

April 14, 2023

To Whom it may Concern,

This letter is to confirm that: “Fiscal policy response to the COVID-19 pandemic in the euro area” by Riccardo Tilli, Paolo d'Imperio. and Cristiana Fiorelli was accepted by the *Economics Bulletin* on 01/28/2023. We expect that it will be published shortly in Volume 43, Issue 1. Volume 43 consists of backdated issues for the year 2023. See the details before for more complete explanation.

Sincerely,



John P Conley
Editor
Economics Bulletin

Details:

AccessEcon’s editorial software was conceived in 1999 and deployed in 2000. The Economics Bulletin remains the oldest entirely electronic journal in Economics, as well as the oldest open access journal. Patches and improvements have been made continuously in the intervening years. The need for backward compatibility led us to continue to build on the existing foundation for as long as possible. This became increasingly difficult, expensive, and ultimately, infeasible.

We decided in the second quarter of 2022 that we had no option but build a modern system from scratch. The task was complicated by the task of porting a database designed more than 20 years ago, with hundreds of thousands of documents and records, to work with the new software. Like most software projects in my experience, this took longer, and cost more, than budgeted.

At this point, we have an alpha version built, and have ported most of the data. We are actively debugging and stress testing, We don’t want to deploy the new system until we have confidence in its stability. There will, doubt, be some teething issues, but we are determined to minimize them to the extent we can.

At this point, we estimate(!) that we will launch towards the end of the quarter 1 or beginning of quarter 2 of 2023. Our plan is to start publishing papers in the order they were accepted, in back issues, with 2022 dates. Accepted papers will be published in the issue dated with the approximate quarter they were accepted. For example, a paper accepted in July of 2022 will be published in the Volume 42, Issue 3. If you need a letter indicating that a paper is accepted, stating where it will be published, please write to editor@economicsbulletin.com, and we will be happy to provide one. We apologize for these delays, and thank you for your patience.

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The impact of fiscal policies on GDP growth in the euro area during the Covid-19 pandemic

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Abstract

We estimate the impact of fiscal measures adopted in response to the Covid-19 crisis at the euro area level, combining standard macroeconomic data with an index on the strictness of 'lockdown style' policies. Given the multitude of shocks occurred simultaneously during the pandemic, the fiscal stimulus is identified together with other supply- and demand-side shocks using a sign and zero restricted Bayesian vector autoregressive (VAR) model. Our results show that during the two years 2020-2021, public spending and revenue-side measures avoided a further reduction of GDP equal to 2.8 and 0.9 percentage points, respectively.

Keywords: Fiscal policy, GDP growth, VAR, Covid-19

JEL Classification: E32; E62, H50

Declaration of interests: none

The views expressed in this paper are those of the authors and should not be attributed to the Italian Ministry of Economy and Finance.

1. Introduction

Starting from the beginning of 2020, worldwide governments have used fiscal policies to offset the economic crisis triggered by the Covid-19 pandemic. Because of the unprecedented size and importance of fiscal policies during the crisis, the economic literature began to show interest on this topic (see, e.g., Chudik *et al.*, 2021).

Faria-e-Castro (2021), in DSGE model for the US, finds that unemployment benefits are the most effective tool to stabilize income for borrowers, who are the hardest hit during a pandemic, while liquidity assistance programs are the most effective if the policy objective is to stabilize employment. Di Bartolomeo *et al.* (2022) show that the effects of emergency fiscal measures avoided an additional fall of the Italian GDP of about 4.4 percentage points (pp thereafter) in 2020, with a significant impact on the dynamics of consumption and investments.

This paper focuses on the euro area as a whole assessing the role of fiscal policies in sustaining the economy during the pandemic. The fiscal shocks are identified and isolated from other supply- and demand-side disturbances using a Bayesian vector autoregressive (VAR) model with sign and zero restrictions, based on a novel empirical strategy combining standard macroeconomic data with an index recording the strictness of ‘lockdown style’ policies.

Our results show that the direct impact of fiscal policy measures avoided an even wider collapse of aggregate euro area GDP equal to 3.7 pp in the two years 2020-2021. In particular, public expenditure contributed for 2.8 pp, while revenue-side measures for the residual 0.9 pp.

The paper is organized as follows. The next section introduces the empirical approach and sets out the structural identification of the shocks, providing a description of the estimation procedures. Section 3 shows and discusses results. The last section concludes.

2. Empirical strategy

Using a VAR model estimated with standard Bayesian techniques, we quantify the role that those fiscal interventions played during the pandemic in avoiding an even wider collapse of the economy.

We construct a dataset of quarterly data from 2002Q1 to 2021Q4 for the euro area. The vector of endogenous variables includes gross domestic product (GDP), the harmonised index of consumer prices (Prices), government final consumption expenditures and investment (Government Spending),

and net taxes, namely total revenues net of transfers (Government Revenues). The source is Eurostat. Moreover, in order to capture the pandemic effects on the economy, we include the so-called Stringency index (Hale et al., 2021), developed and provided by the University of Oxford, as an exogenous variable. The index records the strictness of “lockdown style” policies that primarily limit people and firms’ behaviour at the country level. It is calculated using all ordinal containment and closure policy indicators, plus an indicator recording public information campaigns. The index for the euro area is a GDP-weighted average of the national Stringency indices. Nominal variables are deflated and enter the VAR in log-levels.

2.1 Model and estimation

The VAR model can be represented as follows:

$$Y_t = A_1 Y_{(t-1)} + A_2 Y_{(t-2)} + \dots + A_5 Y_{(t-5)} + C X_{(t)} u_t,$$

where $Y_{(t)}$ is the vector containing our four endogenous variables, namely, GDP, Prices, Gov. Spending, Gov. Revenues, and $X_{(t)}$ the vector containing the stringency index treated as exogenous in the model. Coefficients are contained in the matrix A_i and C . The VAR lags are assumed to be equal to five given the quarterly frequency of data. The reduced-form coefficients are obtained through a standard Bayesian estimation after assuming a Normal-Diffuse prior. Structural identification of shocks is based on sign and zero restrictions as in Arias *et al.* (2018).

2.2 Structural identification

Governments employed a combination of higher expenditures and lower/deferred taxes to deal with the pandemic. As a consequence, the fiscal shocks are a government spending shock and a government revenue shock.¹ Following Mountford and Uhlig (2009), we propose an identification strategy based on sign restrictions, exploiting the methodology developed by Arias *et al.* (2021) to disentangle the government spending and the revenue shock from the other disturbances in the economy.

We impose a series of sign restrictions on impact responses able to isolate demand and supply shocks (business cycle), orthogonal to the fiscal stimulus we are interested in.² As shown in Table 1, a demand shock is assumed to trigger a positive response of output and prices, while a supply shock would

¹ We do not evaluate the role of public guarantee schemes and other liquidity measures such as government loans (see e.g., Pfeiffer *et al.* 2020).

² See, e.g., Furlanetto *et al.* (2017).

generate an increase of GDP and a contemporaneous decrease of prices. Moreover, we also assume that business cycle shocks have positive effects on government revenues.

A government spending shock is assumed to have a positive impact on GDP while we remain agnostic on the contemporaneous impact on other variables. Similarly, a reduction in net tax burden is assumed to have a positive impact on GDP but no contemporaneous impact on government spending. The latter restriction is also imposed on the demand and supply shocks in order to disentangle them from the government expenditure shock. The assumption is that governments do not respond on impact to demand and supply shocks (Blanchard and Perotti, 2002).

Table 1: Sign and zero restrictions on impact responses for each variable (in rows) to identified shocks (in columns)

	Demand	Supply	Gov. Spending	Gov. Revenues
GDP	+	+	+	+
Prices	+	-	NA	NA
Gov. Spending	0	0	+	0
Gov. Revenues	+	+	NA	-

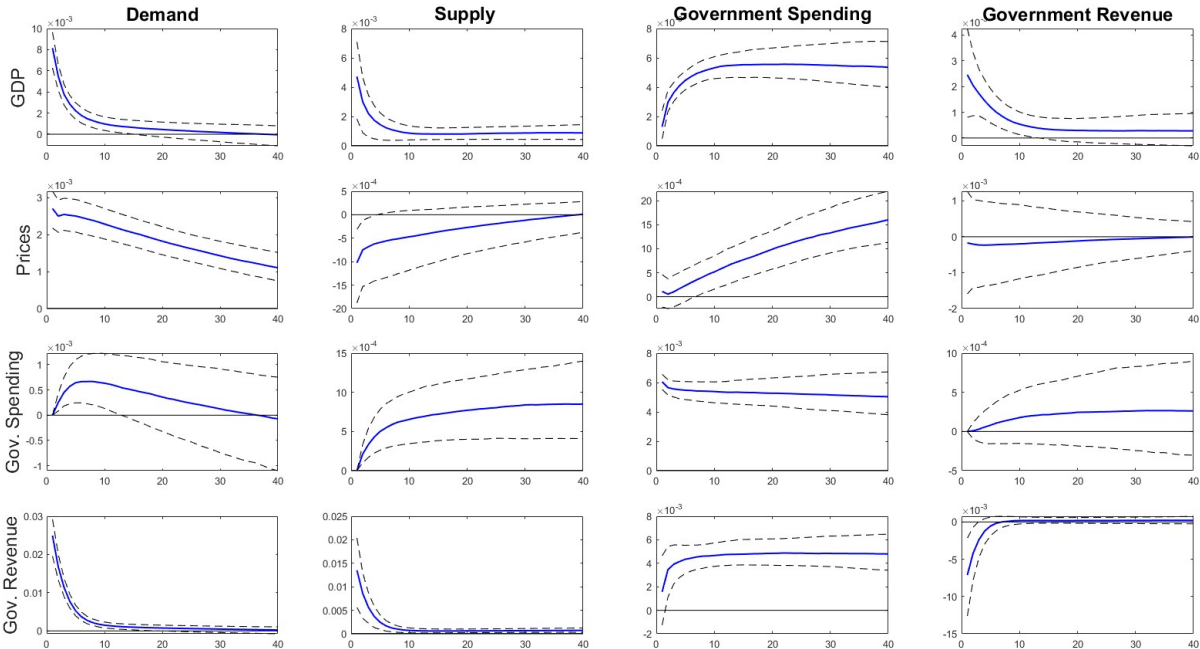
Note: *NA* indicates that the response of the variable is left unrestricted.

The identified supply and demand shocks are compatible with the business cycle shock proposed in Mountford and Uhlig (2009), although they also restrict consumption and investment. Another difference is that they restrict the responses for four quarters, while we only impose restrictions on impact. The latter choice rests on the fact that during the pandemic fiscal authorities adopted timely emergency measures with possibly short-lived effects. However, our identification strategy does not exclude longer lasting impact on GDP.

3. Results

The VAR’s endogenous variables, by construction, consistently respond to the imposed shocks on impact. A positive demand shock increases both GDP and prices, while a positive supply shock increases GDP and decreases prices. Moving to the fiscal shocks, an increase of government expenditure has a positive effect on GDP that remains above its steady state during the forty periods under analysis, while a reduction in fiscal revenues triggers a positive effect on GDP which converges to its steady state after about ten periods.

Figure 1: Impulse response functions



Note: Responses of endogenous variables in the VAR to Demand, Supply, and Fiscal structural shocks. 68% uncertainty interval. Source: Authors’ elaborations from VAR estimates.

The historical shock decomposition of GDP to the identified structural shocks is reported in Figure 2. We focus on the period 2019Q4-2021Q4, namely from the beginning of the Covid-19 pandemic to the last quarter before the Russian invasion of Ukraine, which triggered disturbances of

diverse nature that go beyond the goal of this study. The black-solid line represents the GDP in deviation from its baseline, while the bars describe the quarterly contribution of each shock to this deviation.

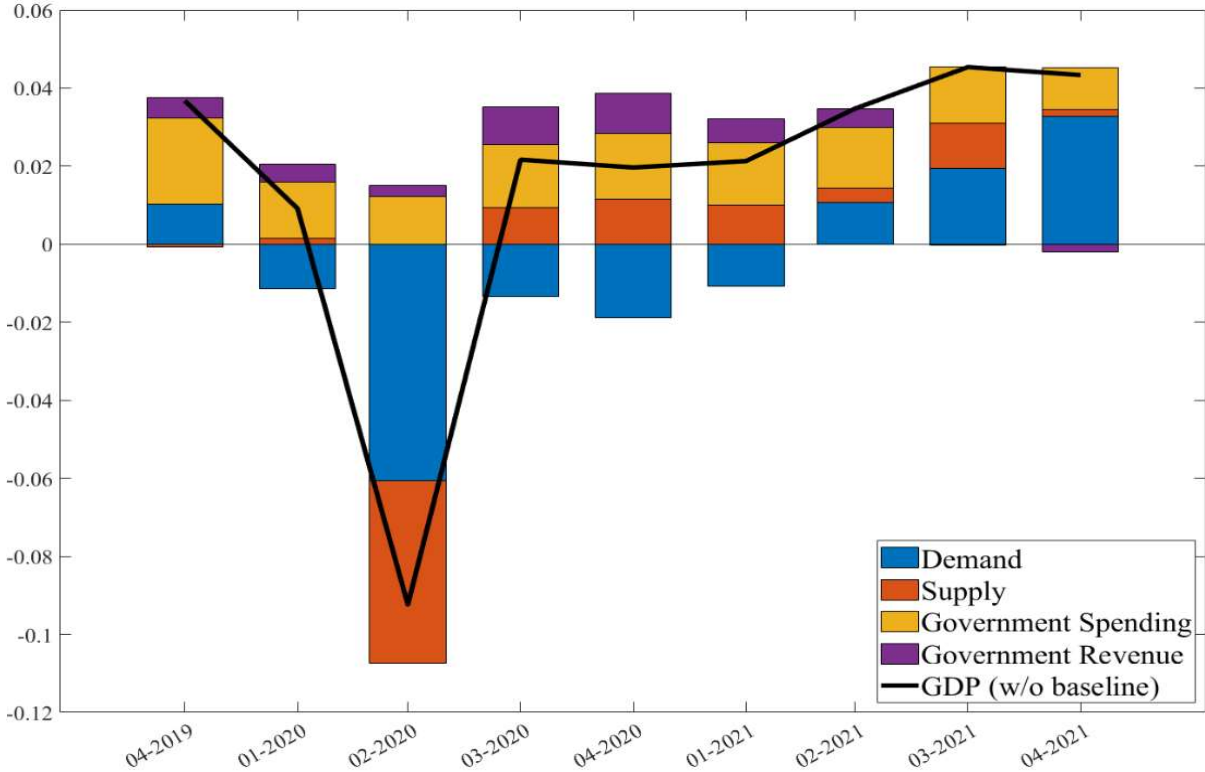
The Figure 2 clearly shows that expansionary fiscal policies contributed to mitigating the negative effects of the recession caused by the pandemic crisis. This major contribution occurred from the beginning of the pandemic, in the first quarter of 2020, onward.³ To quantify the contribution of fiscal measures to GDP we consider two scenarios. The first is the observed scenario, where the dynamic of GDP is the product of the four identified shocks, namely demand, supply, government spending and revenues. The second is the counterfactual scenario, where we switch off the last two fiscal policy shocks. By comparing the two scenarios we find that fiscal policy measures avoided an even wider collapse of GDP in the eight quarters 2020Q1-2021Q4 equal to 3.7 pp, where we take the GDP registered in 2019 as reference. The total contribution of fiscal policies can be decomposed in the two identified components: spending measures avoided a reduction of GDP equal to 2.8 pp, while revenue-side measures contributed for the residual 0.9 pp.

To quantify the contribution of fiscal measures to GDP, we calculate the difference between the observed GDP and the counterfactual GDP, without the policy interventions. The estimated VAR provides a decomposition of the actual data in a trend and the four identified structural shocks. The counterfactual GDP can thus be easily obtained by combining the trend and the two non-policy shocks (supply and demand), while discarding the two policy shocks (government spending and revenue).⁴ The counterfactual series we obtain describes how the euro-area GDP would have evolved in the absence of fiscal policy intervention. By comparing the two scenarios, we find that fiscal policy measures avoided an even wider collapse of GDP in the eight quarters 2020Q1-2021Q4 equal to 3.7 pp, where we take the GDP registered in 2019 as reference. The total contribution of fiscal policies can be decomposed in the two identified components: spending measures avoided a reduction of GDP equal to 2.8 pp, while revenue-side measures contributed for the residual 0.9 pp.

³ Except for the last quarter of 2021, when government revenues become slightly contractionary.

⁴ Pellegrino (2017) uses a similar approach to identify a counterfactual without uncertainty shocks.

Figure 2: Historical decomposition, euro area GDP



Note: Contribution of the identified structural shocks to the deviations of GDP from its baseline forecast over the period 2019Q4-2021Q4. Source: Authors’ elaborations from VAR estimates.

The discussed quantification of fiscal contribution to GDP growth should be considered as a lower bound, given that our methodology does not capture the role of public loan guarantees and other liquidity measures, which likely avoided a large number of liquidity issues and defaults across firms (see, e.g., Falagiarda *et al.* 2020).

4. Conclusions

We have evaluated the role of the economic support of the fiscal policies during the Covid-19 pandemic in the euro area using aggregate quarterly data.

In a counterfactual scenario, we find that fiscal policy measures avoided a further collapse of euro area GDP equal to 3.7 pp during the two years 2020-2021. Government spending has produced a

more sizeable effect than tax cuts and tax deferral to mitigate the recession caused by the pandemic crisis.

The results may offer interesting insights for future research. Among others, the heterogeneity in the fiscal response across countries and the interactions between monetary and fiscal policy.

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