# Household beliefs about fiscal dominance[1]

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PRELIMINARY

**Abstract**

We use a customized survey of households in Germany to assess how they think about the risk of fiscal dominance. More specifically, we design a randomized controlled trial to study how fiscal news affect individual debt-to-GDP and inflation expectations. We also elicit individual beliefs about the likelihood of a scenarios associated with stretched euro area fiscal resources. We find that a large share of households think that these scenarios are very likely. Moreover, information treatments that increase individuals' expected debt-to-GDP ratio also increase their inflation expectations. Consistent with fiscal dominance, these average effects stem from individuals who think that fiscal resources are more stretched than others. Individuals who think that the fiscal capacity is less stretched do not associated larger future debt-to-GDP ratios with inflation. We rationalize these results by introducing a New Keynesian model in which agents have heterogeneous priors on how the fiscal authority will meet its budget constraint in the future and study how fiscal shocks affect inflation in that setup and how monetary policy should optimally deal with agents that have fiscal dominance type of beliefs.

**Keywords:** Inflation expectations, fiscal and monetary policy, heterogeneous beliefs, randomized control trial, survey data

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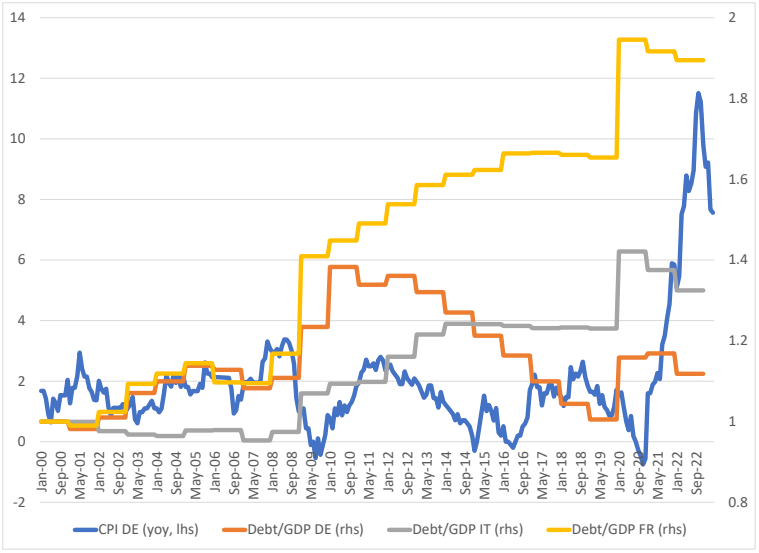
# 1 Introduction

Debt-to-GDP ratios increased substantially in advanced economies during Covid. As Figure 1 shows, this is the case for the three largest euro area economies: Germany, France, and Italy. That surge in debt-to-GDP was followed by a spike in inflation in the euro area as a whole as well as in Germany, as Figure 1 also illustrates. There are concerns that this inflation surge was, at least partly, triggered by such large increases in debt-to-GDP ratios (Barro and Bianchi, 2023, Hall and Sargent, 2022). In line with this view, some central bankers called for more fiscal discipline in order to help achieving price stability (e.g. Schnabel, 2022).

Figure 1: Public debts in the EA and German inflation




Note: Debt/GDP ratios in Germany, France and Italy (compared to their January 2000 level) and CPI inflation (year-over-year) in Germany.

A reason why an increasing debt-to-GDP ratio can be inflationary is that, in the face of large public debts, a central bank could be less willing to raise rates sufficiently to fight price pressures as these increases would endanger public debt sustainability.[1] This latter mechanism is associated with the so-called risk of fiscal dominance and can affect households views about the long-run inflation that the central bank is targeting. From a New-Keynesian perspective, such views are important for managing current inflation and aggregate demand, as household inflation expec-

[1] See Sargent and Wallace (1981), Leeper (1991), Sims (1994), Woodford (1994), Bassetto (2002), Bassetto and Sargent (2020), Barthélemy et al. (2024), among many others.

tations are an important determinant of the nominal anchor of the economy through their effect on spending and labor market decisions. So far, existing works arguing in favor of the empirical relevance of this mechanism and the role of the expectation channel, notably Bianchi and Melosi (2017) and Bianchi et al. (2022), have relied on indirect evidence inferred from macroeconomic data.

In this paper, we use individual survey data from Germany and investigate whether one can find direct evidence that households beliefs are consistent with a fiscal dominance logic.

We start by laying out some elements of theory that motivate the design of our survey. According to the intertemporal budget constraint of the government – the cornerstone of fiscal dominance models – an increase in debt/GDP should lead to higher inflation if it is not backed by future fiscal resources nor sufficiently eroded by haircuts induced by a default. We consider a version of that constraint where, given current information, agents have heterogeneous beliefs about the probability that the euro area debt-to-GDP ratio will not be funded in the future, that is that the fiscal capacity is stretched. In that setup, we underline that, after an unexpected increase in debt-to-GDP, individuals who expect fiscal capacity to be more stretched than others should also expect more larger increase in inflation than others. Testing whether this relation that is at the heart of fiscal dominance is supported by the data is challenging: To do so, one needs to observe an exogenous shock to debt/GDP, a causal reaction of inflation expectation to this shock, and a measure of how much fiscal resources are perceived to be stretched. We propose to use survey data to address these issues.

We design and exploit a customized survey conducted on a representative sample of about 6,000 German households in November 2021. Studying German individuals is also of particular interest as Germany may be exposed to the risk of fiscal dominance stemming from the decisions of other euro area sovereign fiscal authorities: In a monetary union, a common monetary policy interacts with national fiscal policies and their associated heterogeneous and sovereign yield curves. So, monetary policy could be consistent with both stable inflation and sustainable public debt for the average euro area country but, at the same time, destabilize public debt for countries with the least sustainable debt-to-GDP. This could then lead to aggregate effects that the central bank may want or be forced to avoid at the cost of higher inflation.

First, we elicit individuals' views on how much euro area fiscal capacity is stretched. We do so by asking them about their perceived likelihood of scenarios that can occur when increases in debt/GDP are not backed by fiscal resources: (i) a sovereign default of at least one euro area member in the coming years and (ii) a central bank (the ECB) that keep interest rates low in order

to help fiscal authorities roll-over their debt. We find that each of these scenarios are likely or very likely for about 75% of households in the sample. Moreover, the two scenarios are not exclusive in the mindset of respondents. About 65% of households report that both scenarios are likely or very likely.

We use information reported in the survey to investigate what individual characteristics drive views on fiscal capacity. These depend on individual characteristics such as income, asset holdings, age, gender, or location. Interestingly, several of these individual characteristics have previously been identified as determinants of inflation expectations. We find that these characteristics also matter for the perceived risks of scenarios associated with fiscal issues which, according to the fiscal dominance view, should lead to higher expected inflation. We also find a strong correlation with political leaning: Individuals who voted for center left parties at the September 2021 elections (which happened about one month before the survey) report that these scenarios are less likely than other survey respondents. We find a similar result for individuals who trust the ECB or the German government more than the average. Finally, we find that individuals who think the risk of a default is very likely expect higher inflation and lower growth than others, So they have a worse macroeconomic outlook than other respondents. This pessimistic outlook is not observed when looking at individuals who report that it is very likely that the ECB will be forced not to raise rates. Consistent with this scenario, this subset of households expect lower interest rates on savings than others.

Second, we look at whether, consistent with the fiscal dominance view of inflation, news signalling an increase in public debt also increase inflation expectations. A key challenge when aiming at identifying the reaction of expectations to fiscal news is to measure an exogenous fiscal shock and a causal reaction of inflation expectation to this shock. Following Coibion et al. (2021), we address this issue by conducting a randomized controlled trial using information treatment on fiscal variables. More specifically, we provide randomly selected groups of respondents with public information from the European Commission about future debt-to-GDP projected for Germany, but also France and Italy, over a 3-year horizon. Looking at fiscal treatments in other euro area economies allows us to test whether French or Italian fiscal stances are expected to have an impact on German inflation, a specificity of a monetary union. In addition to these fiscal treatments, we consider two treatments providing information on the interaction between monetary and fiscal policies. The first one is on the quantity of government debt assets that the ECB holds due to its quantitative easing policy. The second one is a public statement made in a interview by former Bundesbank President Jens Weidmann reiterating that the ECB mandate is to ensure price stability and not to help governments to finance their debt. We then ask individuals about their

expected euro-area debt-to-GDP ratio and German inflation expectations which allows to identify the effects of each treatment on both variables.[2]

We obtain that information on public debt in France and Italy increase the expected euro area debt-to-GDP ratio by about 13 percentage points. Information on German public debt also increase the expected euro area debt-to-GDP but by about 4 percentage points. Information on quantitative easing lowers, although non-statistically significantly, the expected euro-area debt to GDP by about 3 percentage points consistent with the view that this can help governments lower their debt. Finally, Weidmann's statement increases expected euro-area debt-to-GDP by 5.5 percentage points, suggesting that reassessing that the ECB should not help governments may make households more concerned about public debt than otherwise. Overall, we find evidence that information treatments randomly shift individual fiscal expectations. In addition, we find that the treatments that significantly increase euro area debt expectations also lead individuals to significantly increase the inflation they expect on average between now and the next 5 years or 10 years. The impact is about 7 basis points on this average inflation rate, implying a relatively small cumulative increase in prices of 7 percents over the next 10 years.

Third, we investigate how these aggregate effects vary across individuals. As discussed above, the fiscal dominance logic implies that news leading to an increase in public debt ratios should be more inflationary for individuals who think that fiscal capacity is more stretched than others. Focusing on fiscal treatments, we find that individuals who think that a default in the euro area is very likely increase their debt-to GDP by about 7 percentage points and their inflation inflation expectation by 16 basis points. In contrast, in response to the same treatments, individuals who think that a default is less than very likely report larger increase in debt-to-GDP ratios, of about 12 percentage points, and a non significant increase in their inflation expectations of about 3 basis points. For these households, an increase in debt can be accommodated by fiscal space and so does not require more inflation.

Strikingly, while individuals who think that it is very likely that the ECB will not raise rates to help governments expect higher debt-to-GDP in reaction to the fiscal treatments, they do not significantly increase their inflation expectation. So they do not associate the inflationary impact of larger public debts to conventional interest rate decisions that the central bank would need to take to help governments relaxing their budget constraint. This could be consistent with households having a Fisher equation in mind, so that lower interest rates go with lower rather than higher

[2]We ask individuals about their euro-area debt-to-GDP ratio expected in 5 year and German inflation expected on average over the next 5 or 10 years, therefore capturing the expected persistent impact of the treatments we consider.

inflation rates.

In sum, the positive mapping between debt-to-GDP and expected inflation observed at the aggregate level is stronger for households who think that a default is very likely, which should capture the view that the euro area fiscal capacity is more stretched than others. This heterogeneity is consistent with the fiscal dominance mechanism. It will for instance not show up if the main reason for why an increase in debt-to-GDP was perceived to be inflationary was associated to an expansionary effect of public spending. Note that our results do not rule out that some individuals think that way. These individuals are potentially among the ones who see less risk of a default than others.

One question one may have is whether beliefs about the likelihood of a default capture something else than the perception on euro area fiscal capacity. For instance, it could be that households who think a default is more likely are more pessimistic about the outlook than others. They could interpret the fiscal news as bad news which would further worsen their outlook. As is well known from survey of household inflation expectations, these tend to increase with worse economic condition. This could this explain the inflationary effect of the fiscal news. As discussed above, households who think a default is very likely have lower growth and higher inflation expectation. Moreover, as we show, the fiscal treatment have a positive impact on the probability to answer that lower growth will be the main reason for public debt to increase. However, one still finds that the fiscal treatments lead households who think a default is very likely to increase their debt-to-GDP and inflation expectations even when controlling for an impact of treatments that can vary with individual macroeconomic outlook. We obtain similar results when controlling for the impact of inflation uncertainty as well as trust in the ECB and in the German government. So the positive mapping between debt and inflation does not merely stem from more pessimistic macroeconomic beliefs, nor higher uncertainty.

Overall, our results underline that the same fiscal news can be interpreted differently, depending on how individuals think about the future fiscal space. In a last section, we rationalize these empirical results by introducing a New Keynesian model in which agents have different priors on whether the economy will move from a monetary dominance regime to a fiscal dominance regime in the future or not. We find that the fiscal news we consider are not very inflationary as the reaction of individuals who put a large probability on the scenario of stretched fiscal resources are offset by the small reaction of individuals who put a small probability on that scenario. Larger effects can be obtained when firms have the same inflation expectations than households. We investigate how monetary policy should optimally react when some individuals believe in a switch

to a fiscal dominance regime in the future. This introduces a policy trade-off as the inflationary impact of such beliefs need to be offset by a negative output gap.

**Literature review.** Our paper is connected to three strands of the literature.

To start with, our paper is connected to the expanding literature using randomized controlled trials to study how individuals' economic expectations react to new information (See Armantier et al., 2016, Armona et al., 2019, Coibion et al., 2018, 2019, among many others). Within this literature, only a couple of papers study agents reaction to fiscal news. Roth et al. (2022) study how information about U.S. government debt-to-GDP ratio affects US households attitudes towards government spending and taxation. Coibion et al. (2021) investigates the effects of information treatment on fiscal variables on inflation expectations of US households. We build on their work to design our fiscal treatments. We confirm their result that fiscal treatments leading to higher debt-to-GDP ratio also increase inflation expectations but on a representative sample of German households. We also further investigate how households connect fiscal variables and inflation expectations depending on their views about the fiscal outlook and find that this connection is consistent with fiscal approaches of inflation for a subset of them. In addition, we investigate what drives the differences of views about the fiscal outlook. Finally we rationalize our empirical results with a New Keynesian model featuring heterogeneous beliefs.

Our work also contributes to the literature assessing how fiscal variables affect inflation. Inflation can result from fiscal policy in setups where fiscal expansions lead to a boom typically because of deviations from Ricardian equivalence due to financially constrained agents (Angeletos et al., 2023, Galí et al., 2007), or because of cognitive constraints (Eusepi and Preston, 2018). Inflation can also be affected by fiscal variables when the fiscal-monetary policy interaction is such that inflation is used to meet the government budget constraint rather than to achieve the central bank inflation target (Leeper, 1991). Bianchi and Ilut (2017), Bianchi and Melosi (2017) and Bianchi et al. (2022) provide extensive quantitative evaluation of the second mechanism relying on macro models estimated to match features of US macroeconomic data.[3] Barro and Bianchi (2023) look at cross-country differences in fiscal stimulus during Covid and post-Covid inflation. Our contribution with respect to this literature is to provide direct micro evidence on how households connect fiscal variables to inflation expectations that is consistent with fiscal dominance.

Finally, our work is connected to the literature that investigates the determinants and the

[3]See also Schmidt (2024) who investigate how monetary policy should react to prevent fiscal dominance risk in a model in which the central bank is forced to fiscal dominance because of a upper bound on nominal interest rates.

macroeconomic consequences of heterogeneous beliefs about aggregate variables. Mankiw et al. (2003), Coibion and Gorodnichenko (2012), Andrade and Le Bihan (2013), Andrade et al. (2016) analyze how differences in information sets can account for the disagreement about future macroeconomic outcomes observed in various survey of expectations. Other works find that experience and memory from historical episodes (Malmendier and Nagel, 2016) or from shopping (D'Acunto et al., 2021) explain the heterogeneity of household inflation expectations. Andre et al. (2021) document that individuals form their macroeconomic expectations according to different narratives about the macroeconomy. Andrade et al. (2019) show that the forward guidance on interest rates that the Fed implemented in the wake of the Great Recession increased disagreement about future inflation and growth as that policy was interpreted differently. Here we show that he same fiscal news leads to disagreement in future debt-to-GDP and inflation forecast depending on the view that individual have on the fiscal space.

Several recent papers extend the New Keynesian model to introduce disagreement between agents. Angeletos and Lian (2018) and Andrade et al. (2019) show how disagreement about what forward guidance conveys affects its effectiveness. Caballero and Simsek (2022) analyze how disagreement between financial markets and the central bank affect the transmission of monetary policy. Lorenzoni and Werning (2023) show how disagreement between firms and workers can be inflationary. Here we introduce disagreement about whether the economy will enter a fiscal dominance regime in a future date.

## 2 Some theoretical background

In this section, we present some motivation and guidance for the design of our survey relying on the intertemporal budget constraint of the government.[4]

**The intertemporal budget constraint of a fiscal authority.** Our starting point is the intertemporal budget constraint of the government, which is key for fiscal dominance. This constraint is obtained as follows.

Time is discrete and indexed by $t \in \{0, 1, ...\}$. In each period t, the budget constraint of government writes

$$Q_t B_t + P_t(T_t - G_t) = \delta_t B_{t-1},$$

[4]On the mechanism connecting monetary policy to the intertemporal budget constraint of the government, see Bassetto et al. (2024).

where $B_t$ is date-t nominal debt, $P_t$ the price level, $Q_t$ the nominal price of bonds issued at date $t$ and maturing at date $t+1$, $G_t$ real government expenditures, $T_t$ real taxes and $\delta_t \in [0,1]$ is the haircut imposed by the government on its past debt repayment. As we focus on default risk, we focus here on one-period nominal debt.[5] The pricing of bonds is as follows:

$$Q_t = E_t \left\{ \frac{\xi_{t+1}}{\xi_t} \delta_{t+1} \frac{P_t}{P_{t+1}} \right\},$$

where $\xi_t$ is the date-t stochastic discount factor. Using these two equations, one can write:

$$\frac{B_{t-1}}{P_t} \delta_t = (T_t - G_t) + E_t \left\{ \frac{\xi_{t+1}}{\xi_t} \frac{B_t \delta_{t+1}}{P_{t+1}} \right\}.$$

Iterating forward and dividing both sides by real GDP denoted by $Y_{t-1}$, one obtains the intertemporal budget constraint of the government, which can be written as

$$\frac{D_{t-1}}{S_t} = 1 + \pi_t, \tag{1}$$

with $D_{t-1} = \frac{B_{t-1}}{P_{t-1} Y_{t-1}}$ the debt-to-GDP ratio a date $t-1$, $\pi_t$ the inflation rate between $t-1$ and $t$, and $S_t = \frac{1}{\delta_t Y_{t-1}} E_t\{R_t\}$ with $R_t$ the fiscal resources of the government that are made of the present discounted value of future surpluses and a potential bubble term:[6]

$$R_t = \underbrace{\sum_{\tau=t}^{\infty} \frac{\xi_\tau}{\xi_t} (T_\tau - G_\tau)}_{\text{PV of future surpluses}} + \underbrace{\lim_{H \to \infty} \frac{\xi_H}{\xi_t} \frac{B_{H-1} \delta_H}{P_H}}_{\text{Bubble term}}.$$

Overall, the intertemporal budget constraint of the government implies that any increase in debt-to-GDP that is not backed by additional fiscal resources will have to be eroded by inflation.

**Challenges to identify the inflationary effect of public debt.** Let $d_{t-1} = \log D_{t-1}$, and consider an exogenous shock $\epsilon_{t-1}$ that increases the union debt-to-GDP ratio by $\frac{\partial d_{t-1}}{\partial \epsilon_{t-1}} \epsilon_{t-1}$. Let $s_t = \log S_t$, the intertemporal budget constraint of the government, equation (1), implies a reaction of inflation that is given by

$$\frac{\partial \pi_t}{\partial \epsilon_{t-1}} = \left(1 - \frac{\partial s_t}{\partial d_{t-1}}\right) \frac{\partial d_{t-1}}{\partial \epsilon_{t-1}}, \tag{2}$$

This expression illustrates two empirical challenges one faces when trying to identify the effect of public debt on inflation. First, one needs to observe the response of inflation and debt-to-GDP to the same exogenous shock: $\frac{\partial \pi_t}{\partial \epsilon_{t-1}}$, and $\frac{\partial d_{t-1}}{\partial \epsilon_{t-1}}$.

[5] Adding more maturity would introduce interest-rate risk, which is not our focus here.

[6] This bubble term was investigated by e.g. Bassetto and Cui (2018) or Brunnermeier et al. (2020) and exists in models featuring dynamic inefficiency, uninsurable income risk or when debt provides liquidity services. In these cases, no transversality condition forces the bubble term to be 0, as it is the case in standard model.

Second, the inflation response to a shock that increases debt depends on the reaction of the expected present and future fiscal resources to the change in debt-to GDP that results from the shock, $\frac{\partial s_t}{\partial d_{t-1}}$. This term may vary depending on agents beliefs on how an increase in public debt generates fiscal resources as well as on how the fiscal and monetary authorities will react to fund such an increase in public debt.

The literature usually relies on the structure of a model to back-out unobserved exogenous shocks and the beliefs on how the shock will be compensated by an increase in fiscal resources from observed time series of macroeconomic variables (see, e.g., Bianchi et al., 2022, Bianchi and Ilut, 2017, Bianchi and Melosi, 2017, Eusepi and Preston, 2018).

In this paper, we use individual survey data to identify such an impact.

**The monetary union case.** In a monetary union with no fiscal transfers between the fiscal authorities, the intertemporal budget constraint (1) has to hold for each member $j$ of the union. Summing the country-level constraints leads to

$$\frac{D_{t-1}}{S_t} = (1+\pi_t)u_t,$$

with $D_{t-1} = \frac{\sum_j B^j_{t-1}}{P_{t-1}Y_{t-1}}$ the debt-to-GDP ratio of the union, $S_t = \sum_j S^j_t$ the sum of expected current and future surpluses of each union member, $\pi_t$ the inflation rate common across union members and determined by the monetary authority, and $u_t = 1/\sum_j \omega_j (1+\tilde{\pi}^j_t)^{-1}$ a term averaging the country specific components of inflation $(1+\tilde{\pi}^j_t) = (1+\pi^j_t)(1+\pi_t)^{-1}$ with weights $\omega_j = D_j/D$.

Therefore, the intertemporal budget constraint of the fiscal authorities holds in a monetary union, as emphasized in Bassetto and Caracciolo (2021). However, unlike in a fiscal union, an increase in debt-to-GDP in a country of the union $D_j$ that is not funded by an increase in its own future fiscal resources $S_j$ can be accommodated by an increase in inflation at the level of the union $\pi$ which will therefore also show up in other countries. This can lead to complex interactions between the monetary authority and the local fiscal authorities as analyzed in e.g. Maćkowiak and Schmidt (2023).

Another specific aspect of the link between public debt and inflation in a monetary union is that a local shock $\epsilon_k$ that affects debt in a country $k$ can also have an impact on inflation in another member $h$, through its impact on the common monetary union inflation rate, $\pi$, namely

$$\frac{\partial \pi^h_t}{\partial \epsilon^k_{t-1}} = \frac{\partial \pi_t}{\partial \epsilon^k_{t-1}} = \left(1 - \frac{\partial s_t}{\partial d_{t-1}}\right) \frac{\partial d_{t-1}}{\partial d^k_{t-1}} \frac{\partial d^k_{t-1}}{\partial \epsilon^k_{t-1}}, \tag{3}$$

where, for simplicity, we assumed that $\frac{\partial \tilde{\pi}_t^h}{\partial \epsilon_{t-1}^k} = 0$, that is the shock affecting country $k$ has no direct impact, say because it increases demand for exports of country $h$, on inflation in country $h$.

Analyzing the domestic inflationary effects of an increase of public debt in a foreign monetary union member is prone to the same type of empirical challenges than the estimation of the inflationary effects of an increase in a country's own public-debt discussed above. First, one needs to observe the response of country $h$'s inflation to a shock that increases debt in another country $k$ as the response of the debt-to-GDP of the monetary union to the same exogenous shock: $\frac{\partial \pi_t^h}{\partial \epsilon_{t-1}^k}$, and $\frac{\partial d_{t-1}}{\partial \epsilon_{t-1}^k}$.

Second, the inflation response to a shock that increases debt depends on the reaction of the expected present and of the aggregated monetary union future fiscal resources to the change in debt-to-GDP that result from that shock, $\frac{\partial s_t}{\partial d_{t-1}}$. This term may vary depending on agents beliefs on how an increase in public debt generates fiscal resources as well as on how the fiscal and monetary authorities will react to fund such an increase in public debt.

In this paper, we use individual survey data to identify such unobserved terms.

**Heterogeneous beliefs and the budget constraint.** We assume that individuals have heterogeneous beliefs about economic fundamentals and the fiscal-monetary policy interactions but that these beliefs are internally consistent with the intertemporal budget constraint of the government (1).[7] This leads to individual-specific version of equation (2), namely:

$$\frac{\partial \pi_t^i}{\partial \epsilon_{t-1}} = \left(1 - \frac{\partial s_t^i}{\partial d_{t-1}^i}\right) \frac{\partial d_{t-1}^i}{\partial \epsilon_{t-1}}, \tag{4}$$

with $\pi_t^i$, $s_t^i$ and $d_{t-1}^i$ individual $i$ beliefs about the inflation rate, (log of) present value of future surpluses, and (log of) debt-to-GDP ratio.

After the same shock $\epsilon_{t-1}$, individuals have different views on how inflation should adjust to satisfy the budget constraint depending on (i) their beliefs on how the shock affect the debt-to-GDP ratio $\frac{\partial d_{t-1}^i}{\partial \epsilon_{t-1}}$ and (ii) how the shock will be funded by future resources $\frac{\partial s_t^i}{\partial d_{t-1}^i}$.

**Identifying the impact of debt on inflation using survey data.** We rely on survey data to proxy the terms involved in equations (4) and (3).

To start with, following Coibion et al. (2021), we implement a randomized controlled trial to observe how individuals update their beliefs about debt-to-GDP and inflation after an exogenous

[7] Section 7 below introduces a model in which such heterogeneous beliefs may arise in equilibrium, but for now, we take such heterogeneity of beliefs as given.

shock. Individuals are randomly selected to receive an information treatment $T$. Survey questions are also used to observe beliefs about future debt-to-GDP, $d^i$, and inflation, $\pi^i$. These beliefs are compared with the ones of individuals in a control group $C$. Formally, we estimate average treatment effects defined as the difference between the average outcome for households receiving the information treatment and the average outcome for households in the control group:

$$E\left(\frac{\partial d^i}{\partial \epsilon}\right) = E\left(d^i|\epsilon = T\right) - E\left(d^i|\epsilon = C\right) \text{ and } E\left(\frac{\partial \pi^i}{\partial \epsilon}\right) = E\left(\pi^i|\epsilon = T\right) - E\left(\pi^i|\epsilon = C\right).$$

Once we get these estimates, we can verify if, in line with the theoretical predictions of equation (2), a shock that increases the expected debt-to-GDP ratio also increases expected inflation:

$$E\left(\frac{\partial d^i}{\partial \epsilon}\right) > 0 \Rightarrow E\left(\frac{\partial \pi^i}{\partial \epsilon}\right) > 0.$$

As in Coibion et al. (2021), we consider treatments that are related to conditions in respondents' *domestic* economy. In addition, we also exploit the fact that our survey is conducted in a monetary union and consider how individuals react to treatments that are related to conditions in other *foreign* monetary union economies. This allows us to assess if, consistent with the logic of a consolidated budget constraint of fiscal authorities in a monetary union, and equation (3) above, a shock to a foreign union member $k$ that increases debt-to-GDP ratio at the monetary union level also increases inflation in another monetary union member $h$:

$$E\left(\frac{\partial d^i}{\partial \epsilon^k}\right) > 0 \Rightarrow E\left(\frac{\partial (\pi^h)^i}{\partial \epsilon^k}\right) > 0.$$

Finally, another novelty of our survey is to elicit individuals' view on how constraints fiscal resources are, that is how small the term $\frac{\partial s}{\partial d}$ in equation (2) is. Using this information, we can categorize respondents in between individuals who think it is very unlikely that an adjustment of fiscal resources that will compensate for an increase in debt to GDP will happen, that is individuals with a relatively low $\frac{\partial s}{\partial d}$, and individuals who think such an adjustment is more likely to happen therefore who exhibit a relatively high $\frac{\partial s}{\partial d}$. We can then check whether, in line with theory and equation (2), individuals with a low adjustment of fiscal resources to the shock that increase debt-to-GDP expect a higher adjustment of inflation in reaction to the same shock, that is:

$$E\left(\frac{\partial \pi^i}{\partial \epsilon}\middle|\frac{\partial s}{\partial d} = \text{high}\right) < E\left(\frac{\partial \pi^i}{\partial \epsilon}\middle|\frac{\partial s}{\partial d} = \text{low}\right).$$

We detail how the survey is designed in the next section.

# 3 Survey design

## 3.1 General description.

The micro-data we use to answer our research questions is from the Bundesbank Online Panel Households (BOP-HH). The survey runs every month on a sample of individuals, which are at least 16 year old and have used the internet at least once in the past months.[8] A large part of the 2,000 to 7,000 individuals per wave, is participating in the survey more than once.

The BOP-HH collects information on individuals' expectations regarding inflation and other macro-economic variables, their income expectations and consumption patterns, as well as socio-demographic variables, like age, gender, income, region, gender, city size, education, employment status and vote at Parliament elections.

We added a special module to the BOP-HH questionnaire that was fielded in November 2021. In particular, we set-up a randomized control trial (RCT) with the objective to create exogenous variations in the perception of debt-to-GDP and inflation. The survey was completed by a total of 6,023 respondents.

## 3.2 Treatments

The total sample was split into six randomly selected groups of equal size, with five groups receiving different information treatments, $T$, and a control group, $C$, receiving no treatment. The first group received a fiscal information treatment, $T_1$, pertaining to information on the current as well as projected debt level and debt-to-GDP-ratio in their own country, Germany. The second and third group received the same type of fiscal information but for two foreign euro area members, respectively France, $T_2$, and Italy, $T_3$. The fourth and fifth groups received information related to the interaction between monetary and fiscal policy. More specifically, the fourth group received information on the ECB's purchases of sovereign debt, $T_4$. And the fifth group received a statement from the former Bundesbank president Weidmann, asserting that the ECB has a price stability mandate and should not help governments, $T_5$.

The exact wording of the treatment texts is as follows:[9]

**Treatment 1 ("Debt – Germany")** *Germany's government debt is currently €2,398 billion, amounting to 70% of its gross domestic product. According to the European Commission, it is expected that*

[8] See Beckmann and Schmidt (2020) for a detailed description.

[9] The German version of the treatment texts and questions, actually used in the survey, is available in the appendix.

*this figure will total more than €2,680 billion in 2024, probably amounting to 72% of gross domestic product.*

**Treatment 2 ("Debt – France")** *France's government debt is currently €2,762 billion, amounting to 115% of its gross domestic product*[10]*. According to the European Commission, it is expected that this figure will total more than €3,240 billion in 2024, probably amounting to 118% of gross domestic product.*

**Treatment 3 ("Debt – Italy")** *Italy's government debt is currently €2,696 billion, amounting to 156% of its gross domestic product. According to the European Commission, it is expected that this figure will total more than €2,800 billion in 2024, probably amounting to 153% of gross domestic product.*

**Treatment 4 ("ECB Purchases")** *According to information provided by the European Central Bank (ECB), it has purchased around 30% of the government debt of the euro area Member States; this amounts to more than €3.9 trillion.*

**Treatment 5 ("Weidmann")** *In a newspaper interview, President of the Deutsche Bundesbank, Jens Weidmann, said that the European Central Bank's (ECB) low interest rates help it to fulfill its mandate, namely safeguarding price stability. The ECB should not be pressured into pursuing other objectives, such as guaranteeing minimum returns on certain types of investment or helping governments with payment problems.*

### 3.3 Post-treatment questions

To assess the impact of the treatments, we use several questions spanning expectations on the evolution of public debt, inflation and the perception of fiscal constraints.

**Debt expectations.** We ask individuals about their expected evolution of the euro area debt-to-GDP post-treatment using the a qualitative question and a quantitative question. The response to these two questions allows us to obtain estimates of:

$$E\left(\frac{\partial d^i}{\partial \epsilon}\right) = E\left(d^i|\epsilon = T\right) - E\left(d^i|\epsilon = C\right)$$

for the different treatments $T$ considered. More precisely the questions are the following:

[10] Respondents could call up an info box with the following text: "Gross domestic product (GDP) is the value of all goods and services produced within the national borders of an economy in a given year."

**Question 1.** *At present, total government debt of all euro area Member States amounts to 100% of euro area gross domestic product (i). Do you think the ratio of government debt to gross domestic product will be higher or lower in five years' time than at present?*

***1.*** *Far lower,* **2.** *Somewhat lower,* **3.** *Roughly the same,* **4.** *Somewhat higher,* **5.** *Far higher.*

**Question 2.** *In your opinion, to what level will the ratio of euro area government debt to gross domestic product (i) fall / rise in five years' time? XXX percent*

**Reason for debt evolution.** In addition to the reaction of debt-to-GDP to a shock, we elicit the main reason underlying individuals view on future change in euro area debt-to-GDP by asking the following question:

**Question 3.** *What do you think will be the main reason behind a reduction (increase) in the ratio of government debt to gross domestic product?*

***1.*** *Governments will raise (lower) taxes.* ***2.*** *Governments will reduce (increase) expenditure.* ***3.****The euro area economy will grow to a greater (lesser) extent than government debt.* ***4.*** *Interest rates on government debt will remain low (be high).*

This allows us to assess whether individuals primarily relate the evolution of debt to fiscal policy choices $p$ (responses 1 and 2), or to another change in macroeconomic conditions $x$ (responses 3 and 4):

$$E\left(\frac{\partial d^i}{\partial \epsilon}\right) = E\left(\frac{\partial d^i}{\partial p^i}\frac{\partial p^i}{\partial \epsilon}\right) + E\left(\frac{\partial d^i}{\partial x^i}\frac{\partial x^i}{\partial \epsilon}\right)$$

**Inflation expectations.** We survey individuals about their average inflation expectations over the next 5 years or the next 10 years using both qualitative and quantitative questions. The response to these two questions allows us to obtain estimates of:

$$E\left(\frac{\partial \pi^i}{\partial \epsilon}\right) = E\left(\pi^i | \epsilon = T\right) - E\left(\pi^i | \epsilon = C\right).$$

for the different treatments $T$ considered. These questions are also asked pre-treatment so one can look at how the information treatments lead individuals to revise their inflation expectation and estimate. The specific wordings of the questions are as follows:

**Question 4.** *What value do you think the inflation rate or deflation rate will take on average over the next five/ten years?* [11]

[11] Note that half of the respondents is asked about their 5-year ahead inflation expectation while the other half is asked about their 10-year ahead one.

**Perceptions of stretched fiscal resources.** As explained in the previous section, a key determinant of the connection between debt and inflation expectations is how likely households think that fiscal resources can be will expanded to fund most of the increase in public debt, in which case $\frac{\partial s}{\partial d}$ is 'high', potentially close to 1. Or whether they think the fiscal capacity is already stretched so that most of the additional debt-to-GDP will be unfunded, that is $\frac{\partial s}{\partial d}$ is 'low', potentially close to 0.

We elicit these individual beliefs by asking households about their qualitative assessment of the likelihood of scenarios associated with stretched public finances, so that $\frac{\partial s}{\partial d}$ is 'low' when these scenarios are deemed to be likely.

The first scenario is a sovereign default within the euro-area.

**Question 5.** *Within the next five years, at least one country in the euro area will be unable to repay its government debt on time.*

***1.*** *Very likely,* ***2.*** *Fairly likely,* ***3.*** *Neither likely nor unlikely,* ***4.*** *Fairly unlikely,* ***5.*** *Very unlikely.*

The second scenario is a scenario where the central bank does not increase interest rates to control inflation to help government fund their debt.

**Question 6.** *Within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, as this would make it too expensive for one or several of the euro area countries to finance their government debt.*

***1.*** *Very likely,* ***2.*** *Fairly likely,* ***3.*** *Neither likely nor unlikely,* ***4.*** *Fairly unlikely,* ***5.*** *Very unlikely.*

# 4 Individual beliefs about public debt sustainability

In this section, we document several properties of households' views about the risk that fiscal resources are or become stretched and thus that an increase in debt-to-GDP cannot be funded. As Section 2 illustrates, this perception is key in determining how individuals make the connection between public debt and inflation expectations. We use the questions on the likelihood of two scenarios associated with stretched fiscal ressources: question 5 on default and question 6 on whether the central bank's interest rate policy is constrained by fiscal authorities to assess such individual beliefs.

**Scenarios associated with stretched fiscal resources are viewed to be likely or very likely.** Table 1 reports the distribution of responses across different likelihood associated with the scenario of default and the scenario of a constrained policy rate.

Overall, 79.7% of households believe that a default of a country within the euro area is either very likely or likely. Similarly, 79.8% of households believe that the ECB will be either very likely or likely constrained in setting its interest rate policy. At the individual level, expecting a default is usually associated with the expectation of a constraint on interest rate policy: about 90% of households expecting that it is very likely that the ECB will be constrained not to raise rates, think that it is very likely or likely that a EA country default over the next years. This proportion is about 80% for households expecting that it is likely that the ECB will be constrained not to raise rates. So the two scenarios are not viewed as complements but rather associated with a state of the world where the EA fiscal authorities face some fiscal constraints which could lead to various form of debt crisis.

**Views on the likelihood that fiscal resources will be stretched vary with individual characteristics.** We connect views about fiscal constraints both to information treatments and to individual characteristics.

More specifically, let '*Stretched*' be a dummy equals to one when an individual sees a scenario associated with stretched fiscal resources being very likely–i.e. the individual perceives the funding of new fiscal debt, $\frac{\partial s}{\partial d}$, as being low–and zero otherwise. We use two measures for this '*Stretched*' variable: individuals seeing a EA default scenarios being very likely ; and individuals seeing the ECB being constrained to help EA governments as very likely. We then run the following probit regression

$$Stretched = \alpha + \sum_k \beta_k Treatment_k + Controls + Error, \tag{5}$$

with $T_k$ dummy variables equal to one when an individual is treated with the information $k$ and zero otherwise and '*Controls*' a set of individual characteristics.

The results are presented in Table 2. We obtain that none of the treatments has a significant effect on the answers to any of the two scenarios. The treatments we consider do not change their broad assessment of the likelihood that fiscal resources will be stretched. These views are not randomly determined though. As Figures 2 and 3 illustrate, individual characteristics have an effect on the likelihood that individuals report for each of the two scenarios. Individuals expecting a default in the euro area are more likely to be a woman, to be older than 35, to earn a lower income, to live in the South of Germany, to vote for AfD or FDP, to hold no securities, and to perceive inflation above 5%. Individuals expecting that the ECB will be constrained not to raise rates are more likely to be a man, to be older than 45, to earn a high income, to live in the South of Germany, to vote for another party than SPD, to hold no debt, and to perceive inflation closer

to realized inflation than individuals thinking that default is a very likely event. Figure 4 also illustrates that these scenarios are deemed more likely for individuals who report a lower level of trust in the German government and the ECB.

**Worse fiscal outlook does not always go with worse macroeconomic prospects.** How do individuals' beliefs about future fiscal capacity correlate with their macroeconomic expectations? Table 3 shows that households who think that a default is very likely expect higher inflation and lower growth than others. In contrast, their (saving) interest rate expectation is relatively similar than for other households. So higher inflation is not associated with lower interest rates. These households also expect higher EA debt-to-GDP and expect tax increases more than other households.

Table 3 also reveals that households who think that it is very likely that the ECB will be constrained not to raise rates expect broadly similar inflation and growth than others, but lower (saving) interest rates. So lower interest rates is not associated with higher inflation. These households also expect higher EA debt-to-GDP and expect tax increases more than other households.

Overall, individuals who think that either there will be a sovereign default in the EA or that the ECB will be constrained to help governments are very likely scenarios have worse fiscal prospects than others. Individuals expecting that a default is very likely also have a more deteriorated macroeconomic outlook than others. One question one could consider is whether expecting a default and/or a constrained ECB is redundant with a pessimistic macroeconomic outlook. Table 4 shows that households putting a large probability on the scenarios of a default or a default combined with a constrained ECB expect higher inflation expectations even once one controls for their other macroeconomic forecasts.

# 5 The effect of treatments on household expected debt-to-GDP and inflation expectations

We first investigate the effects of treatments on debt and inflation expectations. We establish that some of the treatments have a positive impact on debt expectations and these treatments also have a positive impact on inflation expectations.

**Debt expectations.** We investigate the effect of information treatments on households' expectations about the change in EA debt-to-GDP, $\Delta Debt$. To this purpose, we regress these individual

views on the various information treatments and a set of individual characteristics, namely:[12]

$$\Delta Debt = \alpha + \sum_k \beta_k Treatment_k + Controls + Error. \tag{6}$$

We report the results of the effect of treatments on both the quantitative measures of expected debt-to-GDP in Table 5 and qualitative measures in Table 6. Overall, we obtain that treatments providing information on French and Italian debts have a strong positive effect on quantitative expectation for the EA debt-to-GDP compared to the control group. In terms of qualitative measures, these treatments lead respondents to answer much less that the EA debt-to-GDP will decrease in the future.

We also obtain that the treatment with information on the German debt and the one with the quotation from Jens Weidmann have positive but milder effects on expected debt. In particular, the Weidmann treatment leads to a somewhat positive effect on the quantitative debt expectation but also results in a significantly lower share of respondents expecting debt to increase. In contrast, the ECB purchase treatment leads to a decline in expected debt, at least qualitatively.

Based on these results, we then group the French, Italian and German debt treatments and we gather the two other treatments together. We report the effects of the corresponding bundles in the last columns Table 5. Consistently with the effects of individual treatments, we obtain that the debt treatments lead to an increase in expected debt while there is no overall effects of the other treatments.

**Effects of treatments on inflation expectations.** To investigate the effects of treatments in inflation expectations, we regress individual revisions in long-run inflation expectations on the different treatment dummies:[13]

$$\pi^{expost} - \pi^{exante} = \alpha + \sum_k \beta_k Treatment_k + Controls + Error \tag{7}$$

Note that, in our survey, we have access to long term expected inflation both before and after treatments. This contrasts with fiscal variables that are only asked after treatments (See Coibion et al., 2021, for a similar survey design).

The estimates are reported in Table 5 for quantitative measures and Table 6 for qualitative measures.

[12] We also report in Table A.4 in the Appendix some qualitative expectations regarding future debt evolution as a function of treatments.

[13] We report summary statistics of individuals' revisions in long-term inflation expectations as a function of the treatment that they received in Table A.5 in the Appendix.

First, some of the treatments lead to a positive and significant revision in inflation expectation.

Second, we observe that the information treatment on the debt evolution of France and Italy have a larger impact than the information treatment of German debt, QE or Weidmann. So the treatments that have a positive and larger effect on debt expectations have a larger impact on inflation expectations. Interestingly, the fact that German households revise positively their (German) inflation expectation in response to information on other countries' public debt confirms that households understand that in a monetary union, fiscal dominance risk goes beyond the scope of their own country's fiscal stance, consistent with Bassetto and Caracciolo (2021) and Maćkowiak and Schmidt (2023). These results thus complement the findings of Coibion et al. (2021) who focused on the effects of treatments about US fiscal policy on US inflation. When grouping debt treatments on the one hand and the other treatments on the other hand, we also obtain that debt treatments which lead to higher debt expectations result in higher (and statistically significant) revisions in inflation compared with other treatments, which lead, in comparison, to lower debt expectations.

Third, while significant, the impact of information treatments is small. At most, they lead to a revision of about 0.09pp of inflation expectations in reaction to the treatment providing information on French debt.

Fourth, treatments also have an effect on the extensive margin of expected inflation. In table 6, we report marginal effects of Probit regressions relating dummy variables for positive and negative inflation revisions to the information treatment dummies. We obtain that treatments either increase the share of upward revisions or decrease the share of downward revision, although these effects are often non-significant. So fiscal news can move the extensive margin of inflation, which is key in household consumption choices, as emphasized in Andrade et al. (2023).

At the aggregate, treatments increasing households' expected debt ratios also increase more their long-run inflation expectations consistent with a fiscal dominance logic. But another possibility is that the increase in expected EA debt-to-GDP induced by the French and Italian fiscal treatments could be associated with an increase in spending or a decline in taxes which, because of non-ricardian effects, could be viewed as expansionary. Such expansionary effects would also create some supplementary inflation because of a positive output gap or more generally an excess demand. Tables 7 and 8 show that this is not what individuals in our survey have in mind. Indeed, most households think that EA debt/GDP will increase. However, they do not relate that increase to a decline in taxes or an increase in government spending. The increase in debt/GDP is mostly associated with a worsening of economic growth. This is particularly true for the French

and Italian fiscal treatments.

# 6 Treatment effect for individuals with different fiscal outlook

How households connect debt and inflation expectations? In this section, we investigate this question using the insights from Section 2: Higher debt expectations are perceived to be inflationary by households only to the extent that households also perceive that fiscal resources are stretched, so that an increase in debt-toGDP cannot be fully funded. We proceed in two steps. First, we use Questions 5 and 6 as a way to measure whether fiscal resources are more or less stretched and we determine how the effects of treatments on debt and inflation expectations vary with the answers to these two questions. Second, motivated by the findings of Section 4, showing that the heterogeneity fiscal views correlates with other variables, we investigate whether such heterogeneity in treatment effect is also consistent with other mechanisms. In particular, we investigate the role of trust in the ECB, uncertain outlook, and pessimism on economic conditions.

## 6.1 The role of expected fiscal constraint

As we documented above (see Table 5), the answers to Questions 5 and 6 are not impacted by the information treatments. So we can study how these treatments affect differently groups of households with different priors on the fiscal constraint. As a result, we re-estimate equations (6) and (7) for various subgroups of individuals classified according to (i) the (qualitative) probability that they put on the scenario of the default of a euro area member and (ii) the (qualitative) probability that they put on the scenario of a central bank that is constrained by fiscal authorities. Table 9 presents the results both for quantitative and qualitative variables.[14]

**Debt treatments.** We start with the debt treatments, i.e. information on French, Italian and German public debts.

Individuals who think that a scenario of default is very likely are the one driving the connection between debt and inflation. In reaction to debt treatments, all households expect higher EA debt levels.[15] However, only the ones who think that a scenario of default is very likely

[14] We report the corresponding regressions with interaction terms in Appendix TBA.

[15] Note that treated households expecting a default expect relatively lower debt levels compared with treated households not expecting a default.

also increase their inflation expectations. The reaction for the other types of individuals is non-significant.

These results are in line with the idea that the connection between inflation and debt expectations arises only for households expecting stretched public finances as detailed in Section 2.

In contrast, the left panel of Table 9 shows that individuals who think that there is a strong likelihood that the ECB will keep its interest rate at low levels to help governments are not the one who associate higher debt-to-GDP to higher inflation. If anything, households inflation response to the treatments decline with the probability that they put on that scenario.

Overall, households who expect that the EA fiscal resources will be stretched interpret fiscal news leading to an increase in debt-to-GDP as being inflationary. But at the same time they do not make the connection with the fact that the central bank may refrain from its price stability objective to help stabilize public debts.

**The other treatments.** The other treatments do not lead any of the subgroups to statistically different expected debt levels compared with the control group. Despite this, we still observe that some of the groups revise their inflation expectations upward. However, note that, in contrast with debt treatments, only the subgroup not expecting a default is revising inflation expectations upward. So, this revision in inflation expectation is not related to higher debt associated with stretched public finances.

### 6.2 The role of trust, uncertainty and pessimism

We now broaden our investigations by considering whether how households trust the European Central Bank, whether they report to be uncertain about the future outlook and also how they perceive worse economic conditions than others could be the main driver of the heterogeneity of the fiscal treatment discussed above.

Our main regression is:

$$\pi^{expost} - \pi^{exante} = \alpha + \sum_k \beta_k Treatment_k \times \left(1 + 1_{default} + 1_{hetero}\right) + Controls + Error \qquad (8)$$

with $1_{default}$ is a dummy which equals 1 when the respondent expect that a default is very likely and $1_{hetero}$ is a dummy with *hetero* is either trust, uncertainty and pessimism.

We report the estimates of these regressions in Table 10 with the quantitative variables and Table 11 with qualitative ones.

As in the previous subsection, we observe that fiscal treatments lead households to expect a higher level of euro area debt, even if this level of debt is lower for households expecting that a default is very likely. The fiscal treatments lead to an upward revision of inflation both quantitative and qualitative for households viewing fiscal resources being more stretched than others even when one includes those other form of heterogeneity. Interestingly, highly uncertain households revise upward inflation both quantitatively and qualitatively after the fiscal treatments. In contrast, differences in pessimism and trust play a more minor role in the response of expected inflation – both quantitatively and qualitatively – to the fiscal treatments.

# 7 A model of heterogenous beliefs

We now build a model in which households have heterogenous beliefs regarding future debt levels and future policy regime – either fiscal or monetary dominance. We first derive analytical results in a flexible-price environment and we then extend our insights to a sticky price environment.

## 7.1 The environment

Time is discrete and indexed by $t \in \{0, 1, ...\}$.

**Households' consumption.** There is a unit mass of homogenous atomistic agents indexed by $i \in [0, 1]$. Their consumption decisions follow the standard Euler equation, in log-linear deviations from the steady-state:

$$c_{i,t} = -\frac{1}{\sigma}\left(r_t - E_{i,t}\pi_{t+1}\right) + E_{i,t}c_{i,t+1} \tag{9}$$

where $E_{i,t}$ is agent i's expectation operator, conditional on her beliefs, $c_{i,t}$ date-t consumption of agent $i$, $r_t$ the date-t nominal interest rate and $\pi_{t+1}$ the date-$t+1$ inflation rate.

Different beliefs regarding the path of the real interest rates may lead agents to adopt different consumption-saving decisions and, thus, they may obtain different wealth outcomes. We focus on the effects of the heterogeneity of beliefs on the outcomes of monetary policy decisions and, as in Andrade et al. (2019), we include a risk-sharing mechanism in the microfoundations of the model so that agents equalize their wealth when they agree on future policy regimes.[16]

[16] We provide the microfoundations of the model in Appendix A.1.

**Fiscal and monetary policies.** Monetary policy is set as follows:

$$r_t = \phi^k \pi_t \tag{10}$$

At date-t, the evolution of the debt-to-GDP rate is:

$$b_t = \beta^{-1} \left( r_{t-1} - \pi_t + b_{t-1} - (1-\beta)\tau_t \right). \tag{11}$$

As it is standard, we obtain this equation from the budget constraint of the government.[17] The fiscal rule is

$$\tau_t = \gamma^k b_{t-1} + \xi_t \tag{12}$$

As it is well known, there are two potential regimes in this environment and $k \in \{M, F\}$. In the fiscally-led regime, $\phi^F < 1$ and $\gamma^F < 1$. In the monetary-led regime, $\phi^M > 1$ and $\gamma^M > 1$.

**Information and beliefs.** The economy starts in the monetary-led regime. Each agent can perfectly observe the current policy regime as well as the macroeconomic variables. However, agents may disagree about future policy regimes and future macroeconomic variables. We assume that agents can be of two types: a share $\theta \in [0, 1]$ expect the policy regime to shift to fiscal dominance at some date $T > 1$ and the remaining, a share $1 - \theta$, expects the policy regime to continue to be monetary dominance forever.

### 7.2 Equilibrium

We now turn the description of the equilibrium outcome. We proceed backwards, starting with dates after date T.

**After date T onwards.** At date $T$, all agents observe and agree on the policy regime. This regime can either be fiscal or monetary.

**Monetary dominance.** If this policy regime is monetary dominance, then, as $\phi^M > 1$, the central bank controls inflation, which is such that $\pi_t = 0$ for any $t \geq T$. Taking into account this path for inflation, we obtain that the debt-to-GDP ratio evolves as:

$$b_t = \beta^{-1}(1 - (1-\beta)\gamma^M) b_{t-1} - \beta^{-1}(1-\beta)\xi_t \tag{13}$$

[17] See Appendix **??** for the derivation of (11) from the budget constraint of the government.

Iterating this equation forward, we obtain:

$$b_{t-1} = \sum_{k \geq t} \left( \frac{\beta}{1-(1-\beta)\gamma^M} \right)^{k-t} (1-\beta)\xi_k \tag{14}$$

Several comments are in order. First, notice that (14) is the intertemporal budget constraint of the government under monetary dominance expressed in deviations from the steady state in the case in which deficits react sufficiently to past public debt. Indeed, the left-hand term $b_{t-1}$ is the debt-to-GDP ratio and the right-hand term is the present value of future government's resources. In addition, the price level (or inflation) is not determined so that this budget constraint is satisfied.

Second, agents may have different views about fiscal variables but they all expect the same path for inflation: they all expect the inflation rate to stay at 0%, even if they may expect different paths for the deficits and the debt-to-GDP ratios.

**Fiscal dominance.** Otherwise, the policy regime is fiscal. In this case, rewriting (11) at date t using (12) at date $t-1$ and taking expectation, we obtain:

$$b_t = E_t \frac{1}{1-(1-\beta)\gamma^F} \left( \beta b_{t+1} + \pi_{t+1} - r_t - (1-\beta)\xi_{t+1} \right) \tag{15}$$

We then iterate this equation forward:

$$b_t = E_t \sum_{k=1}^{\infty} \left( \frac{\beta}{1-(1-\beta)\gamma^F} \right)^k \left( \pi_{t+k} - i_{t+k-1} - (1-\beta)\xi_{t+k} \right). \tag{16}$$

Using the law of iterated expectation, $E_{t+k-1}\pi_{t+k} = i_{t+k-1}$ and $E^k_{t+k-1}\xi_{t+k} = 0$, we obtain that:

$$E^i_1 b_t = \beta^{-1} \left( E^i_1 r_{t-1} - E^i_1 \pi_t + E^i_1 b_{t-1}(1-(1-\beta)\gamma^F) - (1-\beta)E^i_1 \xi_t \right) = 0. \tag{17}$$

As a result, we obtain:

$$E^i_1 \pi_t = 0 \text{ for all } t > T, \tag{18}$$

$$E^i_1 \pi_T = E^i_1 r_{T-1} + E^r_1 b_{T-1}(1-(1-\beta)\gamma^F). \tag{19}$$

Agents anticipating fiscal dominance also anticipates inflation at date $T$. From equation (19), one can observe that the higher are debt expectations, the higher is the expected rate of inflation $E_1\pi_T$. This contrasts with agents anticipating monetary dominance who expect 0-inflation: $E^i_1 \pi_T = 0$.

**Before date T.** At date $T-1$, we show that a Fisher equation holds:

$$r_{T-1} = \theta E_{F,T-1}\pi_T + (1-\theta)E_{F,T-1}\pi_T, \tag{20}$$

in which the right-hand term is average inflation expectation across households. Importantly, at date $T-1$, agents agree to disagree: they have different inflation expectations due to their different expectations regarding the future policy regime. This happens despite the fact that they all agree on current (observable) macroeconomic variables.

Using the policy rule, one can then compute the inflation rate in previous periods:

$$\pi_t = \left(\theta E_{F,T-1}\pi_T + (1-\theta)E_{M,T-1}\pi_T\right)\phi^{t-T} = \phi^{t-T}\theta E_{F,T-1}\pi_T \tag{21}$$

**Summary.** The following proposition summarizes our findings:

**Proposition 1.** **(i)** *Inflation satisfies* (21) *for any* $t < T$.

**(ii)** *Agents expecting monetary dominance expects 0 inflation at any future maturity* $E_0\pi_t = 0$ *for any* $t \geq T$. *In their case, any increase in future debt* $b_t$ *leads to no additional inflation.*

**(iii)** *Agents expecting fiscal dominance expects 0 inflation before date T but positive inflation at date* $T-1$. *Their inflation expectation is increasing in their expectation of date-T debt-to-GDP.*

*Proof.* See Appendix A.2. □

To sum up, agents may well agree in the short run despite their heterogeneity of beliefs regarding the future policy regime. The expected future level of debt has an impact on inflation expectations only through households expecting a shift to fiscal dominance.

Notice that, before date $T$, under monetary dominance ($\phi > 1$), inflation is lower than at the average expectation at date $T-1$: $\pi_t < (\theta E_{F,T-1}\pi_T)$. The presence of households expecting fiscal dominance is then weakly inflationary at date 0. This result may be quite different in the case where monetary policy is passive ($\phi < 1$) already before date $T$. In this case, $\pi_t > (\theta E_{F,T-1}\pi_T)$: the positive average inflation expectation in the future due to fiscal dominance risk leads to potentially large inflation levels currently.

We now simulate a sticky-price version of this model to confirm these findings.

### 7.3 Sticky prices

We now extend these results to a sticky price environment. A key aspect of such an environment are firms' inflation expectations, which enters the new-Keynesian Phillips curve:

$$\pi_t = \beta E_t^f \pi_{t+1} + \kappa y_t \tag{22}$$

with $E_t^f$ is the expectation operator for firms. In this section, we consider two situations. In the first one, we assume that firms disagree with households and always expect 0-inflation, as this would be the case if the economy would always remain under monetary dominance. In such a situation, firms then disagree with households, who – if they disagree on the future policy regime – at least agree that they will discover the actual future regime at date $T$. In the second situation, we assume that firms share the same beliefs as households.

In both cases, we obtain that households agree to disagree on the future policy regime and, consistently with our empirical results, that the connection between debt expectations and inflation expectations in the future appears only through households expecting fiscal dominance. Comparing the two situations that we investigate, we also obtain that the expectation of higher future inflation translates into inflation in the short-run only to the extent that firms internalize the expectations of some of the households to shift to fiscal dominance.

**When firms disagree with households.** In the panel (a) of Figure 6, we plot the path for inflation expected by both households expecting fiscal dominance (dashed line) and households expecting monetary dominance (plain line). After date $T$, the two types of households disagree on the path of inflation. Households expecting a shift to fiscal dominance also expect positive inflation after this date – and consistently with our findings, a higher debt expectation leads to a higher inflation expectation as shown in panel (b) – in this graph, we report the responses to a shock of 1% of the debt-to-GDP ratio and to a shock of 10% of this ratio. In contrast, households expecting monetary dominance expect 0 inflation.

Before date T ($T = 20$ in the graph), both types of households agree on inflation and, thus, the two lines overlap each other. As this can be observed, both types of households agree on a low level of inflation. The main reason is that, as firms expect 0 inflation, active monetary policy is sufficient to drive down inflation to 0 almost completely. Indeed, at date-$T-1$, households agree to disagree on the future policy regime. On the one hand, households expecting monetary dominance expects 0 inflation and households expecting fiscal dominance expects positive inflation. The resulting inflation expectation leads households to consume more and to increase the output

gap, which is inflationary. However, an active monetary policy increases sufficiently the nominal interest rate to reduce the output gap and, thus, inflation.

As the active monetary policy successfully avoids date-$T-1$ inflation expectations to be inflationary at $T-1$, this holds even more in previous periods, in which then almost no inflation may arise.

**When firms share the same beliefs as households.** In the panel (c) of Figure 6, we plot the path for inflation when firms share the same beliefs as households in the case in which monetary policy is active before date $T$. As this can be observed, such a situation leads to sizable inflation before date $T$. Indeed, in contrast to the previous situation, before date T, firms also expect inflation. As a result, unless monetary policy engineers a sufficiently negative output gap, current inflation will end up being positive. In panel (d), we plot the same inflation path but in the case in which monetary policy is passive before date $T$. As in the flexible price case, a passive monetary policy before date $T$ leads to much stronger current inflation than an active monetary policy. In sum, these findings illustrate the key role of current monetary policy and the one of firms for fiscal dominance risk to be inflationary.

**Optimal policy.** To what extent fiscal dominance risk may affect current monetary policy itself via the expectation channel? We endogenize central bank's monetary policy decision at date 0. To this purpose, we now endow the central bank with a loss function:

$$L_t = \sum_{k \geq t} (\pi_t)^2 + \lambda (y_t)^2$$

with $\lambda \geq 0$.[18] We then consider the problem of the central bank at date 0 regarding its monetary policy from date 0 to date $T-1$, taking as given private sector expectations at that date. The problem solved by the central bank is:

$$\begin{aligned} &\min \sum_{0 \leq k \leq T-1} (\pi_t)^2 + \lambda (y_t)^2, \\ &\pi_t = \beta \pi_{t+1} + \kappa y_t \text{ for } 0 \leq t \leq T-2, \\ &\pi_{T-1} = \beta E_{T-1} \pi_T + \kappa y_{T-1} \end{aligned}$$

[18] Agents are heterogenous, as they do not share the same beliefs and so they do not take the same actions. For simplicity, we omit the terms in the loss function resulting from heterogeneity. We refer the interested reader to Andrade et al. (2019) and, in particular, to Section 3 in the online appendix for the derivation and the implications of the welfare loss function with heterogenous beliefs.

where $E_{T-1}\pi_T$ is given. Notice that the Euler equation is not a constraint in the central bank's problem as the central bank can always adjust the nominal interest $i_t$.[19] We relegate the derivation of the optimal solution to Appendix A.3.

In Figure 6, we plot the optimal inflation path for different shares of households expecting fiscal dominance (panel (a)) and for different weights $\lambda$ attached to output stabilization (panel (b)). A larger share of households expecting fiscal dominance leads the central bank to accept positive levels of inflation in the present. Fighting inflation expectation requires to run negative output gaps: a larger share of households expecting fiscal dominance leads to a higher average inflation expectation $E_{T-1}\pi_T$, thus requiring larger negative output gaps to reduce inflation. The extent to which fiscal dominance households are inflationary then depends on the weight attached by the central bank to output stabilization: as illustrated by panel (b), the larger is this weight, the costlier it is to run negative output gaps and the less the central bank stabilizes inflation.

Some comments are in order. First, these findings illustrate that the mere presence of fiscal dominance expectations lead the central bank to accept higher current inflation – even though monetary policy is not constrained by fiscal policy, either currently or even in the future.

Second, these findings also illustrate that current monetary policy cannot do anything about fiscal dominance expectations: in our model, agents agree to disagree also with the central bank that the future policy regime is going to be fiscal dominance. Framed differently, current monetary dominance does not per se rule out future fiscal dominance. Such a finding is connected to the speech by Schnabel (2024) and, more specifically, to the following quote:

> The determined monetary policy response to the steepest rise in inflation in the history of the euro area convincingly demonstrates that the ECB has by no means deviated from its price stability mandate as predicted by the fiscal dominance theory.

Our model indicates that this can happen not directly through actions but only indirectly via how actions may potentially affect private agents' beliefs regarding future fiscal dominance risk.[20] In contrast, our findings are more in line with the idea to scrutinize fiscal dominance risk in long-term inflation expectations as also put forward by Schnabel (2024).

[19] The Euler equation is potentially a constraint for the central bank only when adding a constraint on the nominal interest rate as the ELB. However, in our case, the optimal policy features monetary tightening so that a lower bound on interest rates is not likely to be relevant.

[20] Modelling such learning would require, for example, to embed asymmetric information in a model in which fiscal dominance is the endogenous outcome of strategic interactions as in Barthélemy et al. (2024).

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Table 1: Beliefs about fiscal constraints

| | All | ECB not able to raise rate | | | |
|---|---|---|---|---|---|
| | | very likely | likely | neutral | unlikely/ very unlikely |
| All | | 33.2 | 47.5 | 14.4 | 4.9 |
| Default in EA | | | | | |
| very likely | 37.2 | 18.1 | 15.7 | 2.4 | 1.0 |
| likely | 41.9 | 10.9 | 22.4 | 6.8 | 1.8 |
| neutral | 11.9 | 2.3 | 5.0 | 4.0 | 0.6 |
| unlikely/very unlikely | 9.0 | 1.9 | 4.4 | 1.3 | 1.5 |

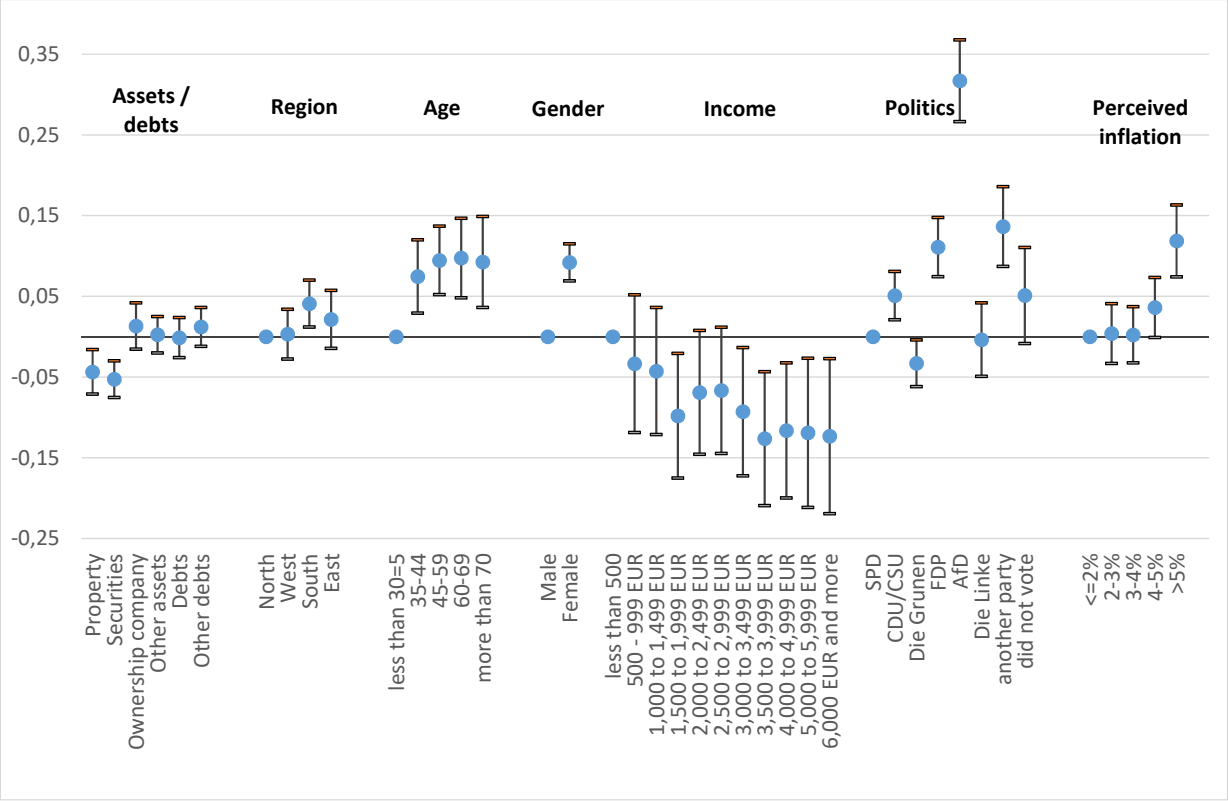
Note: this table reports proportions of households in % answering to the question how likely is it that within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, as this would make it too expensive for one or several of the euro area countries to finance their government debt and to the question how likely is it that within the next 5 years at least one country in the euro area will be unable to repay its government debt on time.

Table 2: Main Determinants of Scenarios - Marginal effects - "Very likely"

| | (1) | (2) |
|---|---|---|
| | Default | ECB rate |
| Debt FR | 0.0192 | 0.0076 |
| | (0.0206) | (0.0209) |
| Debt IT | -0.00454 | 0.0116 |
| | (0.0206) | (0.0209) |
| Debt DE | 0.0052 | 0.0316 |
| | (0.0205) | (0.0212) |
| ECB purchase | 0.0148 | 0.0164 |
| | (0.0208) | (0.0210) |
| Weidmann statement | -0.0184 | -0.0046 |
| | (0.0204) | (0.0208) |
| Observations | 5,957 | 5,962 |

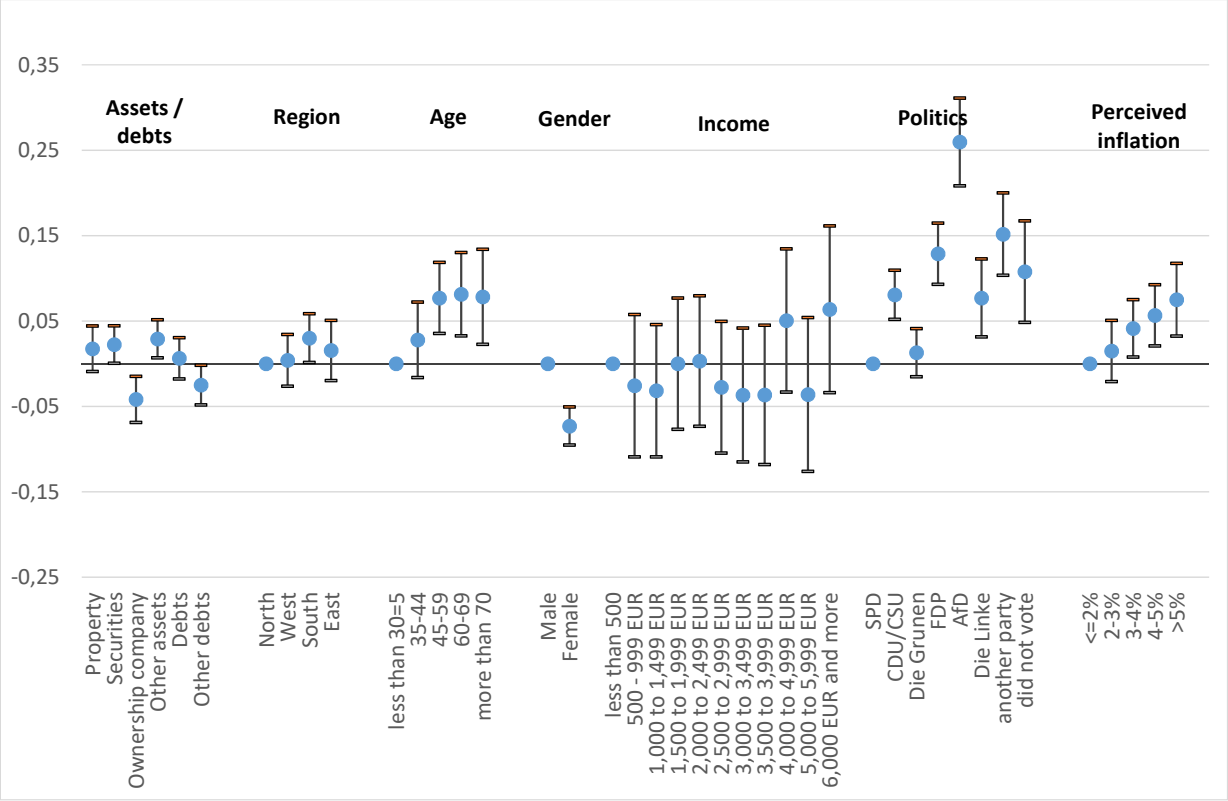
Note: this table reports marginal effects of a Probit model where the endogenous variable is a dummy variable equal to one is one household answers that this very likely that "'within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, as this would make it too expensive for one or several of the euro area countries to finance their government debt"' or "'within the next 5 years at least one country in the euro area will be unable to repay its government debt on time." We report results associated with the treatment variable but several control variables are included: age, gender, income, region, political leaning, asset/debt holdings, city size, education, employment status. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Figure 2: Determinants of the scenario "Default in the EA"



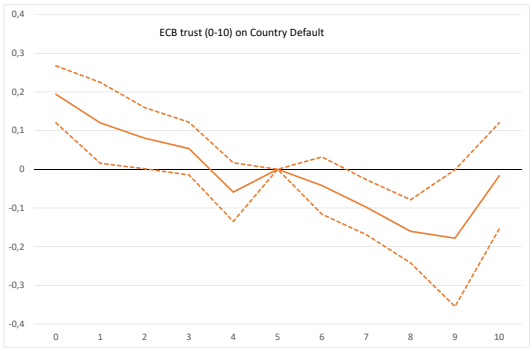

Note: this figure reports marginal effects from a Probit regression where the endogenous variable is a dummy variable equal to one when a household reports that within the next 5 years, it is very likely that at least one country in the euro area will be unable to repay its government debt on time. "Assets/debts" correspond to dummy variables equal to 1 when a given household reports non-zero holdings of a given type of asset / loans or advances: "Property" corresponds to "Real estate", "Securities" corresponds to shares, bonds including funds/ETFs, "Ownership company" corresponds to ownership of/equity in unlisted businesses or companies, "Other assets" corresponds to all other types of assets; "Debts" corresponds to outstanding loans secured by real estate (mortgage loans), "Other debts" corresponds to other outstanding loans (e.g. overdraft facilities, consumer credit/loans for goods and services, loans to finance an enterprise or a professional activity, loans from friends or family). Additional controls are included for city size, education, professional status, results are not reported since most parameters are not statistically significant.

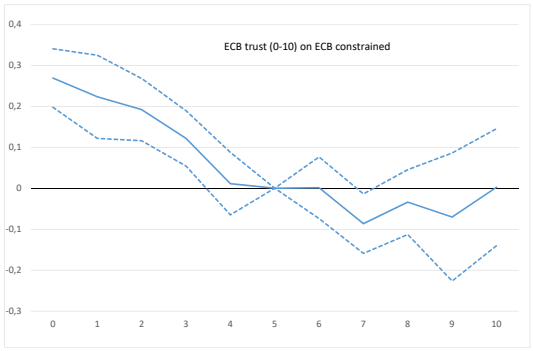
Figure 3: Determinants of the scenario "ECB not able to raise rates"

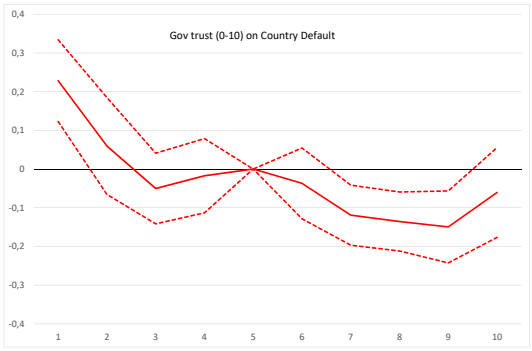


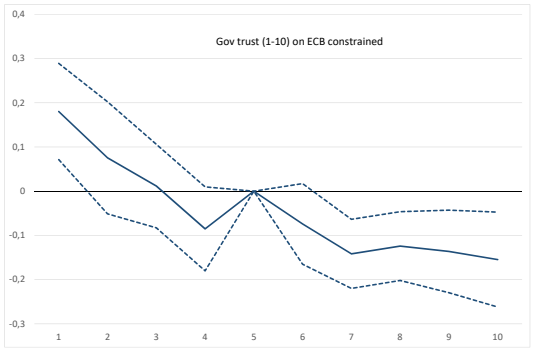

Note: this figure reports marginal effects from a Probit regression where the endogenous variable is a dummy variable equal to one when a household reports that it is very likely that within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, as this would make it too expensive for one or several of the euro area countries to finance their government debt. "Assets/debts" correspond to dummy variables equal to 1 when a given household reports non-zero holdings of a given type of asset / loans or advances: "Property" corresponds to "Real estate", "Securities" corresponds to shares, bonds including funds/ETFs, "Ownership company" corresponds to ownership of/equity in unlisted businesses or companies, "Other assets" corresponds to all other types of assets; "Debts" corresponds to outstanding loans secured by real estate (mortgage loans), "Other debts" corresponds to other outstanding loans (e.g. overdraft facilities, consumer credit/loans for goods and services, loans to finance an enterprise or a professional activity, loans from friends or family). Additional controls are included for city size, education, professional status, results are not reported since most parameters are not statistically significant.

Figure 4: Effect of Trust on Country Default and on ECB constrained




(a) Country default

(b) ECB constrained

Notes: This figure reports the marginal effects of the score of trust in the ECB or the German government on the probability that a respondent answer that it is very likely that one country of the euro area will be in default (left panel) and that it is very likley that the ECB will be constrained (right panel). Additional controls are included for age, gender, voting party, uncertainty, city size, education, professional status.

Table 3: Beliefs about fiscal contraints and macroeconomic outlook

| | Quantitative answers in % | | | | % of HHs exp. an increase | |
|---|---|---|---|---|---|---|
| | Perceived infl. | Expected Infl. 1Y | Expected Infl. LT | Saving IR | Econ growth | Tax |
| Default in EA | | | | | | |
| Very likely | 4.43 | 5.86 | 5.61 | 0.31 | 32.2 | 44.6 |
| Likely | 4.05 | 4.81 | 4.57 | 0.30 | 41.4 | 24.2 |
| Others | 3.89 | 4.62 | 3.90 | 0.36 | 51.5 | 15.5 |
| ECB constrained not to raise rate | | | | | | |
| Very likely | 4.24 | 5.39 | 5.00 | 0.21 | 37.7 | 41.6 |
| Likely | 4.11 | 4.91 | 4.66 | 0.36 | 42.0 | 25.0 |
| Others | 4.15 | 5.40 | 4.87 | 0.39 | 39.3 | 22.2 |

Note: Inflation rates and saving interest rates in percents. For Econ growth and tax.: shares of individuals expecting an increase in the variables. EA public debt (quantitative answer) we report the average quantitative post-treatment answers given by households on debt to income ratios for the euro area. Observations below the 1st percentile and above the 99th have been dropped.

Table 4: Expectation of fiscal constraints and expected inflation

| | Inf. Percep. | Inf. Exp. 1Y | Inf. Exp. LT |
|---|---|---|---|
| *ECB constrained* | | | |
| Very likely | 0.149*** | 0.352*** | 0.0755 |
| | (0.0398) | (0.0486) | (0.0509) |
| Likely | 0.0567 | 0.115*** | -0.0387 |
| | (0.0357) | (0.0439) | (0.0457) |
| Other answers | Ref. | Ref. | Ref. |
| *EA country default* | | | |
| Very likely | -0.0182 | 0.221*** | 0.322*** |
| | (0.0374) | (0.0458) | (0.0470) |
| Likely | -0.0497 | 0.114*** | 0.0840** |
| | (0.0334) | (0.0407) | (0.0408) |
| Other answers | Ref. | Ref. | Ref. |
| Observations | 5,518 | 5,597 | 5,381 |
| $R^2$ | 0.093 | 0.247 | 0.280 |

Note: Estimates of regressions of inflation expectations on default and fiscal dominance scenarios. Controls: expectations of unemployment, rents, lending rates, saving rates, property prices, economic growth, fuel prices, stock prices, taxes. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions

| | Debt | Debt | Inflation | Inflation | Debt | Debt | Inflation | Inflation |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Debt FR | 13.60*** | 12.73*** | 0.0924*** | 0.0884*** | | | | |
| | (2.518) | (2.427) | (0.0352) | (0.0333) | | | | |
| Debt IT | 13.41*** | 12.86*** | 0.0697** | 0.0702** | | | | |
| | (2.520) | (2.428) | (0.0352) | (0.0333) | | | | |
| Debt DE | 4.362* | 3.676 | 0.0421 | 0.0521 | | | | |
| | (2.520) | (2.430) | (0.0353) | (0.0334) | | | | |
| ECB QE | -3.698 | -3.359 | 0.0448 | 0.0482 | | | | |
| | (2.525) | (2.433) | (0.0353) | (0.0334) | | | | |
| Weidmann Statement | 5.604** | 5.455** | 0.0542 | 0.0566* | | | | |
| | (2.520) | (2.428) | (0.0352) | (0.0333) | | | | |
| Debt FR+IT+DE | | | | | 10.53*** | 9.604*** | 0.0684** | 0.0700*** |
| | | | | | (2.091) | (1.984) | (0.0290) | (0.0271) |
| Other treatments | | | | | 1.089 | 1.034 | 0.0498 | 0.0527* |
| | | | | | (2.220) | (2.106) | (0.0307) | (0.0287) |
| Controls | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 5,740 | 5,740 | 5,739 | 5,740 | 5,773 | 5,773 | 5,771 | 5,772 |
| $R^2$ | 0.013 | 0.008 | 0.084 | 0.079 | 0.001 | 0.001 | 0.590 | 0.596 |

Note: this table reports the results of Huber regressions where the endogenous variable is the debt to income ratio reported by households after the treatment or inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions – Qualitative variables

| | Debt | | | Inflation | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Marginal effects | Ordered | Positive | Negative | Ordered | Positive | Negative |
| Debt FR | 0.0225 | 0.103 | -0.151* | 0.0407** | 0.0991* | -0.130* |
| | (0.0163) | (0.0673) | (0.0914) | (0.0192) | (0.0589) | (0.0691) |
| Debt IT | 0.000583 | 0.0157 | -0.0610 | 0.0361* | 0.113* | -0.0683 |
| | (0.0160) | (0.0662) | (0.0889) | (0.0192) | (0.0589) | (0.0680) |
| Debt DE | -0.0150 | -0.0521 | -0.0475 | 0.0351* | 0.100* | -0.0828 |
| | (0.0158) | (0.0660) | (0.0891) | (0.0192) | (0.0591) | (0.0686) |
| ECB QE | -0.0595*** | -0.265*** | 0.177** | 0.0203 | 0.0597 | -0.0458 |
| | (0.0152) | (0.0645) | (0.0842) | (0.0191) | (0.0591) | (0.0679) |
| Weidmann statement | -0.0475*** | -0.181*** | 0.0613 | 0.0344* | 0.0572 | -0.151** |
| | (0.0153) | (0.0646) | (0.0861) | (0.0191) | (0.0591) | (0.0692) |
| Observations | 5,965 | 5,955 | 5,934 | 5,773 | 5,765 | 5,758 |

Note: this table reports the results of marginal effects of Probit regressions where the endogenous variable is the answers to debt to income ratio evolutions reported by households after the treatment or the qualitative inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7: Main reason for expected debt/GDP evolution

| % of answers | All | ECB constrained | | Default in EA | |
|---|---|---|---|---|---|
| | | Others | Very likely | Others | Very likely |
| *Debt/GDP increase (78.2%)* | | | | | |
| Decrease taxes | 0.7 | 0.7 | 0.6 | 0.7 | 0.6 |
| Increase public expenditures | 55.6 | 55.7 | 55.2 | 59.9 | 49.2 |
| Economic growth weaker | 40.1 | 39.7 | 40.8 | 36.0 | 46.1 |
| Increase interest rates | 3.7 | 3.9 | 3.4 | 3.4 | 4.1 |
| *Debt/GDP decrease (7.5%)* | | | | | |
| Increase Taxes | 23.5 | 20.9 | 31.8 | 19.6 | 33.9 |
| Decrease public expenditures | 12.5 | 13.0 | 11.2 | 12.9 | 11.6 |
| Economic growth stronger | 46.5 | 49.9 | 35.5 | 47.6 | 43.8 |
| Low interest rates | 17.5 | 16.2 | 21.5 | 19.9 | 10.7 |

Note: Conditional on reporting an increase or a decline in debt/GDP ratio (respectively 78.2% and 7.5% of households), this table reports the percentage of households for each main reason to explain the increase/decline in debt/GDP ratio. The list of reasons is given by the questionnaire and households had to choose only one among the different options. The percentages sum to 100 over the different options conditional on reporting an increase or a decline of the debt/GDP ratio. In column (1), we report the % for all households reporting a increase/decline in the debt/GDP ratio, in columns (2) and (3) we split the sample according to whether households think it is very likely that within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, in columns (4) and (5), we split the sample according to whether households think it is very likely that at least one country in the euro area will be unable to repay its government debt on time.

Table 8: Treatment effects on the main reason for expected increase in debt/GDP ratio

| Reason | Tax | Gov | Econ growth | Rate |
|---|---|---|---|---|
| Debt - FR | -0.00214 | -0.0545** | 0.0501** | 0.00757 |
| | (0.00389) | (0.0244) | (0.0242) | (0.00910) |
| Debt - IT | 0.00680 | -0.0470* | 0.0440* | -0.00158 |
| | (0.00477) | (0.0245) | (0.0243) | (0.00852) |
| Debt - DE | 0.00634 | -0.0446* | 0.0342 | 0.00599 |
| | (0.00515) | (0.0247) | (0.0245) | (0.00911) |
| ECB purchases | -0.000773 | -0.0431* | 0.0385 | 0.00693 |
| | (0.00432) | (0.0252) | (0.0249) | (0.00941) |
| Weidmann | -0.00185 | -0.000819 | 0.000368 | 0.00280 |
| | (0.00374) | (0.0249) | (0.0246) | (0.00918) |
| Observations | 3,370 | 4,640 | 4,640 | 4,638 |

Note: this table reports marginal effects of treatments on the main reasons why public debt/GDP will increase in the euro area. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 9: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions – By fiscal constraint regime

| | Country default | | | | ECB | | | |
|---|---|---|---|---|---|---|---|---|
| | Likely+others | | Very likely | | Likely+others | | Very likely | |
| | Debt | Inflation | Debt | Inflation | Debt | Inflation | Debt | Inflation |
| | *Panel (a) : Quantitative variables* | | | | | | | |
| Debt FR+IT+DE | 11.60*** | 0.0268 | 6.698* | 0.159** | 11.07*** | 0.0945*** | 5.986 | 0.0195 |
| | (2.445) | (0.0259) | (3.555) | (0.0620) | (2.385) | (0.0324) | (3.678) | (0.0496) |
| Other treatments | 2.014 | 0.0554** | 0.197 | 0.0756 | 2.817 | 0.0743** | -1.683 | 0.0125 |
| | (2.593) | (0.0275) | (3.765) | (0.0658) | (2.519) | (0.0342) | (3.925) | (0.0529) |
| Observations | 3,594 | 3,626 | 2,134 | 2,133 | 3,810 | 3,835 | 1,915 | 1,920 |
| $R^2$ | 0.094 | 0.001 | 0.083 | 0.003 | 0.082 | 0.093 | 0.112 | 0.807 |
| | *Panel (b): Qualitative - Proba. of increase* | | | | | | | |
| Debt FR+IT+DE | -0.0657 | 0.0355 | 0.235** | 0.201** | -0.0151 | 0.123** | 0.103 | 0.0506 |
| | (0.0660) | (0.0613) | (0.100) | (0.0812) | (0.0615) | (0.0586) | (0.104) | (0.0826) |
| Other treatments | -0.253*** | 0.0606 | -0.160 | 0.0402 | -0.205*** | 0.0675 | -0.210** | 0.0428 |
| | (0.0692) | (0.0648) | (0.102) | (0.0863) | (0.0642) | (0.0621) | (0.107) | (0.0880) |
| Observations | 3,715 | 3,619 | 2,189 | 2,120 | 3,960 | 3,836 | 1,971 | 1,921 |

Note: this table reports the results of Huber regressions where the endogenous variable is the debt to income ratio reported by households after the treatment or inflation expectations revisions for different subgroups of households depending on their answers to Questions 5 and 6. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions: role of trust, uncertainty and pessimism – quantitative variables

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | High uncertainty | | Low trust | | Pessimism | |
| | Debt | Inflation | Debt | Inflation | Debt | Inflation |
| Debt FR+IT+DE | 12.63*** | -0.00658 | 13.58*** | -0.00346 | 8.614*** | 0.0283 |
| | (3.384) | (0.0433) | (3.810) | (0.0305) | (2.993) | (0.0408) |
| Other treatments | 1.799 | 0.0383 | 5.221 | 0.0273 | 0.139 | 0.0382 |
| | (3.628) | (0.0464) | (4.011) | (0.0322) | (3.184) | (0.0433) |
| Fiscal constraint | 1.873 | 0.0242 | 5.889 | -0.0238 | 1.317 | 0.0272 |
| | (3.764) | (0.0480) | (4.923) | (0.0394) | (3.653) | (0.0496) |
| Debt FR+IT+DE # Fiscal constraint | -6.224 | 0.0769 | -10.75* | 0.108** | -5.454 | 0.0661 |
| | (4.298) | (0.0548) | (5.575) | (0.0446) | (4.175) | (0.0567) |
| Other treatments # Fiscal constraint | -4.399 | -0.0193 | -7.284 | -0.0191 | -2.595 | -0.0287 |
| | (4.570) | (0.0583) | (5.939) | (0.0475) | (4.427) | (0.0601) |
| Hetero | -1.571 | -0.0676 | -0.227 | -0.0559 | -7.264** | -0.0471 |
| | (3.566) | (0.0456) | (4.817) | (0.0386) | (3.519) | (0.0478) |
| Debt FR+IT+DE # Hetero | -0.660 | 0.0944* | 0.956 | 0.00636 | 6.629* | 0.0470 |
| | (4.109) | (0.0525) | (5.423) | (0.0435) | (4.015) | (0.0546) |
| Other treatments # Hetero | 1.698 | 0.0365 | -3.737 | 0.107** | 4.140 | 0.0572 |
| | (4.375) | (0.0559) | (5.752) | (0.0461) | (4.256) | (0.0579) |
| Observations | 5,387 | 5,439 | 3,390 | 3,409 | 5,728 | 5,758 |
| $R^2$ | 0.079 | 0.028 | 0.091 | 0.227 | 0.080 | 0.602 |

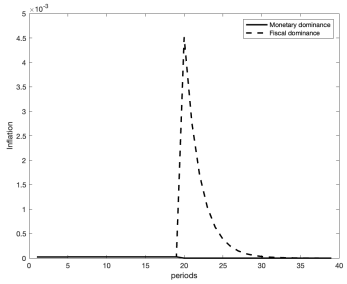
Note: this table reports the results of Huber regressions where the endogenous variable is the debt to income ratio reported by households after the treatment or inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions : role of trust, uncertainty and pessimism – qualitative variables

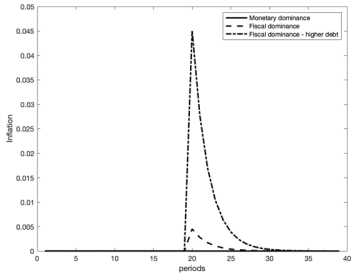
| | High uncertainty | | Low trust | | Pessimism | |
|---|---|---|---|---|---|---|
| | Debt | Inflation | Debt | Inflation | Debt | Inflation |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Debt FR+IT+DE | 0.00810 | -0.0342 | -0.000164 | -0.0269 | -0.0361 | 0.0117 |
| | (0.0252) | (0.0306) | (0.0291) | (0.0346) | (0.0223) | (0.0273) |
| Other treatments | -0.0328 | -0.0245 | -0.0513* | -0.000493 | -0.0951*** | 0.0137 |
| | (0.0270) | (0.0328) | (0.0307) | (0.0365) | (0.0237) | (0.0290) |
| Fiscal constraint | 0.0286 | -0.0144 | 0.0174 | -0.0203 | 0.0337 | -0.00504 |
| | (0.0280) | (0.0339) | (0.0374) | (0.0447) | (0.0272) | (0.0332) |
| Debt FR+IT+DE # Fiscal constraint | 0.0537* | 0.0846** | 0.0471 | 0.112** | 0.0480 | 0.0699* |
| | (0.0320) | (0.0387) | (0.0424) | (0.0507) | (0.0311) | (0.0380) |
| Other treatments # Fiscal constraint | 0.0259 | 0.0117 | 0.0334 | -0.000467 | 0.0221 | -0.000765 |
| | (0.0340) | (0.0412) | (0.0451) | (0.0539) | (0.0329) | (0.0403) |
| Hetero | 0.00225 | -0.0721** | 0.0581 | -0.0250 | -0.0188 | -0.00453 |
| | (0.0266) | (0.0322) | (0.0366) | (0.0439) | (0.0262) | (0.0320) |
| Debt FR+IT+DE # Hetero | -0.0434 | 0.0953** | -0.00214 | -0.0178 | 0.0455 | 0.00375 |
| | (0.0306) | (0.0371) | (0.0413) | (0.0494) | (0.0299) | (0.0366) |
| Other treatments # Hetero | -0.0790** | 0.0879** | -0.0193 | 0.0606 | 0.0456 | 0.0202 |
| | (0.0326) | (0.0395) | (0.0437) | (0.0523) | (0.0317) | (0.0388) |
| Observations | 5,521 | 5,440 | 3,487 | 3,410 | 5,933 | 5,758 |
| $R^2$ | 0.074 | 0.026 | 0.068 | 0.033 | 0.072 | 0.023 |

Note: this table reports the results of Huber regressions where the endogenous variable is qualitative evolution of the debt to income ratio reported by households after the treatment or qualitative inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** p<0.01, ** p<0.05, * p<0.1.

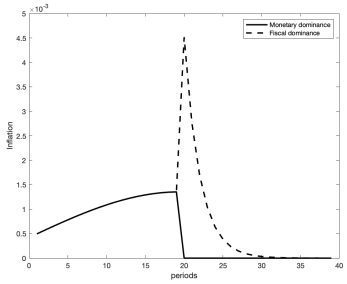
Figure 5: Inflation path – sticky price model.



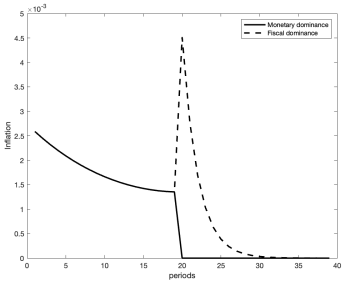

(a) Firms always expect monetary dominance




(b) Effects of higher debt expectations



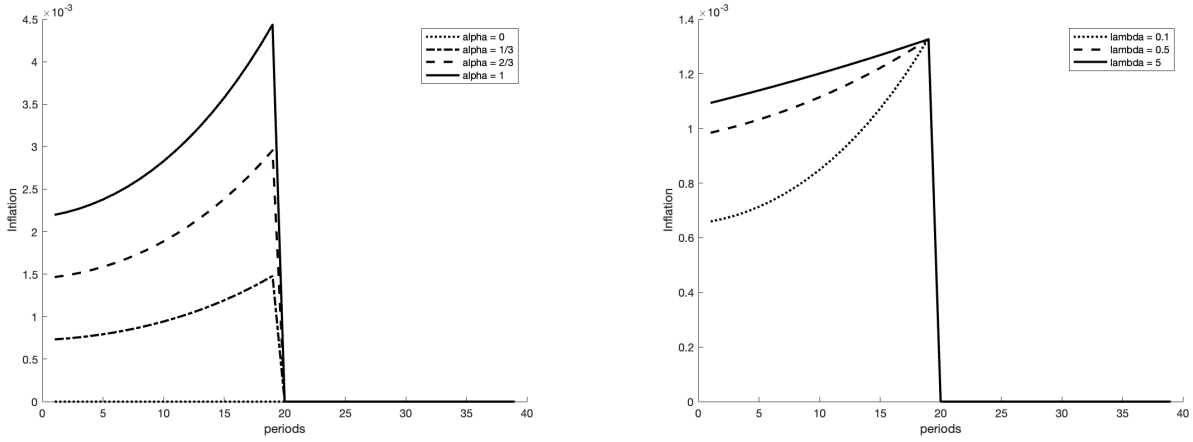

(c) Firms share the same beliefs as households – Active monetary policy




(d) Firms share the same beliefs as households – Passive monetary policy

Note: In these two graphs, we calibrate the share of fiscal dominance households to be 30%, the discount factor is $\beta = .99$, the policy reaction to inflation is $\phi^M = 1.5$ under monetary dominance and $\phi^F$ under fiscal dominance, the fiscal reaction to debt is $\gamma^M = 1.5$ under monetary dominance and $\gamma^F = 0.5$ under fiscal dominance. The elasticity of intertemporal substitution is 0.5. The shock to debt-to-GDP is calibrated at 1% in line with our empirical results.

Figure 6: Optimal inflation path.




(a) Heterogenous shares of fiscal dominance households

(b) Heterogenous weights on output gap

Note: In these two graphs, if not otherwise specified, we calibrate the share of fiscal dominance households to be 30% and the weight on output gap to be 0.2, the discount factor is $\beta = .99$. After date T, the policy reaction to inflation is $\phi^M = 1.5$ under monetary dominance and $\phi^F$ under fiscal dominance, the fiscal reaction to debt is $\gamma^M = 1.5$ under monetary dominance and $\gamma^F = 0.5$ under fiscal dominance.The shock to debt-to-GDP is calibrated at 1% in line with our empirical results.

# Online Appendix – Household beliefs about fiscal dominance

**Andrade-Gautier-Mengus-Moench-Schmidt**

**(Not for publication)**

# A Model and Proofs

## A.1 Microfoundations

We first provide microfoundations to the model presented in the main text. The household's side closely follows Andrade et al. (2019). The budget constraint of the government follows Leeper (1991) and, more precisely, Bianchi et al. (2022).

**The Euler equation under heterogeneous beliefs.** A family of households is constituted by a continuum of mass 1 of agents indexed by $i \in [0,1]$. Each agent decides to consume and save in order to maximize:

$$U = \int_0^1 \sum_{t=0}^{\infty} E_{i,0}\beta^t \frac{(C_{i,t})^{1-\sigma}}{1-\sigma} di.$$

in which $E_{i,t}$ is agent i's expectation operator, $C_{i,t}$ denotes date-t consumption of agent $i$. $\beta \in (0,1)$ is the discount factor, $\sigma > 0$ is the inverse of the intertemporal elasticity of substitution. Each agent faces the budget constraint:

$$P_t C_{i,t} + Q_t B_{i,t} + P_t T_t = P_t y + B_{i,t-1} + Z_{i,t}$$

where $B_{i,t}$ denotes her holdings of bonds, $P_t$ denotes date-t price level, $Q_t$ the unit price of a bond, $T_t$ lump sum taxes paid by households and $Z_{i,t}$ denotes a nominal intra-family transfer.

Agents may decide to implement transfers within the family, once they have observed shocks. We assume that agents decide sequentially on these transfers. A transfer $\{Z_{i,t}\}_{i\in[0,1]}$ should be budget-balanced, that is:

$$\int_0^1 Z_{i,t} di = 0. \tag{23}$$

We assume that a transfer is implemented if and only if every agent agrees to implement it. An agent $i$ agrees with a transfer scheme whenever:

$$E_{i,t}\left[U_t | \{\hat{Z}_{i,t}\}_{i\in[0,1]}\right] \geq E_{i,t}\left[U_t | \{Z_{i,t}\}_{i\in[0,1]}\right]$$

for all budget-balanced $\{Z_{i,t}\}_{i\in[0,1]}$.

**The Euler equation.** Given the scheme of transfers, the individual path for consumption solves:

$$\max \sum_{t=0}^{\infty} E_{i,0}\beta^t \frac{(C_{i,t})^{1-\sigma}}{1-\sigma},$$
$$\text{s.t. } P_t C_{i,t} + Q_t B_{i,t} + P_t T_t = P_t y + B_{i,t-1} + Z_{i,t}.$$

The maximization yields:

$$(C_{i,t})^{-\sigma} = E_{t,i}\beta(C_{i,t+1})^{-\sigma}\frac{P_t}{Q_t P_{t+1}}$$

Denoting by $\pi_t$ the date-t inflation rate and by $i_t = -\log Q_t$ the nominal interest rate, we obtain the standard log-linearized Euler equation:

$$c_{i,t} = -\frac{1}{\sigma}(i_t - E_{i,t}\pi_{t+1}) + E_{i,t}c_{i,t+1}. \tag{24}$$

**Intra-Family transfers.** First, note that, at any date $t \geq T$, all agents expect to share the same beliefs on future policy regimes. As a result, if they face any difference in wealth, e.g., due to difference in bondholdings $B_{i,t}$, they all agree to reshare wealth equally so as to maximize $U_t$. Second before $T$, agents disagree to make transfers, so that $Z_{i,t} = 0$ for all $i \in [0,1]$. Indeed, agents are not ready to make transfers to agents with which they disagree as this would translate into a suboptimal use of resources.

**Budget constraint of the government.** The budget constraint is:

$$B_t = D_t + R_{t-1}B_{t-1}$$

Dividing this constraint by the price level $P_t$, we obtain:

$$\frac{B_t}{P_t} - \frac{D_t}{P_t} = \frac{R_{t-1}}{\Pi_t}\frac{B_{t-1}}{P_{t-1}}$$

with $\Pi_t = P_t/P_{t-1}$ the gross inflation rate.

$b_t$ is the deviation from the steady state of real debt:

$$\frac{B_t}{P_t} = b(1+b_t)$$

with $b$ the steady state value. Similarly, we have

$$\frac{D_t}{P_t} = d(1+\delta_t)$$
$$R_t = R(1+i_t)$$
$$\Pi_t = \Pi(1+\pi_t)$$

The development at order 0 of the budget constraint then yields:

$$b - d = \frac{R}{\Pi}b$$

and the order 1 yields:

$$bb_t - d\delta_t = \frac{R}{\Pi} b \left( i_t - \pi_t + b_{t-1} \right) \tag{25}$$

In the model the long term real interest rate $R/\Pi$ is equal to the inverse of the discount factor $\beta \in (0,1)$, which describes the relative preference for the present of the private sector. This connection stems from the Euler equation that is the first order condition of the consumption-saving problem solved by households in standard macroeconomic models. The basic standard Euler equation writes:

$$(C_{i,t})^{-\sigma} = \beta R_{t-1}/\Pi_t (C_{i,t+1})^{-\sigma}.$$

In steady state, $C_{i,t} = C_{i,t+1}$ for all $i \in [0,1]$, and $1 = \beta R/\Pi$, which we use here.

Thus, from the order 0, we have $\beta(b-d) = b$ and, thus, $d = b\beta^{-1}(1-\beta)$. (25) can then be rewritten, after simplifying by $b$:

$$b_t = \beta^{-1} \left( i_t - \pi_t + b_{t-1} + (1-\beta)\delta_t \right)$$

As GDP $Y$ is constant, $b_t$ also denotes the debt-to-GDP ratio.

### A.2 Proof of Proposition 1

At date $T$, agents expect all agents to share resources so that their consumption satisfies $C_{i,T} = Y$, for all $i \in [0,1]$, and, thus, $c_{i,T}$. At date $T-1$, market clearing implies that:

$$\int c_{i,T-1} di = 0.$$

Plugging the Euler equation $c_{i,T-1} = -1/\sigma \left( i_{T-1} - E_{i,T-1}\pi_T \right)$ and the market clearing condition at date $T-1$, we then obtain that:

$$i_{T-1} = \int E_{i,T-1}\pi_T di.$$

The rest of the proposition is proven in the main text.

### A.3 Derivation of optimal monetary policy

The first order conditions from the central bank's problem are as follows:

$$\pi_t = -\mu_t + \beta\mu_{t-1} \text{ for } 0 \leq t \leq T-1,$$
$$\lambda y_t = \kappa \mu_t \text{ for } 0 \leq t \leq T-1.$$

with $\mu_t$ the Lagrange multiplier associated with the date-t NKPC with the convention that $\mu_{-1} = 0$. The optimal solution then solves the following system of equations for $0 \leq t \leq T-2$:

$$\begin{aligned}\pi_t &= \beta\pi_{t+1} + \kappa y_t \\ \pi_t &= -\mu_t + \beta\mu_{t-1}, \\ y_t &= \kappa/\lambda\mu_t.\end{aligned}$$

with two boundary conditions: $\mu_{-1} = 0$ and $\pi_{T-1} = \beta E_{T-1}\pi_T + \kappa y_{T-1}$.

Combining these equations together, we find that $\mu_t$ solves the following differential equation:

$$\mu_{t+1} - \left(\beta^{-1} + \beta + \kappa^2/\lambda\beta^{-1}\right)\mu_t + \mu_{t-1} = 0$$

The characteristic polynomial admits two real roots $r_1$ and $r_2$ as:

$$\left(\beta^{-1} + \beta + \kappa^2/\lambda\beta^{-1}\right)^2 - 4 = \left(\beta^{-1} + \beta + \kappa^2/\lambda\beta^{-1} - 2\right)\left(\beta^{-1} + \beta + \kappa^2/\lambda\beta^{-1} + 2\right) > 0$$

for any $\beta \in [0, 1]$.

The date-0 solution is then $\mu_t = Ar_1^t + Br_2^t$ with $(A, B)$ solution to:

$$\begin{aligned}&(Ar_1 + Br_2) - \left(\beta^{-1} + \beta + \kappa^2/\lambda\beta^{-1}\right)(A + B) = 0 \\ &\left(\frac{\kappa^2}{\lambda} - 1\right)\left(Ar_1^{T-1} + Br_2^{T-1}\right) + \beta\left(Ar_1^{T-2} + Br_2^{T-2}\right) = \beta E_{T-1}\pi_T\end{aligned}$$

# B Additional empirical evidence

## B.1 Additional figures and tables

Table A.1: Expectation of fiscal constraints and macro variables

| | Inf. Exp. 5Y | Inf. Exp. 10Y | Home prices | Saving rates |
|---|---|---|---|---|
| *ECB constrained* | | | | |
| Very likely | 0.0583 | 0.0824 | -0.0140 | -0.0135** |
| | (0.0710) | (0.0729) | (0.159) | (0.00601) |
| Likely | -0.0622 | -0.00843 | 0.0343 | 0.0165*** |
| | (0.0631) | (0.0665) | (0.141) | (0.00585) |
| Other answers | Ref. | Ref. | Ref. | Ref. |
| *EA country default* | | | | |
| Very likely | 0.286*** | 0.372*** | 0.668*** | 0.00477 |
| | (0.0645) | (0.0690) | (0.150) | (0.00648) |
| Likely | 0.0529 | 0.127** | 0.436*** | 0.0117** |
| | (0.0561) | (0.0600) | (0.133) | (0.00587) |
| Other answers | Ref. | Ref. | Ref. | Ref. |
| Observations | 2,726 | 2,622 | 5,641 | 1,996 |
| $R^2$ | 0.282 | 0.721 | 0.273 | 0.998 |

Note: Estimates of regressions of inflation expectations on default and fiscal dominance scenarios. Controls: expectations of unemployment, rents, lending rates, saving rates, property prices, economic growth, fuel prices, stock prices, taxes. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.2: Expectation of fiscal constraints and expected macro variables (12-month horizon - qualitative) - Marginal effects - "Increase"

| | Unemploy | Rents | Lending rates | Saving rates | Inflation |
|---|---|---|---|---|---|
| *ECB constrained* | | | | | |
| Very likely | 0.0259* | 0.00654 | -0.00616 | -0.00501 | 0.118*** |
| | (0.0147) | (0.0122) | (0.00617) | (0.00535) | (0.0151) |
| Likely | 0.00364 | 0.000299 | 0.00441 | -0.00849* | 0.0499*** |
| | (0.0130) | (0.0108) | (0.00572) | (0.00476) | (0.0129) |
| Other answers | Ref. | Ref. | Ref. | Ref. | Ref. |
| *EA country default* | | | | | |
| Very likely | 0.0453*** | 0.0238** | 0.00148 | -0.00972* | 0.0651*** |
| | (0.0143) | (0.0120) | (0.00613) | (0.00510) | (0.0147) |
| Likely | 0.0283** | -0.00987 | 0.000406 | -0.00644 | 0.0387*** |
| | (0.0128) | (0.0108) | (0.00562) | (0.00476) | (0.0130) |
| Other answers | Ref. | Ref. | Ref. | Ref. | Ref. |
| Observations | 5,914 | 5,914 | 5,914 | 5,914 | 5,914 |

Note: Controls: expectations of unemployment, rents, lending rates, saving rates, property prices, economic growth, fuel prices, stock prices, taxes. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.3: Expectation of fiscal constraints and expected macro variables (12-month horizon - qualitative) - Marginal effects - "Increase"

| | Taxes | Home prices | Econ growth | Fuel prices | DAX |
|---|---|---|---|---|---|
| *ECB constrained* | | | | | |
| Very likely | 0.0694*** | 0.0236* | -0.0245* | 0.0146 | 0.0350 |
| | (0.0130) | (0.0136) | (0.0148) | (0.0161) | (0.0284) |
| Likely | 0.0119 | 0.00510 | 0.00285 | 0.0119 | 0.0315 |
| | (0.0111) | (0.0121) | (0.0133) | (0.0142) | (0.0255) |
| Other answers | Ref. | Ref. | Ref. | Ref. | Ref. |
| *EA country default* | | | | | |
| Very likely | 0.110*** | 0.00562 | -0.0565*** | 0.0236 | -0.0583 |
| | (0.0123) | (0.0132) | (0.0148) | (0.0156) | (0.0418) |
| Likely | 0.0618*** | 0.0127 | -0.0219 | -0.00563 | -0.0385 |
| | (0.0107) | (0.0120) | (0.0136) | (0.0139) | (0.0291) |
| Other answers | Ref. | Ref. | Ref. | Ref. | Ref. |
| Observations | 5,914 | 5,914 | 5,914 | 5,914 | 5,914 |

Note: Controls: expectations of unemployment, rents, lending rates, saving rates, property prices, economic growth, fuel prices, stock prices, taxes. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.4: Qualitative and Quantitative Expectations about EA Public Debt GDP Ratio

| | Qualitative | | | | |
|---|---|---|---|---|---|
| | Much lower | Lower | Same | Higher | Much higher |
| All | 0.5 | 7.0 | 14.4 | 49.0 | 29.2 |
| No Treatment | 0.7 | 6.9 | 12.6 | 49.0 | 30.9 |
| All treatments | 0.5 | 7.0 | 14.7 | 49.0 | 28.8 |
| Debt - France | 0.2 | 5.4 | 11.7 | 50.8 | 31.9 |
| Debt - Italy | 0.2 | 6.7 | 13.2 | 49.9 | 30.0 |
| Debt - Germany | 0.5 | 6.3 | 14.7 | 49.8 | 28.8 |
| ECB purchases | 0.8 | 9.2 | 16.9 | 45.3 | 27.7 |
| Weidmann statement | 0.7 | 7.6 | 17.1 | 49.0 | 25.6 |

Note: this table reports simple statistics on expectations abour EA public debt over GDP. The columns report the share of households answering the question "Do you think the ratio of government debt to gross domestic product will be higher or lower in five years'time than at present?", possible answers include "Far lower", "Somewhat lower"; "Roughly the same"; "Somewhat higher"; " Far higher". We have excluded about 5% of extreme observations i.e. observations higher than 180% and below 70%. The first line reports results for all households and the following lines of the questionnaire report the results splitting the sample by treatment.

Table A.5: Statistics on Long-Term Inflation Expectations Revisions

| | Share of Revisions (%) | | | Mean Revision | | |
|---|---|---|---|---|---|---|
| | Upward | No Revision | Downward | All | Positive | Negative |
| All | 37.8 | 45.0 | 17.2 | 0.31 | 2.24 | -3.22 |
| No Treatment | 35.3 | 45.5 | 19.2 | 0.14 | 2.02 | -3.05 |
| All treatments | 38.3 | 44.9 | 16.8 | 0.34 | 2.28 | -3.26 |
| Debt - France | 38.6 | 45.6 | 15.8 | 0.43 | 2.25 | -2.98 |
| Debt - Italy | 39.7 | 42.6 | 16.9 | 0.36 | 2.39 | -3.35 |
| Debt - Germany | 38.5 | 44.6 | 16.9 | 0.33 | 2.23 | -3.05 |
| ECB purchases | 37.5 | 44.1 | 18.4 | 0.25 | 2.31 | -3.55 |
| Weidmann statement | 37.2 | 47.4 | 15.4 | 0.33 | 2.21 | -3.36 |

Note: for average, we have excluded revision lower than -25% and higher than +20% (p1 and p99 of the distribution of inflation revisions).

Table A.6: Information Treatment Effects on Long-Term Inflation Expectation Revisions by Voting Party

| | SPD | CDU | Grunen | FDP | Other |
|---|---|---|---|---|---|
| Debt - France | 0.0868 | 0.176** | 0.0346 | 0.147 | -0.125 |
| | (0.0710) | (0.0682) | (0.0530) | (0.115) | (0.127)) |
| Debt - Italy | 0.121* | 0.141** | 0.0357 | 0.0790 | -0.000499 |
| | (0.0705) | (0.0671) | (0.0545) | (0.112) | (0.125) |
| Debt - Germany | 0.0601 | 0.00648 | 0.0349 | 0.161 | 0.176 |
| | (0.0715) | (0.0648) | (0.0529) | (0.123) | (0.131) |
| ECB purchases | 0.0575 | 0.0688 | -0.0189 | 0.115 | 0.125 |
| | (0.0712) | (0.0678) | (0.0544) | (0.115) | (0.123) |
| Weidmann statement | 0.0450 | 0.0174 | 0.00322 | 0.163 | 0.363*** |
| | (0.0691) | (0.0680) | (0.0527) | (0.122) | (0.127) |
| Observations | 1,478 | 1,196 | 1,272 | 665 | 877 |
| $R^2$ | 0.147 | 0.808 | 0.965 | 0.171 | 0.833 |

Note: this table reports estimates of Huber regressions relating long-term inflation revisions to information treatment dummies by vote to the Parliamentary Elections in 2021. *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Information Treatment Effects on Long-Term Debt/GDP Ratio Expectations by Voting Party

| | SPD | CDU | Grunen | FDP | Other |
|---|---|---|---|---|---|
| Debt - France | 15.76*** | 17.49*** | 16.58*** | 8.662 | 10.73 |
| | (4.781) | (5.674) | (5.162) | (7.878) | (6.601) |
| Debt - Italy | 16.04*** | 22.97*** | 0.486 | 9.472 | 11.02* |
| | (4.759) | (5.549) | (5.317) | (7.678) | (6.504) |
| Debt - Germany | 10.80** | 7.959 | -1.891 | 9.360 | 1.503 |
| | (4.808) | (5.376) | (5.169) | (8.354) | (6.777) |
| ECB purchases | 6.316 | 5.997 | -14.03*** | -4.991 | -5.302 |
| | (4.775) | (5.642) | (5.322) | (7.910) | (6.416) |
| Weidmann statement | 7.574 | 12.58** | 2.411 | 3.958 | 3.375 |
| | (4.647) | (5.665) | (5.179) | (8.360) | (6.547) |
| Observations | 1,482 | 1,190 | 1,252 | 659 | 872 |
| $R^2$ | 0.084 | 0.088 | 0.128 | 0.140 | 0.168 |

Note: this table reports estimates of Huber regressions relating long-term inflation revisions to information treatment dummies by vote to the Parliamentary Elections in 2021. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions – as a function of fiscal expectations – quantitative variables

| | (1) Debt | (2) Infla | (3) Debt | (4) Infla | (5) Debt | (6) Infla |
|---|---|---|---|---|---|---|
| Debt FR+IT+DE | 12.34*** | 0.0699* | 11.32*** | 0.0459 | 11.14*** | 0.0699* |
| | (2.723) | (0.0370) | (2.490) | (0.0338) | (2.434) | (0.0370) |
| Other treatments | 3.173 | 0.0736* | 1.830 | 0.0598* | 2.771 | 0.0736* |
| | (2.878) | (0.0391) | (2.641) | (0.0358) | (2.573) | (0.0391) |
| Fiscal constraint | -1.099 | 0.00836 | 0.646 | 0.0218 | | |
| | (3.701) | (0.0502) | (3.628) | (0.0491) | | |
| Debt FR+IT+DE#Fiscal constraint | -4.125 | 0.0900 | -4.543 | 0.0722 | | |
| | (4.244) | (0.0575) | (4.141) | (0.0561) | | |
| Other treatments#Fiscal constraint | -1.577 | -0.0123 | -2.025 | -0.0210 | | |
| | (4.511) | (0.0612) | (4.391) | (0.0595) | | |
| ECB | 10.31*** | 0.0658 | | | 10.21*** | 0.0658 |
| | (3.757) | (0.0511) | | | (3.685) | (0.0511) |
| Debt FR+IT+DE#ECB | -3.433 | -0.0849 | | | -4.472 | -0.0849 |
| | (4.326) | (0.0588) | | | (4.223) | (0.0588) |
| Other treatments#ECB | -4.283 | -0.0450 | | | -4.783 | -0.0450 |
| | (4.607) | (0.0627) | | | (4.487) | (0.0627) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 5,724 | 5,754 | 5,729 | 5,759 | 5,724 | 5,754 |
| $R^2$ | 0.083 | 0.051 | 0.079 | 0.600 | 0.081 | 0.051 |

Note: this table reports the results of Huber regressions where the endogenous variable is the debt to income ratio reported by households after the treatment or inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** p<0.01, ** p<0.05, * p<0.1.

Table A.9: Information Treatment Effects on EA Debt Expectations and inflation expectations revisions – as a function of fiscal expectations – qualitative variables

| | (1) Debt | (2) Infla | (3) Debt | (4) Infla | (5) Debt | (6) Infla |
|---|---|---|---|---|---|---|
| Debt FR+IT+DE | -0.0174 | 0.0211 | -0.0171 | 0.0132 | -0.00285 | 0.0211 |
| | (0.0202) | (0.0248) | (0.0186) | (0.0227) | (0.0180) | (0.0248) |
| Other treatments | -0.0773*** | 0.0206 | -0.0759*** | 0.0221 | -0.0726*** | 0.0206 |
| | (0.0213) | (0.0262) | (0.0197) | (0.0241) | (0.0191) | (0.0262) |
| Fiscal constraint | 0.0175 | -0.00896 | 0.0289 | -0.00620 | | |
| | (0.0275) | (0.0337) | (0.0270) | (0.0330) | | |
| Debt FR+IT+DE#Fiscal constraint | 0.0487 | 0.0794** | 0.0539* | 0.0700* | | |
| | (0.0315) | (0.0386) | (0.0308) | (0.0377) | | |
| Other treatments#Fiscal constraint | 0.0189 | 0.00114 | 0.0281 | 0.00200 | | |
| | (0.0335) | (0.0411) | (0.0327) | (0.0400) | | |
| ECB | 0.0748*** | 0.00736 | | | 0.0769*** | 0.00736 |
| | (0.0280) | (0.0343) | | | (0.0274) | (0.0343) |
| Debt FR+IT+DE#ECB | 0.00683 | -0.0341 | | | 0.0195 | -0.0341 |
| | (0.0322) | (0.0395) | | | (0.0315) | (0.0395) |
| Other treatments#ECB | 0.0157 | 0.00449 | | | 0.0222 | 0.00449 |
| | (0.0343) | (0.0421) | | | (0.0334) | (0.0421) |
| Observations | 5,928 | 5,755 | 5,934 | 5,759 | 5,931 | 5,755 |
| $R^2$ | 0.079 | 0.023 | 0.071 | 0.023 | 0.076 | 0.023 |

Note: this table reports the results of Huber regressions where the endogenous variable is the debt to income ratio reported by households after the treatment or inflation expectations revisions. Controls for age, region, gender, city size, income, education, employment status, vote at Parliament elections are included. *** p<0.01, ** p<0.05, * p<0.1.

## B.2 Updating of inflation expectations

One concern could be that these households behave like the ones who think it is very likely that fiscal resources will be stretched but do not react to the treatments because these are not informative. To address that potential issue we run the following alternative regression to estimate the effect of treatments on inflation expectations:

$$\pi_{expost}^{expected} = \alpha + \sum_i \beta_i Treatment_i + \gamma \pi_{exante}^{expected} + \sum_i \delta_i Treatment_i \times \pi_{exante}^{expected} + Controls + Error \quad (26)$$

As discussed in Coibion et al. (2018), a negative $\delta_i$ indicates that households updated their inflation prior after the treatment. The results are reported in Table A.10. Consistent with the above results, we find that households who think that the EA default is very likely update much more their inflation prior than the other households. Still these ones also update their beliefs after the treatment but this revision is much smaller.

In all, the results are consistent with the lower likelihood that these households put on the scenario where fiscal resources will be stretched: They expect these shocks to be accommodated by fiscal surpluses so that future overall debt does not change and no fiscal constraint would then imply future inflation. Note, however, that it may well be the case that in situations where they expect the constraint to bind, these agents will also associate higher future debt-to-GDP to higher inflation. They may also expect the constraint to bind, if they start expecting higher future debt-to-GDP ratios.

## B.3 Connection between debt and inflation: an IV approach

An alternative approach to investigate whether there is a connection between inflation and debt is to use treatments as instrumental variables. We report the corresponding estimates in Table A.11. Overall, we find that instrumenting with treatments allows to obtain a positive and statistically significant connection between debt and inflation. Digging further, we confirm that this connection is driven only by households expecting a default, thus confirming our view that the connection results from the expectation of stretched public finances.

Table A.10: Alternative - Inflation Expectations - Information Treatment Effects by Scenario

| | All | Default in EA | | ECB constrained | |
|---|---|---|---|---|---|
| | | very likely | likely and others | very likely | likely and others |
| Pre-treatment expectation | 0.988*** | 0.980*** | 0.994*** | 0.982*** | 0.990*** |
| | (0.00311) | (0.00657) | (0.00231) | (0.00590) | (0.00339) |
| Debt - Fra. | 0.132*** | 1.124*** | 0.137*** | 0.833*** | 0.940*** |
| | (0.0386) | (0.0856) | (0.0338) | (0.0701) | (0.0414) |
| Debt - Ita. | 0.0547* | 0.868*** | 0.0786** | 0.654*** | 0.0935** |
| | (0.0323) | (0.139) | (0.0356) | (0.107) | (0.0372) |
| Debt - Ger. | 0.0427 | 0.378*** | 0.0281 | 0.130* | 0.0664 |
| | (0.0363) | (0.108) | (0.0347) | (0.0704) | (0.0437) |
| ECB purchases | 0.0252 | 0.360*** | 0.0928*** | 0.0153 | 0.122*** |
| | (0.0314) | (0.115) | (0.0344) | (0.0588) | (0.0459) |
| Weidmann | 0.0427 | 0.0893 | 0.0843*** | -0.0252 | 0.102*** |
| | (0.0318) | (0.0771) | (0.0325) | (0.0625) | (0.0376) |
| Pre-expect *x* Debt - Fra. | -0.0107 | -0.229*** | -0.0187*** | -0.207*** | -0.247*** |
| | (0.00667) | (0.0112) | (0.00524) | (0.0112) | (0.00598) |
| Pre-expect *x* Debt - Ita. | 0.00350 | -0.186*** | -0.0148** | -0.170*** | 0.00276 |
| | (0.00421) | (0.0307) | (0.00677) | (0.0244) | (0.00448) |
| Pre-expect *x* Debt - Ger. | -0.000619 | -0.0484** | -0.00740 | -0.0178 | -0.00728 |
| | (0.00580) | (0.0207) | (0.00541) | (0.0120) | (0.00702) |
| Pre-expect *x* ECB | 0.00525 | -0.0706*** | -0.00979* | 0.0117* | -0.0213** |
| | (0.00361) | (0.0215) | (0.00538) | (0.00612) | (0.00851) |
| Pre-expect *x* Weidmann | 0.00288 | 0.00721 | -0.00744 | 0.00105 | -0.00132 |
| | (0.00406) | (0.00832) | (0.00487) | (0.00810) | (0.00478) |
| Observations | 4,998 | 1,881 | 3,129 | 1,679 | 3,321 |
| $R^2$ | 0.988 | 0.960 | 0.983 | 0.985 | 0.983 |

Note: this table reports estimates of a Huber regression relating post treatment long term inflation expectations to information treatment dummies interacted with pre-treatment long-term inflation expectations. This regression has been estimated for the full sample and separately on different subsamples. Column (1) - full sample of households. Column (2) households thinking it is very likely that within the next five years, the ECB will be unable to sufficiently raise its key rates to control inflation, Column (3) uses the sample of households giving another answer (likely, unlikely, very unlikely) to this question. In column (4), the regression is estimated using the sample of households thinking that it is very likely that at least one country in the euro area will be unable to repay its government debt on time whereas column (5) uses the sample of households giving another answer (likely, unlikely, very unlikely) to this question. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

| Instrument | No | | Debt/other | | All treatments | |
|---|---|---|---|---|---|---|
| $\hat{debt/gdp_i^e}$ | -0.000454** | -0.000322 | 0.00388** | 0.00354* | 0.00310* | 0.00278 |
| | (0.000204) | (0.000203) | (0.00188) | (0.00186) | (0.00173) | (0.00170) |
| Controls | No | Yes | No | Yes | No | Yes |
| Observations | 5,467 | 5,466 | 5,467 | 5,466 | 5,467 | 5,467 |
| $R^2$ | 0.001 | 0.609 | 0.001 | 0.609 | 0.001 | 0.608 |

| Instrument | No | | Debt/other | | All treatments | |
|---|---|---|---|---|---|---|
| $\hat{debt/gdp_i^e} * Default = 0$ | -0.0006*** | -0.0005** | 0.00290 | 0.00336 | 0.00175 | 0.00174 |
| | (0.0002) | (0.000227) | (0.00214) | (0.00225) | (0.00161) | (0.00162) |
| $\hat{debt/gdp_i^e} * Default = 1$ | -0.0008 | -0.0007 | 0.00424* | 0.00423* | 0.00294* | 0.00252 |
| | (0.00026) | (0.00026) | (0.00237) | (0.00232) | (0.00177) | (0.00167) |
| Controls | No | Yes | No | Yes | No | Yes |
| Observations | 5,462 | 5,462 | 5,462 | 5,462 | 5,462 | 5,462 |
| $R^2$ | 0.002 | 0.608 | 0.002 | 0.610 | 0.002 | 0.611 |

Table A.11: Inflation as a function of debt, using treatments as IV