INFER
INTERNATIONAL NETWORK FOR ECONOMIC RESEARCH

INFER BRIEF SERIES No. 2 | 2024

INTERNATIONAL NETWORK FOR ECONOMIC RESEARCH

Fiscal multipliers, public debt anchor and government credibility in a behavioural macroeconomic model

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In the context of the ongoing series of crises since the beginning of the 21st century (also called the polycrisis or permacrisis), fiscal rules are proving to be both insufficient and unsuitable to cushion economic shocks and stabilise public debt. Meanwhile, economic facts have highlighted the major role played by economic agents' expectations. This paper aims to fill a gap in the literature on fiscal credibility and government performance, both in terms of stabilising the economy (via fiscal multipliers) and of fiscal discipline. This paper offers an innovative theoretical insight into the role of government credibility in a framework where economic agents' expectations are based on "animal spirits". Results show that when agents are optimistic about the future output-gap and public debt, the fiscal multiplier tends to be larger whatever the nature of the fiscal shock (public expenditure or consumption tax). It also appears that fiscal expansion deteriorated, to a lesser extent, the public debt. Furthermore, agents' expectations about public debt and the fiscal credibility of the government turn out to affect government performance (the fiscal multiplier and public debt stability).

This paper lies at the crossroad of three fields of literature. First, this paper borrows from the literature on fiscal discipline by focusing on the public debt path. Since the seminal paper of Kopits and Symansky (1998), the debate on fiscal discipline and government performance has been regularly been reopened (see for instance Barbier-Gauchard et al. (2023a) for a general overview of this debate). Widely criticised and several times reformed, the Stability and Growth Pact (1996) has failed to hold up the drift of public finance. In this respect, many studies, such as those by Barbier-Gauchard et al. (2021), have looked into the factors that affect fiscal rule compliance. In the same vein, Barbier-Gauchard et al. (2023b) try to predict future fiscal rule compliance.

Second, this paper provides new results on the determinants of fiscal multipliers.

Since Auerbach and Gorodnichenko (2012)'s seminal article, a vast literature has emerged on the state-dependence (or non-linearity) of fiscal multipliers. Empirically, fiscal multipliers vary significantly over time and depend on the economic environment. A bunch of theoretical articles have suggested various mechanisms to explain this variability. The main factors put forward are variations in marginal utilities over the business cycle (Sims and Wolff, 2018), credit cycles and sovereign risk (Aloui and Eyquem, 2019; Canzoneri et al., 2015; Ahmad et al., 2021 among others), or labour market mechanisms (Betti and Coudert, 2022; Michaillat, 2014). In addition, studies bridge the gap between fiscal policy, debt dynamics and financial markets by highlighting the impact of sovereign risk on the effectiveness of fiscal policy (Badarau et al., 2014; Corsetti et al., 2013).

Third, this paper fits into the literature on fiscal credibility, a fairly recent branch research. Most contributions to date are empirical studies dealing either with the determinants of fiscal credibility as analysed by ElBerry and Goeminne (2021) or Montes and de Hollanda Lima (2022), or with the effect of a fiscal credibility indicator on monetary and financial variables as in Montes and Acar (2020) and End and Hong (2022). Indeed, the credibility of fiscal plans influences government bond spread forecasts and then the evolution of the spreads themselves, as highlighted by Cimadomo et al. (2016). Also, Fève and Pietrunti (2016) and Ricco et al. (2016) demonstrate that fiscal policy communication affects agents' decisions and the fiscal multiplier.

The purpose of this paper is to fill a gap in in the literature on fiscal credibility and government performance, both in terms of stabilising the economy (via fiscal multipliers) and of fiscal discipline using an innovative theoretical framework based on behavioral macroeconomics allowing "animal spirits".

Using behavioural macroeconomics

A standard DSGE approach with rational expectations cannot handle mechanisms related to agents' responses to fiscal news, government credibility and so on... Different contributions highlight the importance of expectations formations process to study the effects of fiscal policy in different settings (Cognitive discount factor as Gabaix (2020), fiscal news and noises in Feve and Pietiunti (2016) or animal spirits in De Grauwe and Foresti (2020)). To analyse the effects of agents' expectations on government performance (fiscal multipliers and public debt volatility), we use a behavioural macroeconomic model. This paper builds on the seminal work of De Grauwe (2012), De Grauwe and Ji (2019) in behavioural macroeconomics to model non-rational expectations and allow for heterogeneous agents and waves of optimism and pessimism. De Grauwe and Foresti (2020) produce new insights into the short-run effects of fiscal policies, especially regarding the role of animal spirits over the business cycle on fiscal multipliers and the dynamics of government debt. Since the focus of this article is the credibility of fiscal policy, this type of model with heterogeneous expectations is relevant as a means to document the role of these mechanisms in fiscal policy shocks and debt sustainability.

Paper contributions

This paper is therefore original in several ways. First of all, the behavioural macroeconomics approach offers a framework in which to analyse the role of agents' expectations on government performance, as initiated by De Grauwe and Ji (2019), De Grauwe and Foresti (2020). Ricardian equivalence has been a central concept in modern macroeconomics to evaluate the effects on economic activity of fiscal shocks. This hypothesis holds in standard DSGE models with rational expectations. In this article, we verify the existence of this mechanism in a bounded rationality framework depending on the state of the economy. We depart from De Grauwe and Foresti (2020) in several ways. First, our model considers an endogenous tax rate, thus allowing for possible Ricardian behaviour. Second, agents' have expectations regarding output-gap, inflation, public expenditure, but also about taxes and public debt. Finally, we propose an analysis of fiscal credibility and its impact on fiscal multipliers and public debt stability.

Bird eye view of the framework

We develop a behavioural model in the spirit of De Grauwe (2012), De Grauwe and Ji (2019), De Grauwe and Foresti (2020), where heterogeneous agents use heuristics to form their expectations. The model is a standard new-Keynesian model with an aggregate demand relationship, a new-Keynesian Phillips curve and a standard Taylor rule for the monetary policy. Also, a fiscal policy block is introduced with public expenditure and an endogenous consumption tax. The key element of the model is the expectation formation process, which allows us to introduce uncertainty about the future evolution of the macroeconomic variables, and the public finance variables: public expenditure, the tax rate and public debt. As in Brock and Hommes (1997), economic agents behave according to simple rules (heuristics) and decide to switch between these rules depending on how well the rules perform in predicting the output-gap, inflation, public expenditure, tax revenue and public debt. For De Grauwe (2012), this switching to the best performing heuristic represents the agents' rationality. *Fundamentalist agents* predict the steady state value of the variable (normalised to zero here) or the value targeted by an institution, such as the central bank's inflation target or the government's public debt target. *Extrapolator agents* account for the last period of observation in their forecasts. We now define the public debt expectations of both types of agents. Economic agents can learn over time and evaluate the performance of their forecasts. They learn from their mistakes as in De Grauwe (2012). This switching behaviour is based on a forecasting criterion, the *mean square forecast error*. Once agents choose which rule to follow, this has a strong effect on their market sentiment. Basically, this can be represented by an index of so called 'animal spirits', as suggested by De Grauwe (2012), which reflects agents' degree of optimism or pessimism at a given time for a given variable.

Key takeaways

Macroeconomic impact of fiscal shocks

Output increases in both cases while the fiscal multiplier is relatively low due to the adjustment of the tax rate subsequent to the increase in public debt a few periods later. Both fiscal shocks are inflationary, though less so in the case of an increase in public expenditure. Indeed, when the consumption tax rate decreases, the increase in household consumption amplifies the increase in prices, leading the central bank to increase its interest rate. While the results of the model for the output-gap, inflation and real interest rates are as expected, the more interesting point is the considerable state-dependency of the responses to the fiscal shocks. The histograms in Figure 1 show the distribution of fiscal multipliers for the 2000 simulations of the model. As already highlighted by De Grauwe and Foresti (2020), this histogram illustrates the uncertainty about the quantitative effects of fiscal shocks.

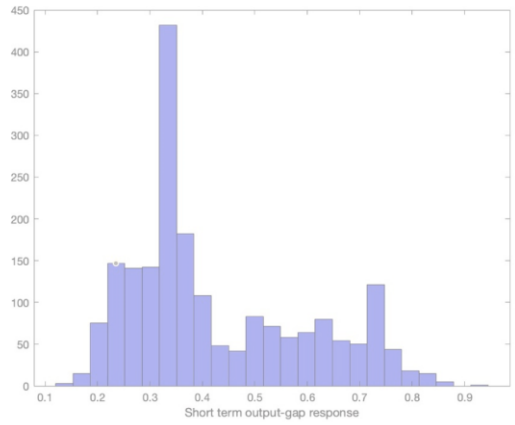
Optimism/pessimism about output-gap and fiscal multipliers

The state-dependence of fiscal multipliers lies in two key elements in the expectation formation process: (1) the agents' degree of optimism/pessimism regarding the expected output-gap and (2) the agents' optimism/pessimism about the expected public debt level. Figure 2 plots the short-run fiscal multipliers as a function of the distribution of animal spirits regarding the output-gap for public expenditure shock. On the x-axis, the animal spirit index varies from (−1) to (1), *i.e.* from total pessimism (−1) to total optimism (+1). This multiplier is higher in periods of high optimism regarding the output-gap, compared with periods of pessimism. When the agents are completely pessimistic indeed, the average short-term fiscal multiplier is around 0.45, compared with about 0.55 when the agents are completely optimistic. The average multiplier is smaller (around 0.35) when the agents are neutral. The results therefore describe an asymmetric U-shaped curve. Our results, as do De Grauwe and Foresti (2020), show that fiscal multipliers depend on animal spirits regarding the output-gap. However, the outcomes with our model depend on the agents' degree of optimism or pessimism. When the agents are optimistic, an increase in demand due to an increase in public expenditure reinforces the expectation of a better output-gap in the future. As a result, the rise in public expenditure generates a sell-fulfilling expansion of the output-gap for a certain number of periods. In addition, and contrary to De Grauwe and Foresti (2020) where the multipliers are of the same magnitude for extreme levels of optimism and pessimism, expectations regarding future public debt (and thus, by extension, regarding future tax rates) play an important role in explaining why the largest fiscal multipliers are obtained in periods of high optimism regarding the output-gap. Because the tax rate is endogenous, and is adjusted to stabilise the public debt path, the agents' behaviour is also driven by expectations regarding future public debt. If agents are optimistic about public debt, a rise in public expenditure, which increases public debt, will not be interpreted by the

agents as meaning the government will need to increase the tax rate in the near future. This means that Ricardian equivalence, in particular the amplitude of this mechanism, depends on agents' levels of optimism/pessimism about future public debt when a fiscal policy is implemented. Optimism regarding future public debt therefore has a sell-fulfilling consequence: a weak Ricardian equivalence effect produces a larger fiscal multiplier which, in turn, leads to a lower increase in public debt following the public expenditure shock due to the high correlation between animal spirits regarding the output-gap and public debt.

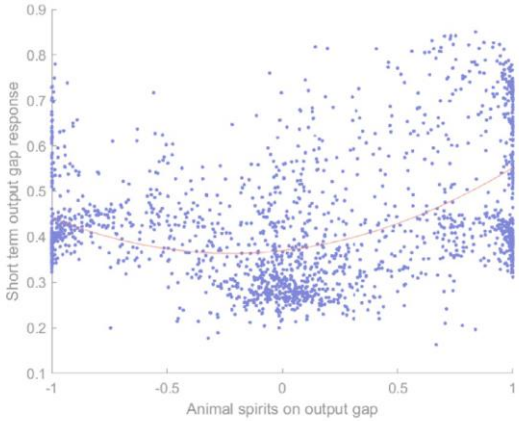
Government credibility and fiscal multipliers

The notion of government credibility is gradually gaining attention, as reflected by the growth in the associated literature. As proposed by End and Hong (2022), "fiscal credibility can be defined as the extent to which economic agents expect the government to try and fulfil its fiscal policy commitments. This covers two aspects: the intention and ability to achieve targets". Fiscal credibility or government credibility mainly rests on comparison between budgetary forecasts (e.g., spending, budget balance, public debt, ...) and budget outcomes. The credibility index used in the model, called *private bias*, expresses credibility as the absolute value of the difference between the expected public debt in period (t-1) for period *t* and the actual level of public debt in Period t. Figure 3 shows the evolution of the short term fiscal multiplier depending on the level of *private bias*, in the case of an expenditure shock. In particular, it appears that the closer to 0 the *private bias* is, *i.e.* the more credible the government is considered to be, the higher the fiscal multiplier is following a positive fiscal shocks. Thus, trust in government prevents Ricardian behaviour. Consequently, the cumulative response of public debt is also affected positively by agents' *private bias*. In addition, a *private bias* close to 0 is associated with smaller public debt deviations whatever the nature of the fiscal shock.



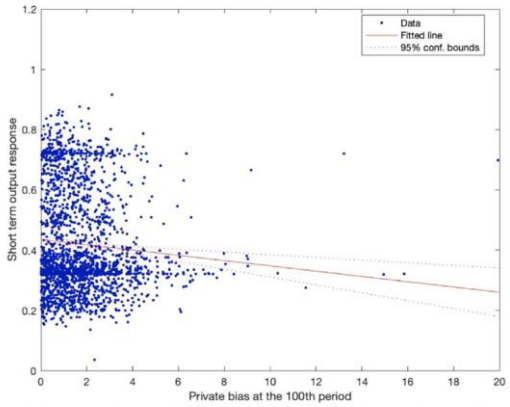
(a) Public expenditure shock

Figure 1 - State dependence of the fiscal multiplier



(a) Short-term fiscal multiplier

Figure 2 - Fiscal multipliers and animal spirits on output-gap



(a) Evolution of the short term fiscal multiplier

Figure 3 - Evolution of the short term fiscal multiplier depending on the level (magnitude) of government credibility

Policy Implications

This paper offers an insight on the crucial role government credibilty could play on fiscal policy performance, both in terms of stabilising the output gap (measured by the fiscal multiplier) and fiscal discipline (measured by the dynamics of public debt).

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