10 seconds per question. All questions are reported in Appendix C and must be answered by radio buttons (only one choice possible). The scores are computed as the fraction of correct answers.

Figure 3: Distribution of the macroeconomic literacy scores

This significant difference in knowledge remains in the attentive sub-sample only (compare Figures 3e and 3f). Less understanding of monetary policy than of fiscal policy may appear surprising in light of the considerable transparency efforts of the CBs, to which the ECB is no exception. We may make several conjectures to explain such a difference. The fiscal-policy instruments directly impact households' finances *via* taxes and government transfers, while the returns on savings or the cost of borrowing may play a less salient role in most households' income. Fiscal policy may also benefit from a wider media coverage than monetary policy, in particular within the context of the national political debate, while CB communication is often targeted at professionals and financial markets participants. Monetary policy is in fact frequently perceived as too complex by the public, and therefore does not trigger political mobilization or partisan cleavage (Bearce 2003). This may be particularly true in the Euro area, where monetary policy has been delegated to a supra-national entity.

We now investigate the determinants of these macroeconomic-literacy scores and discuss the information channels that may be used by the authorities, the CBs in particular, to design communication policies targeted at the groups with lower literacy in the matter.

Table 1 reports on the relationships between socio-demographic and financial variables and macroeconomic literacy scores.¹⁶ Gender has the largest effect on the average scores: men perform significantly better than women. This is true whether considering the total score (Col. I to III), the sample of attentive respondents only as defined in Figure 3 (Col. IV), the monetary-policy questions only (Col. V) or the fiscal-policy questions only (Col.

¹⁶These variables are used throughout the paper as controls and described in Appendix A.1. After checking for the absence of multicollinearity (see Table A.2), a factor analysis does not yield to a substantial decrease in the size of the dataset. For as many as seven factors, the p-value associated to the χ^2 -statistics is < 0.001

VI). Even after controlling for a wide range of socio-economic factors, the average gender ‘knowledge’ gap is close to 0.3/5 or 6 points out of 100 (see Cols. III and IV). Computing the share of correct answers gives even more striking results: fewer than 10% of women answered at least 4 questions correctly and only 0.9% of them score 5 out of 5 versus 21.4% and 4% of the male respondents. On average, men outscore female by more than 0.5 out of 5 points, from an average of 1.83 to 2.36.

Such a gender gap is several times larger than what has been reported in the financial literacy score (De Beckker et al. 2019) but in line with the data of Van Rooij et al. (2011) on the understanding of basic economic and financial concepts using the Dutch National Bank (DNB) household survey.¹⁷ Also using a Dutch household survey, Van der Crujssen et al. (2015) find that female respondents are less likely to answer correctly to a series of true/false statements on the ECB objectives and policy.

Yet, evidence of gender economic-knowledge gap is mixed. Blinder & Krueger (2004) test the factual knowledge of participants to a US household survey about key economic figures and find no significant gender difference. One may argue that there are differences between recalling numbers, as their study requires, and sound economy analysis, as in our questions. Nevertheless, in our data, the strong gender gap persists when considering the two ‘knowledge’ questions embedded in Wave 2 which pertain to the numerical objectives of fiscal and monetary policy in the European Monetary Union (EMU), see Questions 9 and 10 in Appendix C.2. This evidence suggests that the gender macroeconomic-literacy gap is particularly pronounced when it comes to macroeconomic policies in particular, no matter whether we elicit knowledge about general mechanisms, such as the interest-rate adjustment,

¹⁷Women also disproportionately answer ‘I don’t know’ and this tendency is more striking in our survey (more than 10 p.p. in each question) than what has been found in (De Beckker et al. 2019).

or exact numerical information, such as the inflation target.

Turning to the other socio-economic characteristics, older and more educated individuals, higher-income earners, people inclined to financial planning and people who declare a high level of subjective knowledge also tend to obtain higher scores. Non-working people, members of larger households and respondents with more right-wing views tend to obtain lower scores, although these effects are not large and do not hold when excluding inattentive respondents (Col. IV) or when disentangling fiscal and monetary-policy-related questions (Col. V and VI).

In line with previous results on household surveys in Germany and New Zealand ([Hayo & Neuenkirch 2014](#), [Hayo & Neumeier 2021](#)), greater factual knowledge pertaining to monetary policy is associated with more trust in the CB (Col. V). In our survey, this correlation does not extend to factual knowledge about fiscal policy (Col. VI). Political engagement has also been linked to greater knowledge in finance ([Blinder & Krueger 2004](#), [Van der Crujssen et al. 2015](#)) and so it is in our data.¹⁸

¹⁸Throughout our analysis, we introduce political opinions with dummy variables for ‘declaring right-wing view’ and ‘declaring left-wing views.’ About half of the respondents declare a neutral political orientation (i.e. answer ‘3’) or choose not to answer, see Table 2 in Appendix A.1.

	<i>Dependent variable: macroeconomic literacy score</i>					
	Total score: monetary and fiscal policies				Monetary policy score	Fiscal policy score
	(I)	All respondents (II)	(III)	Attentive only (IV)	All respondents (V)	(VI)
<i>Demographic variables</i>						
<i>Female</i>	-8.74*** (0.54)	-6.50*** (0.53)	-5.85*** (0.53)	-5.33*** (1.04)	-6.12*** (0.60)	-5.45*** (0.81)
<i>Age</i>	0.45*** (0.02)	0.39*** (0.02)	0.34*** (0.02)	0.18*** (0.04)	0.22*** (0.02)	0.52*** (0.03)
<i>Education</i>	7.63*** (0.40)	5.72*** (0.40)	5.12*** (0.40)	4.58*** (0.79)	4.26*** (0.45)	6.39*** (0.61)
<i>Household size</i>	-0.02 (0.23)	-0.38* (0.22)	-0.82*** (0.23)	-0.61 (0.47)	-0.59** (0.25)	-1.16*** (0.35)
<i>Working</i>	2.91*** (0.58)	2.60*** (0.56)	1.07* (0.57)	0.51 (1.10)	0.45 (0.64)	2.00** (0.87)
<i>France</i>	2.28*** (0.63)	2.40*** (0.62)	1.50** (0.64)	3.41** (1.36)	3.65*** (0.71)	-1.72* (0.97)
<i>Italy</i>	4.33*** (0.67)	3.00*** (0.66)	3.22*** (0.68)	3.26** (1.40)	8.80*** (0.75)	-5.16*** (1.03)
<i>Habits and opinion variables</i>						
<i>Left-wing view</i>		7.50*** (0.67)	6.71*** (0.67)	1.51 (1.25)	5.24*** (0.75)	8.91*** (1.02)
<i>Right-wing view</i>		4.80*** (0.62)	3.66*** (0.62)	1.46 (1.23)	2.82*** (0.69)	4.90*** (0.94)
<i>Trusting the ECB</i>		4.25*** (0.67)	3.82*** (0.67)	2.71** (1.30)	4.13*** (0.75)	3.36*** (1.02)
<i>Financial planner</i>		3.60*** (0.35)	3.29*** (0.35)	-1.05 (0.74)	1.52*** (0.39)	5.95*** (0.53)
<i>Financial newspapers readers</i>		1.47*** (0.25)	1.21*** (0.25)	0.73 (0.49)	1.59*** (0.28)	0.63* (0.38)
<i>Subjective knowledge</i>		6.88*** (0.64)	6.60*** (0.64)	4.06*** (1.24)	5.58*** (0.72)	8.12*** (0.97)
<i>Financial variables</i>						
<i>Low income</i>			1.43 (1.09)	-0.25 (2.21)	0.13 (1.22)	3.39** (1.66)
<i>Medium income</i>			6.10*** (1.05)	3.88* (2.13)	4.77*** (1.17)	8.09*** (1.60)
<i>High income</i>			8.41*** (1.13)	5.42** (2.32)	6.27*** (1.27)	11.61*** (1.72)
<i>Negative net wealth</i>			-2.06* (1.20)	-7.57*** (2.38)	-4.16*** (1.34)	1.09 (1.82)
<i>Low net wealth</i>			0.11 (1.08)	-5.55*** (2.14)	-1.33 (1.21)	2.28 (1.64)
<i>Medium net wealth</i>			1.18 (1.13)	-2.33 (2.24)	0.01 (1.26)	2.93* (1.72)
<i>Missing net wealth</i>			-3.26*** (1.14)	-6.89*** (2.28)	-4.04*** (1.27)	-2.10 (1.72)
<i>COVID-19 financial loss</i>			3.09*** (0.54)	1.03 (1.07)	1.21** (0.60)	5.90*** (0.82)
Constant	4.72*** (1.66)	-10.81*** (2.01)	-7.70*** (2.47)	33.90*** (5.36)	-4.11 (2.75)	-13.08*** (3.75)
Nb. Obs.	8,585	8,585	8,585	2,050	8,585	8,585
-log-lik.	39649.2	39,337.7	39,239.7	9175.7	40,170.9	42,831.9
Wald F(8)-statistic			24.49***	6.00***	15.21***	18.58***

Notes: *p<0.1; **p<0.05; ***p<0.01. The scores are expressed out of 100 p.p. All explanatory variables are described in Appendix A.1. Clustered estimated standard errors (CESEs) in brackets. The Wald statistic refers to the test of the joined significance of the financial variables. 'Attentive only' (Col. IV) exclude respondents who spent less than 10 seconds in at least one of the five questions.

Table 1: OLS models of the macroeconomic literacy score

Interestingly, the magnitude of the cross-country differences stands out, especially regarding monetary policy questions (Col. V): French and Italian respondents obtain significantly higher scores than their Dutch counterparts. This difference is not as striking when it comes to fiscal policy questions (Col VI). This may look surprising given that the Netherlands score (much) higher in financial literacy than France, which scores itself higher than Italy in this respect (Klapper & Lusardi 2020). Our striking results show that financial literacy and numeracy, which are the usual metrics when it comes to evaluate the economic knowledge of the public, may differ substantially from macroeconomic literacy. The outcome and cross-country ranking may be sensitive to the exact questions of the quiz. It is therefore key to include general-level questions on economic mechanisms in households' surveys to accurately measure the public's knowledge on the matter. These cross-country differences call for more research to design effective targeted communication policies with the European Monetary Union.

To design such targeted communication policies, another key is to identify which information channels to use to broaden the audience. Table 1 reveals that financial-newspaper readers perform significantly better than respondents who do not read as often this media outlet but again, this effect is not large and mostly applies to monetary-policy questions.

Table 2 takes a deeper look at the relationships between media use when it comes specifically to economic information and macroeconomic literacy score. Readers of newspapers and, to a lesser extent, respondents who often watch TV have the highest knowledge score. Hence, reinforcing communication around macroeconomic policies via this channel may lead to redundancy while ignoring the least literate households on the matter. Because the least knowledgeable households tend to use social media more frequently (Panel C of Table 2),

	Never	Rarely	Occasionally	Regularly	Very often	$\chi^2(4)$ -statistic
Panel A. Reading general newspapers						
<i>Average total score</i>	1.67	1.99	2.19	2.44	2.52	416.8***
<i>(sd)</i>	(1.30)	(1.29)	(1.31)	(1.27)	(1.21)	
<i>Average monetary policy score</i>	0.68	0.86	0.98	1.11	1.09	304.6***
<i>(sd)</i>	(0.79)	(0.81)	(0.85)	(0.87)	(0.84)	
<i>Nb. obs.</i>	2,196	1,807	2,305	1,715	578	
Panel B. Watching TV						
<i>Average total score</i>	1.75	2.01	2.00	2.17	2.15	71.9***
<i>(sd)</i>	(1.36)	(1.32)	(1.36)	(1.31)	(1.28)	
<i>Average monetary policy score</i>	0.69	0.88	0.88	0.97	0.93	75.2***
<i>(sd)</i>	(0.81)	(0.81)	(0.84)	(0.85)	(0.85)	
<i>Nb. obs.</i>	702	755	1,412	3,074	2,658	
Panel C. Using social media						
<i>Average total score</i>	2.25	2.34	2.09	1.97	1.86	145.9***
<i>(sd)</i>	(1.36)	(1.31)	(1.35)	(1.29)	(1.24)	
<i>Average monetary policy score</i>	0.96	1.02	0.94	0.86	0.81	58.4***
<i>(sd)</i>	(0.88)	(0.85)	(0.85)	(0.82)	(0.81)	
<i>Nb. obs.</i>	2,043	1,115	1,607	2,164	1,672	

Notes: The questions ask how often respondents use the different sources of information when it comes to economic issues in particular (see 13 in Appendix C). The total knowledge score has a maximum of 5, the monetary policy score a maximum of 3. The χ^2 -statistics correspond to the Kruskal-Wallis test of equality of proportions across the five frequencies of use.

Table 2: Macroeconomic literacy score by frequency of use of information source

using these platforms to diffuse information about monetary policy in particular could help target the fraction of the public who could benefit the most from CB communication.

Finding 1 (Macroeconomic literacy)

- Respondents are less knowledgeable when it comes to monetary policy than fiscal policy.
- More educated, wealthier, newspaper-reader, male and French and Italian respondents have higher macroeconomic scores than females, people with less education achievement, Dutch respondents and social-media users.

Before digging into the effects of information provision on respondents' opinions on fi-

nancing options of macroeconomic policies, we analyze the pre-treatment, i.e. the prior, opinions of the respondents and describe their post-treatment, i.e. posterior views on the matter.

3.2 What do people think?

3.2.1 Priors on monetary and debt-financed public expenses

Before reading the texts but after seeing the video (see, again, Figure 2), we elicit respondent’s prior opinions on monetary and debt-financed expenses. We do so by first asking them, for each funding option, whether they see any advantage and any risk. If they answer by the affirmative (they may also declare not to know), we elicit their views *via* open-ended (OE) questions where respondents may enter what they think the risks and advantages associated to each of these two options are and *via* multiple-choice questions (MCQs) where they may declare whether each option has more drawbacks than advantages (which we treat as having a negative prior) or the other way around (which we treat as having a positive prior) or they do not know (which we treat as not having any prior).¹⁹

A large fraction of the respondents declare a prior opinion on these policy options: almost two thirds (5,459) on monetary-financed expenses and up to 70% (6,029) on debt-financed policies choose either ‘has more advantages than drawbacks’ or the other way around. Overall, priors are negative: among these respondents expressing a prior opinion, a comparable fraction (about two thirds, $\chi^2(1) = 0.03$) believe that debt- or monetary-financed policies

¹⁹The survey questions correspond to Questions 36 and 39 Appendix C. The order of the questions on advantages and risks is randomized for each financing option (debt or money).

inflation-related risks dominate (Figure 4a), with words such as ‘inflation’, ‘devaluation’, ‘increase’, ‘currency’, ‘worth’ or ‘loss’ being the most frequently cited. By contrast, words positively associated to monetary finance belong to the vocabulary of ‘liquidity’, such as ‘money’, ‘easy’, ‘availability’ or ‘increase’ (see Figure 4b). When it comes to debt issuance, similar words are used to describe advantages, while the mentioned risks mostly pertain to debt burden and interest rate payments (see Figure 3 in Appendix B.3).

To dive deeper into the priors, we classify the OE answers into a few categories. Figure 5 reports their distribution across the whole sample and for respondents with high and low macroeconomic-literacy scores, as identified in Section 3.1. We can make several observations, all significant at 1%.

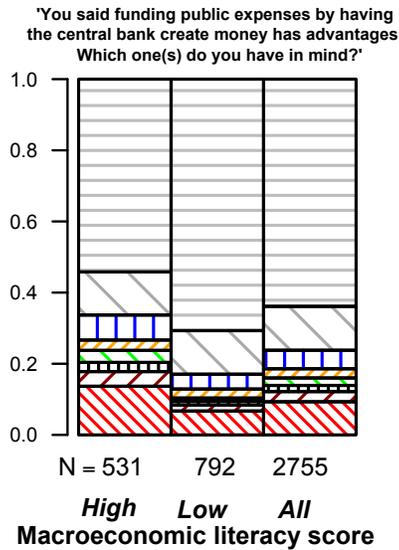
First, respondents are more prolific when it comes to debt issuance than monetary finance. The difference is most pronounced when it comes to the risk-related questions: about two thirds of the respondents fill up an intelligible answer about risks related to debt issuance but only one third do so when it comes to risks associated to monetary finance; compare the gray areas that depict the irrelevant or empty answers in Figures 5d and 5b); p-value < 0.001 . Note also that only 57% of all the respondents saw the OEQ about the risks of monetary finance because the rest did not answer that monetary finance involves any risk, including about 30% who declare not to know. By contrast, almost 80% answer positively to the question on risks associated to public debt issuance and only about 10% did not know. The comparison of OE-answers about the advantages of each funding option tells a similar story (see Figures 5c versus 5a, p-value < 0.001).

It is therefore clear that people are less knowledgeable about monetary finance than

about debt finance. We may conjecture that households are more familiar with the concept of debt than monetary finance. As anecdotal evidence, in the Netherlands, since 2009, advertisements for loans and mortgages have been legally required to include the warning ‘borrowing money costs money’ and we find many instances of this statement in the related OE answers.

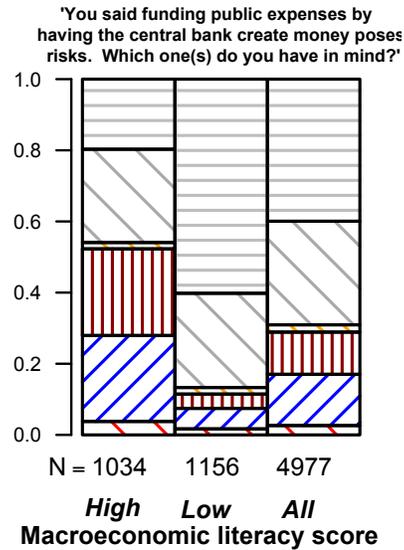
Second, as expected, there are significantly more intelligible answers in the high-macroeconomic-literacy group (defined as obtained a score of 4 or 5/5) than in the rest of the respondents, the difference being the most striking when it comes to the question on risks associated to monetary finance. More than half of the respondents with a high score provide a meaningful OE answer, and mostly cite the loss of the value of money (whether *via* inflation or devaluation), and a few percents of them also mention governance issues. By contrast, about 90% of the respondents with a low score (defined as obtaining a score of 0 or 1/5) fail to explicitly mention any risk associated to monetary financing, and only about 5% of them write about losing the purchasing power of the currency.

Col. I of Table 10 in Appendix B.4 reports on the socio-economic determinants of expressing a negative prior to monetary finance, as opposed to expressing a positive prior (i.e. respondents who choose ‘I don’t know’ to Question 39 are excluded). Not only high macroeconomic literacy score, but also being Dutch, not working, older, more educated, a member of a smaller and higher-income household are all associated with a higher likelihood of reporting such negative prior. Interestingly, and perhaps counter-intuitively, a higher trust in the ECB and reading financial newspapers both correlate with a higher likelihood of reporting a *positive* prior about monetary financing.



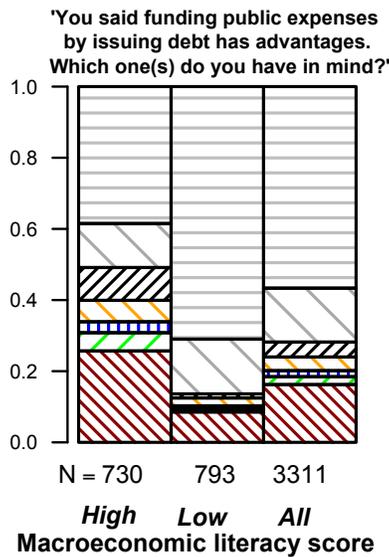
- More money in circulation
- Easy/ quick
- Avoid interest payments
- Investment: growth/welfare
- Avoid tax increase
- Avoid public debt increase
- irrelevant
- missing

(a) Advantages of monetary finance



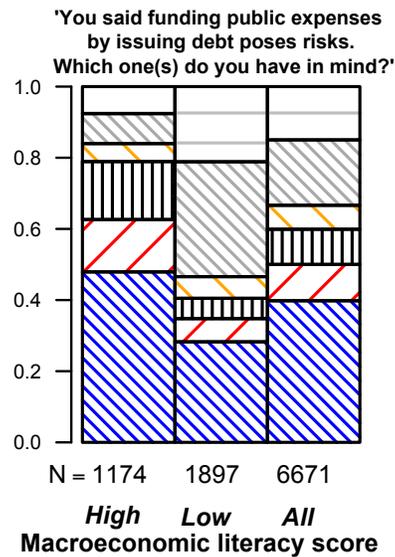
- Bad governance
- Devaluation
- Inflation
- Higher future taxes
- irrelevant
- missing

(b) Risks of monetary finance



- Immediate availability
- Investment: growth/welfare
- Long-term payment deferral
- Avoid tax increase
- Go for current low int. rates
- irrelevant
- missing

(c) Advantages of debt issuance



- Debt burden
- Default/ reputation
- Interest rate risk
- Higher future taxes
- irrelevant
- missing

(d) Risks of debt issuance

Notes: The OE questions are presented if the respondent indicates that they believe there exist risks (or advantages) to each funding option as asked in questions 34, 35, 37 and 38 in Appendix C. The group of low macroeconomic literacy score encompasses respondents who answer correctly no more than one question out of the five knowledge questions, the group of high score include those who answer correctly at least four. Left panel: all proportions are significantly different in the two knowledge groups at 1% except the fraction who mentions 'Higher future taxes' (the p-value of the χ^2 -statistics is 0.14). Right panel: idem except for the category 'Other' (p-value= 0.97) and 'Higher future taxes' (p-value= 0.63).

Figure 5: Distribution of the OE answers by macroeconomic-literacy score

	(I)	(II)	(III)	(IV)	(V)
	has more risks than advantages	I don't know	I am certain or very certain	No answer to OEQs: on risks	on advantages
Panel A. Prior on monetary financing					
<i>Video</i>	43.7	34.5	40.8	40.7	64.4
<i>No video</i>	40.9	39.5	37.8	45.5	74.0
<i>p-value</i>	0.011**	< 0.001***	0.005***	< 0.001***	< 0.001***
Panel B. Prior on debt financing					
<i>Video</i>	42.6	31.7	–	21.4	55.8
<i>No video</i>	52.9	27.4	–	24.2	70.2
<i>p-value</i>	< 0.001***	< 0.001***	–	0.002***	< 0.001***

Notes: ***: significant at the 1% level, **: significant at the 5% level, and *: significant at the 10% level. ‘Video’ corresponds to the sample containing respondents treated with Tr. Video, Video+CB and Video+CB+Media, while ‘No video’ corresponds to the sample containing respondents in the control group and those treated with Tr. CB. The p-values correspond to the χ^2 -test where the null hypothesis is the absence of relationship between the exposure to the video and the respondents’ answers. The order of the questions is randomized. Panel A corresponds to Question 39 and Panel B to Question 36 in Appendix C.

Table 3: Proportion (in p.p.) of answers on prior views

Third, the risk of higher taxes is not mentioned often, neither in case of monetary finance nor when thinking about debt issuance, and the fraction of respondents who do mention ‘higher future taxes’ does not greatly differ across macroeconomic literacy scores. Overall, 7% of the respondents who saw this OE question mention future taxes as a risk of debt issuance, see Figure 5d, and the p-value associated to the cross-score difference is = 0.02**, while only about 2% do so when it comes to the risks of monetary finance, see Figure 5b, with a p-value associated to the cross-score difference being 0.61. Inflation concerns are much more prominent than future tax worries when it comes to monetary finance. Section 4.2 below shed more light on the respondents’ expectations.

Finally, we investigate whether watching the educational video induces more intelligible answers among respondents by providing context around the different public funding options. Table 3 compares the priors of respondents who are exposed to the video to those who are

not. We find that the video significantly increases the respondents' engagement: they tend to provide more OE answers (p-values < 0.001), to be less uncertain in their answers (p-value = 0.005), to oppose more often monetary finance (p-value = 0.011) but emphasize less often the risks of debt issuance (p-value < 0.001) than the respondents in the treatments without the video. While the video insists on the potential large risks of monetary finance, its effect on the answer rates is larger when it comes to the debt issuance than monetary finance (about 10 p.p., compare the first columns of Panels A and B).

We may summarize our findings concerning the prior opinions of the respondents as follows:

Finding 2 (Prior beliefs about financing options of macroeconomic policies)

- *Overall, respondents are less familiar with monetary finance than public-debt issuance.*
- *There are great disparities across levels of macroeconomic literacy: only the highly literate respondents mention inflation as a risk of monetary finance.*
- *Tax expectations are not often mentioned as a risk, neither of debt issuance nor of monetary finance, no matter the level of macroeconomic literacy.*
- *The video successfully induces more intelligible open-ended answers from the respondents.*

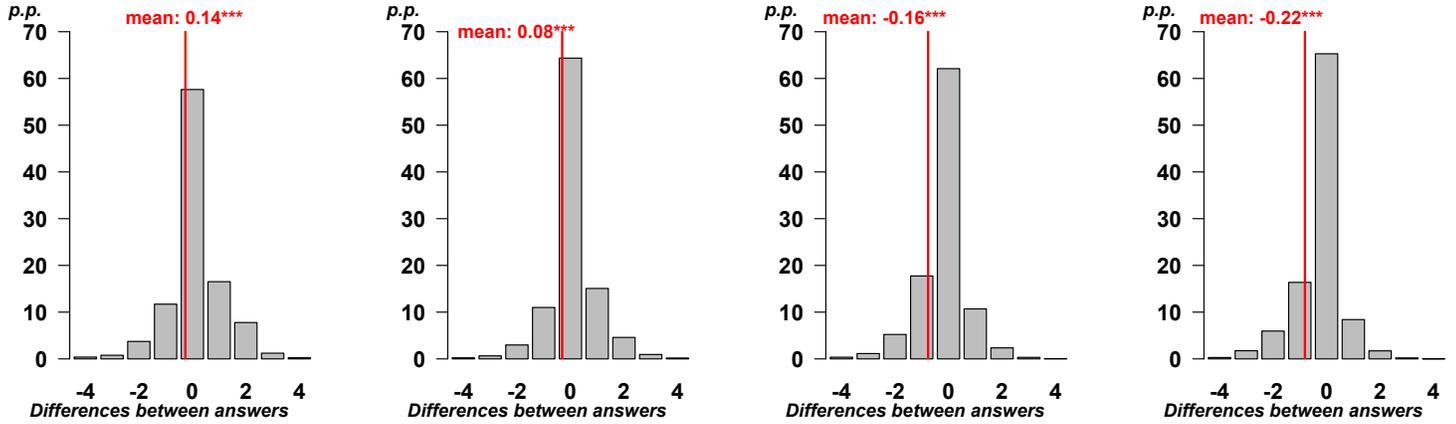
In the next section we investigate how people's expectations regarding future tax and inflation differ under standard debt and monetary financing.

3.2.2 Inflation and tax expectations associated to debt- versus money-financed fiscal stimulus

As underlined in introduction, inflation and future tax expectations following a fiscal stimulus are often considered as key transmission channels through which the stimulus affects the economy in macroeconomic models. It is often noted that these expectations could differ in case of monetary versus standard debt-financing (Cochrane 2022, Galí 2020a). Our survey allows us to shed some light on the matter.

After the treatments, the survey elicits tax and inflation expectations in thought experiments where a fiscal stimulus would be financed either by standard debt issuance or by monetary financing. Precisely, we ask the extent to which the respondent agrees or disagrees with the following statements: ‘*If the government would today fund substantial public expenses (such as those induced by the Pandemic situation)*’ either ‘*by borrowing money and thus increasing the public debt*’ or ‘*by making the central bank create money to fund them*’, ‘*taxes would then be likely to increase*’ or ‘*prices would then be likely to increase faster*’ (see items 48 and 49 in Appendix C). The answers are Likert items from 1 (corresponding to ‘*strongly disagree*’) to 5 (corresponding to ‘*strongly agree*’).

Figures 6a and 6b report the distribution of the differences of expectations of, respectively, future taxes and inflation, associated with debt issuance versus monetary financing. The vertical lines report the averages of these differences: the means are significantly positive, which indicates that overall, whether it is about future inflation or taxes, expectations are significantly higher in the case of bond than in the case of monetary financing.



(a) Tax worries with bond vs. monetary financing (b) Inflation worries with bond vs. monetary financing (c) Tax vs. inflation worries with debt financing (d) Tax vs. inflation worries with monetary financing

Notes: The figures represent the distribution of the differences in the answers (on a scale of 1 to 5) over the whole sample between the relevant survey questions. Figure 6c considers the two questions in item 48; Figure 6a considers the two questions in item 49; Figure 6b (Figure 6a) considers the difference between the answer to the first (the second) question of item 48 and the answer to the first (the second) question of item 49 (see Appendix C). Whole sample (8,601 observations).

Figure 6: Perceptions of macroeconomic mechanisms

The next two figures report the distributions of the differences between tax and inflation worries in case of debt-financed (Figure 6c) and money-financed (Figure 6d) fiscal stimulus. The means are significantly negative, which indicates that overall, whether it is about bond issuance or monetary financing, respondents expect more future inflation than future taxes. In particular, Figure 6c shows that, on average, respondents have views that are significantly in line with the fiscal theory of the price level (FTPL) or a regime characterized by fiscal dominance as opposed to a monetary-dominance view: if the government issues debt, respondents expect on average significantly more future inflation than future taxes.²⁰ These

²⁰The FTPL consists in a reinterpretation of the government budget constraint when the nominal public debt increases: the ‘traditional’ monetary view states that the future taxes and government expenses have to adjust (*via* fiscal consolidation policies) so that the present value of the future budget surpluses always equals the real value of the public debt for a given current price level, while the FTPL states that prices

results are obtained using the entire sample, but the results are quantitatively similar if considering only the 1,720 respondents in the control group.

Admittedly the magnitude of these differences are small and our data stems from qualitative questions but as such, it does not support the theoretical differences between money-financed from debt-financed fiscal stimulus as discussed in the introduction. While respondents expect more inflation than future taxes associated to a monetary-financed public spending, they equally tend to associate inflation expectations, rather than tax expectations, to debt-financed spending.

Before turning to the effects of the information-provision treatments, we provide descriptive statistics of our main dependent variables.

3.2.3 Posteriors on fiscal-policy options

Table 4 describes the five main post-treatment dependent variables, namely the support for monetary-financed policies, on a permanent or exceptional basis, the support for CB independence and the support for fiscal consolidation, either as spending cuts or tax increase.²¹

Let us first focus on cross-country differences. Regarding support for CB independence, more than a third of the respondents do not express a clear opinion (namely they answer 3) and this fraction is the same across countries (the p-value associated to the χ^2 -statistics

will adjust (*via* inflation) to maintain such a balance (Christiano & Fitzgerald 2000). The first regime is sometimes referred to as monetary dominance while the second as fiscal dominance.

²¹In this section, we pool together all treatments because the randomization procedure of the treatment assignment ensures that socio-economic characteristics are equally represented in each treatment (see Table 8 for a formal demonstration). Results discussed here hold when considering the control group only.

is 0.263). By contrast, significantly more respondents support CB independence (i.e. they answer items 1 and 2) in France than in the Netherlands or in Italy (p-value < 0.001). What is surprising is that the picture becomes reversed when it comes to support for permanent monetary finance, where about half of the Dutch respondents oppose this idea (namely answer 1 or 2) but only respectively 40% and 35% of the Italian and French respondents do so (p-value < 0.001). This cross-country difference subsists when asked about an exceptional monetary-financed support in the wake of the COVID-19 pandemic (p-value < 0.001), although only a maximum of one third of the Dutch respondents oppose this proposal, and only 17.5% in Italy.

This suggests that respondents do not link CB independence to the risks associated to monetary finance, which is confirmed by looking at the correlation table between the post-treatment dependent variables (see Table 5): the correlation is strongly significantly positive between opposing monetary financed policies and *opposing* CB independence.

Support for fiscal consolidation in the presence of high public debt also significantly varies across countries. While more than half of the Dutch and French respondents (up to 60% in France) support a decrease in government spending in this case, only 45% of the Italian respondents do so (p-value < 0.001). There is a positive correlation between support for budget cuts and tax increase, which reflects overall preferences towards fiscal discipline but the tax-increase option enjoys overall less support than the spending-cut option.

Variable	Full sample			NL			FR			IT		
	Levels	n	%	$\sum\%$	n	%	$\sum\%$	n	%	$\sum\%$	n	%
CB independence	<i>'A central bank should be directly under the control of its government'</i>											
1	839	9.8	9.8	167	7.6	7.6	491	11.7	11.7	181	8.2	8.2
2	1581	18.4	28.1	391	17.8	25.4	812	19.3	31.0	378	17.2	25.4
3	2985	34.7	62.8	736	33.5	58.8	1493	35.5	66.6	756	34.4	59.7
4	2433	28.3	91.1	709	32.2	91.0	1023	24.4	90.9	701	31.9	91.6
5	763	8.9	100.0	197	8.9	100.0	381	9.1	100.0	185	8.4	100.0
all	8601	100		2200	100		4200	100		2201	100	
Support for monetary finance (permanent)	<i>'Some commentators say that the European central bank should always create money to pay for the public expenses of the COUNTRY (French e.g.) government. What do you think of this proposal?'</i>											
1	1088	12.7	12.7	445	20.2	20.2	475	11.3	11.3	168	7.6	7.6
2	2448	28.5	41.1	613	27.9	48.1	1229	29.3	40.6	606	27.5	35.2
3	3467	40.3	81.4	828	37.6	85.7	1720	41.0	81.5	919	41.8	76.9
4	1323	15.4	96.8	275	12.5	98.2	644	15.3	96.9	404	18.4	95.3
5	275	3.2	100.0	39	1.8	100.0	132	3.1	100.0	104	4.7	100.0
all	8601	100		2200	100		4200	100		2201	100	
Support for monetary finance (exceptional)	<i>'Some commentators say that the European central bank should exceptionally create money to fund the large governmental expenses induced by the pandemic situation. Do you rather support or rather oppose this idea?'</i>											
1	616	7.2	7.2	197	8.9	8.9	327	7.8	7.8	92	4.2	4.2
2	1645	19.1	26.3	510	23.2	32.1	841	20.0	27.8	294	13.4	17.5
3	3528	41.0	67.3	877	39.9	72.0	1797	42.8	70.6	854	38.8	56.3
4	2299	26.7	94.0	554	25.2	97.2	1013	24.1	94.7	732	33.3	89.6
5	513	6.0	100.0	62	2.8	100.0	222	5.3	100.0	229	10.4	100.0
all	8601	100		2200	100		4200	100		2201	100	
Support for fiscal consolidation (spending cuts)	<i>'When the level of the public debt becomes concerning, decreasing the overall amount of government expenses is often justified.'</i>											
1	214	2.5	2.5	35	1.6	1.6	111	2.6	2.6	68	3.1	3.1
2	874	10.2	12.7	192	8.7	10.3	391	9.3	12.0	291	13.2	16.3
3	2766	32.2	44.8	743	33.8	44.1	1206	28.7	40.7	817	37.1	53.4
4	3704	43.1	87.9	1043	47.4	91.5	1793	42.7	83.3	868	39.4	92.9
5	1043	12.1	100.0	187	8.5	100.0	699	16.6	100.0	157	7.1	100.0
all	8601	100		2200	100		4200	100		2201	100	
Support for fiscal consolidation (tax increase)	<i>'When the level of the public debt becomes concerning, increasing the overall amount of taxes is often justified.'</i>											
1	885	10.3	10.3	144	6.5	6.5	413	9.8	9.8	328	14.9	14.9
2	2266	26.4	36.6	461	20.9	27.5	1121	26.7	36.5	684	31.1	46.0
3	3056	35.5	72.2	852	38.7	66.2	1501	35.7	72.3	703	31.9	77.9
4	2146	24.9	97.1	681	30.9	97.2	1013	24.1	96.4	452	20.5	98.5
5	248	2.9	100.0	62	2.8	100.0	152	3.6	100.0	34	1.5	100.0
all	8601	100		2200	100		4200	100		2201	100	

Notes: The questions correspond, respectively, to questions 50, 53, 51, 46 and 47 in Appendix C. The answers are Likert items ranging from 1 (strongly disagree or strongly oppose) to 5 (strongly agree or strongly support).

Table 4: Descriptive statistics of the post-treatment dependent variables

	Support for CB independence	Support for exceptional monetary finance	Support for permanent monetary finance	Support for budget cuts
Support for exceptional monetary finance	0.26***			
Support for permanent monetary finance	0.21***	0.52***		
Support for budget cuts	-0.02*	-0.11***	-0.02*	
Support for tax increase	0.06***	0.01	0.03*	0.15***

Notes: Pearson correlation tests: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; full sample (8,601 observations); see Table 4 for the definition of the variables.

Table 5: Correlation between the main post-treatment dependent variables

This result is consistent with observations from US household surveys. For instance, [Blinder & Krueger \(2004\)](#) find that being worried about the size of the public deficit is paradoxically associated with thinking taxes are too high. [Roth & Wohlfart \(2020\)](#) identify a significant association between worries about the level of public debt and support for spending cuts but not for tax increase because the two fiscal-consolidation options have different determinants. This is also true in our data: the detail of the other socio-economic determinants of the five dependent opinion variables is given in Columns II to VI of Table 10 in Appendix B.4. The last two columns report on, respectively, the determinants of the support for budget cuts and tax increase. Age, gender, income political orientation and financial knowledge and habits all have opposite effects on these two fiscal-consolidation options.

Aversion for tax increase also varies across countries: almost half of the Italian respondents tend to oppose this policy, but only a quarter of the Dutch respondents do (p -value < 0.001). Unsurprisingly, support for budget cuts also tends to be associated with opposing monetary-financed policies but the magnitude of the correlation is not large (see Table 5).

Overall, higher education achievements and higher macroeconomic literacy scores are strongly and significantly associated with more support for CB independence (see Column II of Table 10) and less support for monetary finance (Col. III and IV). The difference in their support for budget cuts versus tax increases also stands out (Col. V and VI) although a higher macroeconomic literacy is associated with *less* support for tax increase.

Older respondents tend to oppose monetary-financed policies but the other variables, including gender, financial variables or financial newspapers reading, are not significantly and unambiguously related to these views. In particular, we do not find the strong partisan effect that is typical of US data (Alesina et al. 2020). We may conjecture that this is due to the more scattered political spectrum in Europe, where parties on each end of the political spectrum do not in fact have diametrically opposing ideas when it comes to economic questions, such as the place of the State in the economy.

Interestingly, higher levels of trust in the ECB is associated with *more* support for monetary finance and does not impact support for CB independence. This association may reflect a higher support for public policies in general, since these respondents also tend to be more supportive of fiscal consolidation policies.

In the next section, we investigate how information provision may shift respondents' beliefs and views.

4 Can information change people’s views?

We first focus on the treatment effects in the main wave of the survey, then take a closer look how the information provision may have affected inflation and tax expectations to shed light on these effects and conclude by investigating persistent treatment effects in the recontact wave.

4.1 Support for policy options

Using the whole data set, we perform OLS cross-sectional estimations of the following baseline specification:

$$Y_i = \alpha + \beta_1 \cdot \text{Tr}_{\text{CB},i} + \beta_2 \cdot \text{Tr}_{\text{Video}+\text{CB},i} + \beta_3 \cdot \text{Tr}_{\text{Video},i} + \beta_4 \cdot \text{Tr}_{\text{Video}+\text{CB}+\text{Media},i} + \gamma X_i + \epsilon_i \quad (1)$$

where the dependent variables Y are the Likert items corresponding to respondents’ post-treatment reported opinions on CB independence, monetary financed initiatives and fiscal consolidation policies, as described in Table 4; the dummy variables $\text{Tr}_{\text{CB},i}$, $\text{Tr}_{\text{Video}+\text{CB},i}$, $\text{Tr}_{\text{Video},i}$, $\text{Tr}_{\text{Video}+\text{CB}+\text{Media},i}$ are equal to one if respondent i is assigned to the corresponding treatment and zero otherwise; the vector X_i include the groups of control variables used in Table 1, along with the macroeconomic literacy score of each respondent i as computed in Section 3.1, their prior beliefs as discussed in Section 3.2.1 and a measure of their reported medium-run inflation expectations.²² Error terms ϵ are cluster estimated standard errors at

²²Inflation expectations are elicited *via* the following qualitative question (see Question 24 in Appendix C): ‘Relative to the past year, how do you think that the average level of the prices in the economy will evolve over the next five years’, where answers range from 1 for ‘It will increase a lot’ to 5 for ‘it will decrease a lot’. The answer ‘I don’t know’ is treated as a missing variable. Hence, a higher value of the inflation

the country level (Jackson 2020). Heterogeneous-treatment effects along a given characteristic of the respondents are analyzed by adding to Specification (1) interaction terms between the treatments and the variable representing that characteristic. Results are reported in Tables 6 and 7.

Let us first focus on the effects of the information-provision treatments on the respondents' support for CB independence (Cols. I to IV of Table 6) and monetary finance, whether on a permanent (Cols. V and VI) or an exceptional basis (Cols. VII and VIII).

The main conclusion from Table 6 is that the information provided significantly and strongly affects the respondents' support for both CB independence and monetary finance. They are more likely to support CB independence if they have seen the video, whether alone or in combination with the written pieces. Tr. `Video+CB+Media` has a lower effect on the support for CB independence than Trs. `Video+CB` and `Video`, the latter having a particularly strong effect. This hierarchy suggests that more and contradicting information results in a milder effect on opinions, while educational content from apolitical experts using a neutral framing may reinforce the public's adhesion to a concept, namely the independence of the CB.

expectations correspond to *lower* inflation expectations.

<i>Dependent variable:</i>	<i>Support for CB independence</i>				<i>Support for monetary financing</i>			
					<i>Permanent</i>	<i>Exceptional</i>		
	I	II	III	IV	V	VI	VII	VIII
	all respondents			‘CB text is clear’ only	all respondents	‘CB text is clear’ only	all respondents	‘CB text is clear’ only
<i>CB</i>	0.06*	0.06*	0.02	0.14	-0.08**	-0.21***	-0.12***	-0.18**
	(0.04)	(0.04)	(0.05)	(0.09)	(0.03)	(0.07)	(0.03)	(0.08)
<i>Video+CB</i>	-0.20***	-0.20***	-0.12**	0.004	-0.11***	0.04	-0.12***	0.02
	(0.04)	(0.04)	(0.05)	(0.08)	(0.03)	(0.07)	(0.03)	(0.07)
<i>Video</i>	-0.28***	-0.29***	-0.14***	-0.14***	-0.02	0.01	0.04	0.06
	(0.04)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)	(0.03)	(0.05)
<i>Video+CB+Media</i>	-0.18***	-0.18***	-0.12**	0.15*	-0.03	0.14**	0.04	0.35***
	(0.04)	(0.04)	(0.05)	(0.08)	(0.03)	(0.07)	(0.03)	(0.07)
<i>Inflation expectations</i>	0.06***	0.06***	0.06***	0.05**	0.06***	0.05***	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
<i>Negative prior</i>	-0.25***	-0.25***	-0.14**	-0.13**	-0.61***	-0.60***	-0.62***	-0.58***
	(0.02)	(0.02)	(0.05)	(0.06)	(0.02)	(0.05)	(0.02)	(0.05)
<i>Macro lit. score</i>	-0.11***	-0.11***	-0.11***	-0.12***	-0.12***	-0.12***	-0.01	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
<i>CB</i> × <i>negative prior</i>			0.10	-0.06		-0.02		0.003
			(0.08)	(0.12)		(0.10)		(0.11)
<i>Video+CB</i> × <i>negative prior</i>			-0.19**	-0.30***		-0.33***		-0.29***
			(0.08)	(0.12)		(0.10)		(0.10)
<i>Video</i> × <i>negative prior</i>			-0.33***	-0.33***		-0.08		-0.06
			(0.08)	(0.08)		(0.07)		(0.07)
<i>Video+CB+Media</i> × <i>negative prior</i>			-0.15**	-0.43***		-0.30***		-0.52***
			(0.08)	(0.12)		(0.10)		(0.10)
Constant	3.12***	3.00***	3.07***	3.09***	2.90***	2.98***	3.09***	3.01***
	(0.10)	(0.13)	(0.11)	(0.14)	(0.10)	(0.14)	(0.11)	(0.15)
Demographic variables	YES	YES	YES	YES	YES	YES	YES	YES
Habits and opinions	YES	YES	YES	YES	YES	YES	YES	YES
Financial variables	NO	YES	NO	NO	YES	YES	YES	YES
Wald $F(8)$ -statistic		1.63		1.61		3.69***		2.50**
Nb. Obs.	8,289	8,289	8,289	4,686	8,289	4,435	8,289	4,686
-log-Lik.	12,321.9	9,255	12,301.9	7,063.5	10,829.5	6,229.0	11,136.6	6,413.8

Notes: See Table 1. The dependent variable ranges from 1 for ‘strongly disagree’ to 5 for ‘strongly agree’ with the statement that ‘A central bank should be directly under the control of its government’ (Col. I-IV), ‘Some commentators say that the European Central Bank should exceptionally’ [Col. V-VI] or ‘always’ [col. VII-VIII] ‘create money to fund the large governmental expenses induced by the pandemic situation’ [Col. V-VI] and ‘to pay for the public expenses of COUNTRY (e.g. French) government’ [Col. VII-VIII]. Note that a *negative coefficient implies an effect toward more support for CB independence*. *Macro lit. score* is included as computed in Section 3.1, inflation expectations is a five-point-scale variable where 1 corresponds to ‘prices will increase a lot over the next five years’ to 5 ‘prices will decrease a lot over the next five years’, ‘I don’t know’-answers are excluded. *Negative prior* is a dummy equal to 1 if the respondent chooses ‘rather drawbacks’ to the pre-treatment question ‘Do you think that this option of the central bank creating money rather has advantages or drawbacks?’, and 0 if they choose ‘Rather advantages’ or ‘I don’t know’. See Table 1 for the control variables. Financial variables are included when they are jointly or individually significant at 5% (see the Wald F-statistics), the demographic and habit-related variables, listed in Table 1, are always jointly significant at 1%. ‘CB text is clear’ excludes the respondents in Trs. *CB*, *Video+CB* and *Video+CB+Media* who declare finding the CB text as unclear after having read it, i.e. it excludes those who answered 1, 2 or 3 to Questions 43 and 44.

Table 6: Treatment effects on public support for CB independence and monetary financing initiatives

These effects hold in the presence of macroeconomic literacy score, inflation expectations and prior beliefs: higher macroeconomic literacy scores, higher inflation expectations²³ and a negative prior on monetary financing are all significantly and positively associated with more support to CB independence and more opposition to monetary finance. The effects of the treatments are also robust to the introduction of financial variables (Col. II).

Col. III includes interaction terms between the treatments and the fact of having a negative prior on monetary financing and reveals significant heterogeneous-treatment effects on the support for CB independence: the video reinforces the support for CB independence to a greater extent among the respondents who express a pre-treatment negative view on monetary finance compared to those who do not. Additionally, the two other treatments involving the video (namely Trs. **Video+CB** and **Video+CB+Media**) mainly affect those respondents with such a negative prior.

Interestingly, reading only the CB blog post does not affect the public support for CB independence; it needs to be combined with the video to have a significant effect. Perhaps the CB text does not shift people's views because it is perceived as more technical than the newspaper piece or the educational video. To test this hypothesis, we exclude the respondents who did not find the CB text 'clear' or 'very clear' (see Col. IV). The heterogeneous-treatment effects persist, suggesting that even if people declare to understand the content of the CB message, it fails to alter their views.

Another explanation for the lack of effect of the CB blog communication could then be that people miss the link between the object of the question, namely CB independence, and

²³Recall that per the definition of the inflation-expectation variable, a positive coefficient sign indicates that a higher inflation expectation (i.e. a *lower* value of this variable) is associated with more support for CB independence.

the dangers of monetary financing, in particular in terms of inflationary risks, as detailed in the CB text.²⁴ In this respect, the combination of the video with the CB blog post allows the respondents to connect the dots between the inflationary risks associated with monetary finance and the governance motive for CB independence from the government. Results in Col. V of Table 6 go in line with this interpretation: the CB communication, with or without the video, is actually effective at reinforcing the opposition to monetary finance, with the combination of the two pieces of information having the largest effect, while the video alone is not.

Looking at heterogeneous treatment effects (Col. VI), the CB blog post alone significantly increases the opposition to permanent monetary finance among respondents who find the text clear (Col. VI). The combination of the video and the CB communication is most effective at shifting beliefs of respondents who have expressed a negative prior about monetary finance.

By contrast, the provision of opposing information reinforces people's prior views and polarizes the opinions because *Tr. Video+CB+Media* reinforces the opposition to monetary finance among those who hold a negative prior on the matter but has the opposite effect on the respondents who did not express such a prior view. Similar treatment effects are observed when it comes to the support for monetary finance on an exceptional basis (see Col. VII and VIII). The polarizing effect of *Tr. Video+CB+Media* is even reinforced when it comes to opinion about the desirability of a one-time monetary-financed stimulus in the context of the COVID-19 pandemic. This evidence suggest that people tend to revise their opinion towards the piece of information that confirms their initial beliefs.

²⁴The blog post even mentions the case where the government could end up recapitalizing the CB in case of monetary finance, which would neutralize such an operation and explicitly states that 'the government owns the central bank'. This detail of the text may have induced confusion between the concept of operational versus financial independence.

We may summarize our results so far as follows:

Finding 3 (Treatment effect on monetary policy)

- *The educational video reinforces the public support for the CB independent mandate and provides context to the CB communication which is key to reinforcing the respondents' opposition to monetary finance.*
- *The video and the CB communication tend to reinforce the prior beliefs.*
- *Providing opposing pieces of information may have a polarizing effect.*

Table 7 performs a comparable analysis as above taking the support for fiscal consolidation as a dependent variable, in the form of the support for budget cuts (Cols. I and II) and tax increase (Cols. III and IV). We control for the prior expressed by the respondents regarding debt issuance but similar results hold if we use the prior on monetary finance instead.

The first thing to recall is that neither of the treatments directly addresses fiscal discipline, so that any treatment effect on the matter may only be a second-round effect; for instance if the treatments convince respondents that monetary finance is not a viable government funding option and, hence, make the budget constraint of the government more salient which could reinforce the rationale for fiscal discipline in the view of the respondent. The video could have such an effect by highlighting the limited number of options for financing public expenses and so could the CB blog post, by arguing against monetary-financed expenses. The text of De Grauwe does mention limiting the increase of the debt as an advantage of a monetary-financed stimulus, which might decrease the support for fiscal consolidation. The second thing to remember from the analysis in Section 3.2.3 is that support for budget

cuts and tax increases have distinct determinants and, therefore, the treatments need not influence these two views in the same way.

In this respect, it is clear from Table 7 that the CB communication (with or without the video) significantly increases the support for tax increase (Col. III), but neither of the treatments impact the support for budget cuts (Col. I). Because potential second-round treatment effects require a fair understanding and level of attention of the information provided, focusing on respondents who reported that the CB text was clear is more revealing (see Cols. II and IV). Among those respondents, no matter the initial prior on monetary finance, all treatments have a fairly large effect and significantly increase the support for fiscal consolidation in the presence of high public debt. The CB communication, even alone (namely in Tr. CB), significantly fosters the support for both the budget-cut (Col. II) and the tax-increase options (Col. IV).

Here again, initial priors matter: in the presence of contradictory information, CB communication reinforces support for fiscal consolidation, whether as budget cuts (Col. II) or tax increases (Col. IV) among the respondents who already have a negative prior on monetary finance. Note that these heterogeneous-treatment effects are only present among the respondents who found the CB text clear (Cols. II and IV).

<i>Dependent variable:</i>	<i>Support for fiscal consolidation</i>			
	<i>(cut public expenses)</i>		<i>(increase taxes)</i>	
	I	II	III	IV
	all respondents	'CB text is clear' only	all respondents	'CB text is clear' only
<i>CB</i>	-0.02 (0.03)	0.22*** (0.07)	0.08** (0.03)	0.24*** (0.08)
<i>Video+CB</i>	0.01 (0.03)	0.24*** (0.06)	0.10*** (0.03)	0.24*** (0.07)
<i>Video</i>	-0.001 (0.03)	0.07* (0.04)	0.06 (0.03)	0.07 (0.05)
<i>Video+CB+Media</i>	-0.01 (0.03)	0.23*** (0.07)	0.10*** (0.03)	0.37*** (0.07)
<i>Inflation expectations</i>	-0.04*** (0.01)	-0.05*** (0.01)	0.08*** (0.01)	0.07*** (0.02)
<i>Macro lit. score</i>	0.09*** (0.01)	0.08*** (0.01)	-0.003 (0.01)	-0.01 (0.01)
<i>Negative prior</i>	0.04** (0.02)	0.11** (0.05)	-0.04 (0.02)	0.01 (0.05)
<i>CB × negative prior</i>		-0.12 (0.10)		-0.18 (0.11)
<i>Video+CB × negative prior</i>		-0.18* (0.09)		-0.16 (0.10)
<i>Video × negative prior</i>		-0.16** (0.06)		-0.03 (0.07)
<i>Video+CB+Media × negative prior</i>		-0.17* (0.10)		-0.34*** (0.11)
Constant	2.54*** (0.10)	2.58*** (0.13)	2.84*** (0.11)	2.87*** (0.15)
Demographic variables	YES	YES	YES	YES
Habits and opinions	YES	YES	YES	YES
Financial variables	YES	YES	YES	YES
Wald F(8)-statistic	3.45***	2.25**	9.25***	5.76***
Nb. Obs.	8,289	4,345	8,289	4,345
-logLik	10,580.8	6,078.4	11,484.2	6,592.6

Notes: See Tables 1 and Tables 6. The dependent variable ranges from 1 for 'strongly disagree' to 5 for 'strongly agree' with the statement that 'When the level of the public debt becomes concerning, decreasing the overall amount of government expenses' (Col. I-II) or 'increasing the overall amount of taxes' (Col. III-IV) 'is often justified'.

Table 7: Treatment effects on public support for fiscal discipline

We may summarize the treatment effects on the support for fiscal discipline as follows:

Finding 4 (Treatment effects on fiscal consolidation)

- *Overall, the CB communication arguing against monetary finance, with or without the educational video, significantly increases the support for fiscal discipline, in particular regarding tax increase or among respondents who find the communication clear.*
- *In presence of contradictory information, there is some evidence that the CB information has a convincing effect insofar as it reinforces the support for fiscal consolidation more among those who did not hold a negative prior view on monetary finance than among those who did.*

Now that we have established treatment effects from the information provided to the respondents on their support or opposition to various monetary and fiscal policies, we investigate the so-called expectation channels that may help explain these treatment effects.

4.2 The expectation channel of the public support for policies

To shed further light on the expectation dynamics associated to each policy option, we focus on the effect of two expectational variables on the respondents' support for fiscal consolidation and opposition to monetary finance. The first expectational variable we consider corresponds to the answer to the second item in Question 49 in Appendix C, and relates to the future prices expectations in case of a money-financed public expense. The second expectational variable corresponds to the answer to the first item in Question 48 in Appendix C, and relates to the future tax expectations in case of a standard debt-financed public expense. The answers range from 1 to 5, with higher values suggesting higher inflation or tax

expectations; we described these further in Section 3.2.2. We will denote here by π_M^e the first variable and by τ_B^e the second one.

We then estimate the effect of the four information-provision treatments on the respondents' support for policies *via* their effects on their tax and inflation expectations π_M^e and τ_B^e using 2SLS regression models.²⁵ We control for all the factors considered so far, including the medium-run inflation and tax expectations of each respondent, their macroeconomic literacy score and their priors on each policy option. Results are reported in Table 8.

The main message from this exercise is a strong and significant effect of expectations on the opposition to monetary-financed policies, both on a permanent (Col. I and II) and on an exceptional basis (Col. III and IV), and on the support for fiscal consolidation, whether as budget cuts (Col. V-VII) or tax increases (Col. VIII-X). In all configurations, the F-statistics reject the presence of weak instruments – inflation expectations are better identified than tax expectations, with a F-statistic higher than the rule-of-thumb of 10. The null of the absence of endogeneity in the OLS model is also systematically rejected (see the DWH F-statistics), which is in line with the usual interpretation of expectations as endogenous variables in macroeconomic models.

Regarding monetary-financed policies, inflation expectations in case of such funding op-

²⁵We need two requirements to apply this class of models. First, the treatments need to have a significant and strong enough effects on the expectations, which is confirmed by the first-stage-regression outcomes in Table 11 in Appendix B.5 and the weak-instrument tests in Table 8. Second, we need the exclusion-restriction assumption, namely the panelists are assumed to respond to the treatments only *via* their expectations. We make this assumption based on the theoretical models underlying the analysis of monetary- versus debt-financed policies. We may also make this assumption given the salience of the inflationary risks of monetary finance and the emphasis on the public budget constraint embedded in all information treatments. Furthermore, with four treatments and two endogenous variables (π_M^e and τ_B^e), our models are over-identified so we report the test statistics of the Sargan-Hansen test which indicate that in all but one models (Col. V), we cannot reject the null of exogeneity of the instruments assuming that at least one is exogenous, namely we cannot reject the null that the error term is uncorrelated with the instruments.

<i>Dependent variable:</i>	<i>Support for monetary-financed spending</i>				<i>Support for decrease in public spending</i>			<i>Support for increase in taxes</i>		
	<i>(permanent)</i>		<i>(exceptional)</i>		All data V	<i>'CB text is clear' only</i>		All data VIII	<i>'CB text is clear' only</i>	
	I	II	III	IV		VI	VII		IX	X
π_M^e	-0.53*** (0.18)	-0.37*** (0.13)	-1.01*** (0.23)	-0.87*** (0.16)	-0.11 (0.16)	0.53*** (0.12)	-	0.65 (0.62)	0.42*** (0.14)	-
τ_B^e	0.40 (0.32)	-	0.36 (0.39)	-	0.30 (0.27)	-	1.07*** (0.34)	-0.52 (1.34)	-	0.84** (0.33)
Constant	3.36*** (0.73)	4.07*** (0.42)	5.18*** (0.87)	5.81*** (0.53)	1.86*** (0.61)	0.93** (0.43)	-0.85 (1.12)	2.38 (2.51)	2.56*** (0.43)	0.06 (1.08)
Weak-instrument test π_M^e	17.78***	17.78***	17.78***	17.78***	17.78***	18.49***	-	17.78***	18.49***	-
Weak-instrument test τ_B^e	5.66***	-	5.66***	-	5.66***	-	3.73***	5.66***	-	3.73***
DWH F-stat	4.61***	7.16***	22.95***	44.50***	0.45	14.40***	13.49***	3.75*	7.17***	6.13**
Sargan test (J-stat.)	$\chi(2) = 3.83$	$\chi(3) = 6.23$	$\chi(2) = 0.67$	$\chi(3) = 1.62$	$\chi(2) = 1.49$	$\chi(3) = 5.06$	$\chi(3) = 4.72$	$\chi(2) = 3.18$	$\chi(3) = 11.41***$	$\chi(3) = 10.18**$
Wald test	54.95***	65.38***	27.19***	29.92***	37.74***	18.24***	11.69***	17.96***	15.81***	12.47***
Demographic variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Habits and opinions	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Financial variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Nb. Obs.	7,911	7,911	7,911	7,911	7,911	4,498	4,498	7,911	4,498	4,498

Notes: See Tables 1 and 6. 2SLS estimates. The F-statistic from the first-stage OLS regression refers to the test of the null that the instruments are weak, the Wu-Hausman statistic refers to the test of the null hypothesis that OLS estimates are consistent (i.e. there is no endogeneity associated to the expectations) and the Sargan test is an over-identification test in case of strictly more instruments than endogenous variables, where a rejection of the null means that the instruments are not exclusively affecting the dependent variable through the expectations. The F-statistics of the Wald test indicates the joined significance of all the regressors. The macroeconomic literacy score, the medium-run inflation and tax expectations and the negative prior on monetary finance are included in all models. Financial variables are included only when they are jointly significant per a Wald test.

Table 8: The effects of tax and inflation expectations on support for policies

tion have a significantly negative effect on the support for these policies and this effect is large, in particular on the support for exceptional monetary financed-stimulus. This stronger expectational effect on the support for exceptional monetary finance rather than on the support for such permanent option is not unexpected because the inflation expectations related to monetary finance are elicited within the context of a one-time monetary-financed expenses (illustrated with the example of the pandemic-related government spending).

Because the dependent variables and the expectations are measured on the same Likert scale, we may interpret the estimated coefficients – bearing in mind that the OLS estimates rely on the interpretation of the Likert scale as a continuous variable. For instance, looking at Col. III and IV, a coefficient associated to inflation expectations close to -1.00 means that a shift to the right of one item on the Likert scale of the inflation expectations (i.e. towards more agreement with the inflation consequences of monetary finance) results in a

shift to the left of one item on the same scale of the support for a one-time monetary-financed fiscal stimulus (i.e. towards more opposition to such stimulus).

As for the support for budget cuts, in line with the treatment effects discussed in Table 7, we find a significant effect of expectations only among respondents who found the treatments clear (Col. VI-VII), not in the whole sample (Col.V). Among this subset of respondents, both higher inflation and the tax expectations significantly result in more support for spending cuts, with a stronger effect of tax than inflation expectations. Similar expectational effects hold for the support for tax increases (Col. VIII-X).

We conclude this section with the following finding:

Finding 5 *Expectation channel of opinions* *The information-provision treatments significantly affect the respondent's expectations, which in turn affect their opinions on policy options. Higher inflation expectations related to monetary finance result in less support for this funding option, while both monetary-finance-related inflation expectations and debt-issuance-related tax expectations result in more support for fiscal discipline.*

As a final exercise, we take a look at the answers to the recontact wave to assess whether the treatment effects persist beyond the time of the main survey.

4.3 Persistent treatment effects in the recontact wave

Between 540 and 590 respondents per treatment took part in the recontact wave compared to 1,720 per treatment in the main wave. To deal with the smaller sample size, we group the treatments per information content and look at the effects of being exposed to the video (in Tr. Video, Video+CB and Video+CB+Media) or the CB text (in Tr. Video+CB, CB and

<i>Dependent variables (Wave 2):</i>	<i>Support for CB independence</i>		<i>Support for permanent monetary finance</i>		<i>Support for fiscal consolidation</i>	
					<i>(budget cuts)</i>	<i>(tax increase)</i>
	All respondents		Readers only		Readers only	Readers only
<i>Being exposed to the...</i>	<i>CB text</i>	<i>video +CB text</i>	<i>CB text</i>	<i>video +CB text</i>	<i>CB text</i>	<i>video +CB text</i>
	I	II	III	IV	V	VI
<i>Info provision in Wave 1</i>	-0.07** (0.04)	0.11** (0.06)	-0.11** (0.05)	-0.17*** (0.06)	-0.01 (0.05)	0.06 (0.06)
Constant	2.78*** (0.18)	2.99*** (0.22)	3.61*** (0.23)	3.60*** (0.23)	2.69*** (0.22)	2.71*** (0.32)
Demographic variables	YES	YES	YES	YES	YES	YES
Habits and opinions	YES	YES	YES	YES	YES	YES
Financial variables	NO	NO	NO	NO	YES	YES
Nb. Obs.	2,707	2,707	1,643	1,643	1,643	1,643
-logLik.	3,578.3	3,578.6	2,279.9	2,278.3	1,914.8	3,144.5

Notes: See Tables 1 and Tables 6. HC3-robust standard errors in brackets. The dependent variables are the five-point-scale Likert items associated to the statement ‘A central bank (such as the European Central Bank) should remain independent from its government(s)’ (Col. I to II), ‘The European Central Bank should **always create money** to pay for the public expenses of the French government’ (Col. III and IV) and ‘When the level of the **public debt** becomes **concerning**... The government should **cut** its public **expenses**’ (Col. V) or ‘... The government should **increase** the overall amount of **taxes**’ (Col. VI) in Wave 2. These correspond, respectively, to items A, E (I) of question 11, and items A and B of question 12, in Appendix C.2. Habits and opinions variables include unconditional inflation expectations, the macroeconomic literacy score as measured in Wave 1 and the prior on monetary finance but exclude subjective knowledge due to many missing data points and the absence of significant correlation with the dependent variables. Financial variables are included when they are jointly significant. The dummy variables *video*, *CB text* and *video + CB text* equal one if the respondent in Wave 2 had been exposed to, respectively, Tr. Video, Video+CB or Video+CB+Media; Tr. CB, Video+CB or Video+CB+Media; and Video+CB or Video+CB+Media in the first wave.

Table 9: Persistent treatment effects in the recontact wave

Video+CB+Media) or both only (Tr. Video+CB and Video+CB+Media) on the reported opinions related to CB independence, monetary finance and fiscal consolidation (see, respectively, items A, D and F of question 11, and item A of question 12 in Appendix C.2). Results are reported in Table 9.

Even after controlling for a wide range of socio-economic variables, macroeconomic literacy, inflation expectations and priors expressed in Wave 1, both the video and the CB text have significant persistent effects on the respondents’ opinions, whether these opinions concern the support for CB independence (Cols. I, II and III), the support for permanent monetary-financed fiscal policy (Cols. IV and V) or the support for fiscal discipline in the form of tax increase (Col. VI) or budget cuts (Col. VII).

The treatment effects on the opposition to monetary finance and CB independence are

particularly persistent. Reading the CB blog post several weeks prior to the recontact wave, in combination or not with watching the video (Col. IV and V), significantly increases the opposition to this government's funding option and along the same order of magnitude as in Wave 1 (see, again, Cols. V and VI of Table 6).

As for CB independence, the video, with or without reading the CB blog post, also significantly increases the support it after several weeks (Col. I and Col. III) and the size of the effect is about half to one-third the size estimated in the main wave, although the statements presented to the respondents are formulated in opposite directions in the two waves.²⁶ By contrast, reading the CB text significantly decreases the support for CB independence in Wave 2 (Col. II), which is in line with the potential confusion between the message conveyed against monetary financing in the blog post and the independent mandate of the CB as discussed in Section 4.1.

Regarding support for fiscal consolidation, no matter whether it concerns budget cuts or tax increase, these second-round effects of the treatments that were present in the first wave do not persist in the recontact wave (Cols. VI and VII).

Finally, the recontact wave also includes several 'knowledge questions' and it is interesting to look into the somewhat incidental effects of the information-provision treatments received in the main wave on the 'knowledge' score of the respondents in Wave 2. Table 9 in Appendix B.2 reports on the determinants of this score in Wave 2, the exact questions correspond to questions 9 and 10 in Appendix C.2 and the distribution of answers are illustrated on figures

²⁶This is part of the obfuscation strategy. Therefore, in Col. I to IV of Table 9, a positive sign is associated to *more* support for Cb independence, whereas it is associated to *less* support for CB independence in Table 6 of Wave 1. This may limit the direct comparison of the effect size across the two waves.

2a and 2b in Appendix B.2.

Most determinants of macroeconomic literacy in Wave 1 are also determinants of the knowledge score in Wave 2, in particular the gender knowledge gap persists and wealthier, more educated respondents, frequent readers of financial newspapers and respondents who trust the ECB also give more frequently the right answers to the knowledge questions in Wave 2.²⁷ While controlling for all these determinants, the information-provision treatments of Wave 1 are found to increase the knowledge score in Wave 2 of the respondents who had declared to trust the ECB in Wave 1 (see Col. IV of Table 9). The magnitude of the effects of the video and the CB communication, alone or combined, is non-negligible: people who tend to trust the ECB score between 10 points more out of 100 if they have seen in the video a few weeks earlier and 15 points if they have seen both the video and read the CB text compared to those who have not seen these treatments or have reported not to trust the ECB (or not having heard about it). Interestingly, the last treatment, Tr. Video+CB+Media does not have any impact in the knowledge score in Wave 2.

Our result confirms the significant correlation established in the literature cited in the introduction between knowledge and trust in the monetary-policy institution. Respondents may be more receptive to the information from the CB if they trust the institution but too much information, or contradictory information, does not help improve their knowledge. It is worth noting that treatments did not include the numerical information about the targets that constitute the right answers in Wave 2. Yet, it is possible that respondents

²⁷Only the effect of age is strikingly reversed: in Wave 2, younger people are significantly more likely to know about the inflation and public debt targets of the EMU, a result in line with the findings of [Van der Cruysen et al. \(2015\)](#). We may conjecture that this difference could be due to the relative recency of these EMU policies, which make them more salient in shorter than in longer life-experiences, for instance by being part of the school curriculum of the younger cohorts.

increased their level of attention to information (via active search or passively) between the two waves as a result of being exposed to the treatments. Treatments may also operate via memory revivals if these respondents had received the information about these targets in the past. Our data does not allow us to discriminate between these potential explanations or alternative ones.

From our analysis, we may end with the following result:

Finding 6 (Persistence of the treatment effects) *The treatment effects of watching the video and reading the CB blog post on the increased opposition to monetary finance and the increased support for CB independence persist in the recontact wave. These pieces of information incidentally contribute to higher knowledge score in Wave 2 among respondents who declare to trust the ECB.*

5 Conclusions

This paper explores what the public’s beliefs about the financing of government expenses, in particular about monetary finance, which has been the subject of heated debates over recent years, in particular in Europe, first in the context of the persistently low pre-pandemic inflation, then associated to the large fiscal packages in response to the COVID-19 pandemic. These debates have raised a number of questions to which our innovative survey experiment of a representative sample of 8,600 European households allowed us to provide credible answers.

First, through the construction of a ‘macroeconomic literacy’ score, we find that the knowledge in this respect is fairly low and we contrast the cross-country and gender differ-

ences observed in our survey with the existing literature on literacy and numeracy.

Second, our survey revealed that despite the low level of knowledge on the matter, about two-third of respondents do express an opinion on monetary financing and half of them fill up intelligible answers about the associated risks. Through open-ended questions, we find that among participants with relatively higher macroeconomic literacy, the primary concern associated with monetary financing relates to inflation. By contrast, concerns about higher future taxes, whether attached to monetary financing or government debt issuance, are not prevalent among respondents. We also find suggestive evidence that Ricardian-equivalence reasoning emerges significantly more often in the case of debt-financed than money-financed stimulus but the differences in expectations is of limited magnitude.

Through a randomized controlled trial, we then find strong evidence that CB communication opposing monetary financing can shift people's views on the matter. This effect may be reinforced when supplemented by an educational video summarizing the government budget constraint. The additional provision of a media opinion piece presenting a pro-monetary financing view has a polarizing effect: people tend to react to the piece of information that confirms their initial beliefs.

Importantly, we find that these effects persist in a recontact wave one month after the initial survey, which suggests that CB communication, even on apparently complex topics, can stick into people's minds. Finally, additional analysis of our data shows that tax and, in particular, inflation expectations are the key channel through which information provision affects views on monetary financing and fiscal consolidation.

Our information-provision experiment also sheds light on the political economy conse-

quences of the view on monetary financing: the CB communication also increases the support for fiscal discipline. Emphasizing the limits of the expansion of CB liabilities reduces public opposition to fiscal consolidation measures.

Our paper therefore provides some answers to several key questions related to monetary financing, including the relevance of the underlying assumptions of the theoretical frameworks, the political-economy consequences, the power of CB communication in influencing views on the matter, and the channels through which these views can be influenced. It would be interesting to investigate further some questions raised by the present research. For instance, our results suggest that people do not really relate CB independent mandates with the inflation risks of monetary financing. It may be interesting to develop educational tools to improve knowledge on the matter. It may also be interesting to understand to which extent increasing macroeconomic literacy may relate to opinions on these policy options. These perspectives are left for future research.

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