Fiscal Multipliers for the United States

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Abstract. The aim of this study is to trace the effects of fiscal policy shocks. We calculate the level of fiscal multipliers and short-term output fiscal elasticities for the United States. We do so by estimating a Bayesian three-variate fiscal vector autoregression model that accounts for uncertain identification assumptions. The government spending multiplier is equal to 1.65 on impact and 0.53 after one year, while the tax multiplier is equal to -2.00 on impact and -0.10 after one year. The posterior output elasticity of taxes is equal to 2.20. Increasing the prior assumptions for output elasticity of taxes leads to a lower tax multiplier. The study shows that both increasing spending and decreasing taxes can stimulate the economy. However, the effects of tax decreases may be larger for the economy.
Keywords: fiscal multipliers, Bayesian VAR model, short-term elasticities, output elasticity of taxes
JEL: C11, C32, E62, E63, H50

1. Introduction

Fiscal policy can play a crucial role in supporting aggregate demand, particularly when policy rates are at their effective lower bound and when the economy is in recession (see Auerbach & Gorodnichenko, 2012; Ramey & Zubairy, 2018). The effectiveness of fiscal policy actions may be measured using fiscal multipliers, whose quantification is a difficult task (see Angelini et al., 2023; Čapek & Cuaresma, 2020).

Many studies which use vector autoregression (VAR) models (i.e. Angelini et al., 2023; Caldara & Kamps, 2017; Mertens & Ravn, 2014) agree that the differences in fiscal multipliers estimates stem from different assumptions concerning the level of contemporaneous elasticities. Caldara and Kamps (2017) analytically show a negative relationship between the systemic response to output of fiscal variables[1] and the size of tax and spending multipliers. Mertens and Ravn (2014) state that the output elasticity of tax revenues is significantly greater than calculated by international organisations (by, for instance, Blanchard & Perotti, 2002). This leads them to the conclusion that tax multipliers are at the higher end of the range, such as those of Mountford and Uhlig (2009) and Romer and Romer (2010).

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[1] Meaning short-term output elasticities of government spending and tax revenues.

Building on Blanchard and Perotti (2002) and the subsequent studies, this study extends the existing literature in three ways. Firstly, we employ a slightly different methodology estimating the size of fiscal elasticities and the associated fiscal multipliers using the flexible Bayesian SVAR methodology of Baumeister and Hamilton (2015, 2018, 2019). Secondly, our study can be viewed as an extension of Sznajderska et al. (2024), who applied this methodology to examine the effects of both monetary and fiscal policy in the United States. Unlike their study, we use a three-equation model à la Blanchard and Perotti (2002) that allows us to focus more precisely on the effects of fiscal policy without identifying monetary and price shocks. Thirdly, our study diverges from Sznajderska et al. (2024), as it tests different prior assumptions. Specifically, we concentrate on the prior assumptions for output tax short-term elasticity, following the prominent study of Mertens and Ravn (2014).

The aim of the research described in this article is to measure the level of fiscal multipliers in the United States using the Baumeister and Hamilton (2015, 2018, 2019) approach. The two research questions are: what are the values of fiscal multipliers in a three-variate Baumeister and Hamilton fiscal VAR model? How do the results change when we set different prior assumptions for the output elasticity of taxes?

The paper is organised as follows. Section 2 briefly summarises the literature on the subject, Section 3 describes the model and data, and Section 4 presents the results. The last section summarises our conclusions.

2. Literature review

Fiscal VAR models are widely studied to evaluate the effects of the fiscal policy in the United States (see Angelini et al., 2023; Auerbach & Gorodnichenko, 2012; Blanchard & Perotti, 2002; Caldara & Kamps, 2017; Klein & Linnemann, 2019; Mountford & Uhlig, 2009; Sznajderska et al., 2024). A common approach in this respect is to use proxy-VAR models, as it is challenging to correctly identify unexpected fiscal shocks in traditional VAR models. This difficulty results from the fact that, for instance, any planned fiscal policy actions are often announced well before they are implemented, a phenomenon known as fiscal foresight. However, the necessity of finding the correct proxies is the main disadvantage of the proxy-VAR method. Angelini et al. (2023) show that the set of the used instruments (proxies) can crucially affect the multiplier. Additionally, the problem of potentially endogenous proxies arises. This may concern whether or not to impose an orthogonality assumption between tax shocks and total factor productivity shock (see Angelini et al., 2023) or government spending shocks and total factor productivity shock (see Ben Zeev & Pappa, 2015).

Fiscal policy faces not only implementation lags (caused by the fact that it takes time for policy changes to be put into effect), but also decision lags (resulting from the time needed for the policy to change in response to shocks). Decision lags help in identifying fiscal policy shocks. They allow for the assumption that the ongoing changes in output do not affect spending decisions. This approach was implemented by Blanchard and Perotti (2002) and followed by many others. It usually requires the identification of short-term tax elasticity of output or short-term output elasticity of taxes, which can be problematic and uncertain.

Our study is related to the fiscal VAR literature that discusses which fiscal policy actions are most effective. Mountford and Uhlig (2009), for example, find that among the three scenarios: deficit-spending, balanced budget spending expansion and deficit-financed tax cuts, the last one is the most effective, with the largest present value multiplier equal to five after five years.

The effectiveness of fiscal policy may be evaluated using fiscal multipliers. However, there is no consensus concerning the value of fiscal multipliers. Ramey (2019) shows that fiscal multipliers range in value from 0.60 to 2.00 in government spending and -5.00 to 0 in tax revenues. She also finds evidence that the range of estimates for average fiscal multipliers has been reduced considerably, particularly for government purchases.

Caldara and Kamps (2017) report the peak spending multiplier to be between 1.00 and 1.30 and tax multiplier between 0.50 and 0.70. Mertens and Ravn (2014) find tax multiplier around -2.00 on impact and up to -3.00 after six quarters.

It is worth noting that the results of Caldara and Kamps (2017) and Mertens and Ravn (2014) are contradictory: the first study finds that the government spending multiplier is larger than the tax multiplier and the other one concludes the opposite.

The work by Angelini et al. (2023) shows that the tax multiplier is larger than the spending multiplier. They report that the spending multiplier is in the range between 1.60 and 2.10, i.e. statistically significantly larger than 1. Their findings show, on the other hand, that the tax multiplier is between 0.70 and 3.60. They underline, however, that tax multipliers are characterised by a larger statistical uncertainty. The authors' interpretation of this result may incline policymakers with an aversion towards parameter uncertainty to assign a larger weight to the fiscal spending level than to tax revenues.

3. Methodology

We estimate the Bayesian fiscal VAR model for the United States. The methodology is based on the studies of Baumeister and Hamilton. A detailed description of the methodology may be found in Baumeister and Hamilton (2015, 2018, 2019) and here, we briefly summarise the approach. The model may be written in the following, short version:

$$\boldsymbol{A}y_t = \boldsymbol{B}x_{t-1} + u_t, \text{where } u_t \sim N(0, \boldsymbol{D}). \tag{1}$$

$y_t = (y_{1t}, \dots, y_{nt})'$ and is an $n \times 1$ vector of endogenous variables, $\boldsymbol{A}$ is a matrix of contemporaneous relationships, which is the main interest of this study, x_{t-1} is an $(mn + 1) \times 1$ vector consisting of m lags of y_t and a constant, $\boldsymbol{B}$ is an $n \times (mn + 1)$ matrix of the lagged variable parameters, and u_t is an $n \times 1$ vector of structural shocks. Finally, $\boldsymbol{D}$ is an $n \times n$ diagonal matrix.

We set the prior distributions for the elements of $\boldsymbol{A}$, $\boldsymbol{B}$ and $\boldsymbol{D}$. The diagonal elements of covariance matrix $\boldsymbol{D}$ follow inverse Gamma distribution $\Gamma(\kappa_i, \tau_i(\boldsymbol{A}))$. The rows in $\boldsymbol{B}$ follow multivariate normal distribution with the mean equal to 0. We set all the hyperparameters according to Baumeister and Hamilton (2015). We use standard hyperparameters applied in Bayesian VAR analyses: overall tightness (λ_0 = 0.2), lag decay (λ_1 = 1) and tightness around constant (λ_3 = 1,000).

The elements of $\boldsymbol{A}$ follow t-Student distributions, symmetric or truncated to account for sign restrictions. In our system of three variables, $\boldsymbol{A}$ can be presented as:

$$\begin{bmatrix} \mathbf{1} & -\boldsymbol{\alpha}_{gy} & -\boldsymbol{\alpha}_{gt} \\ -\boldsymbol{\alpha}_{yg} & \mathbf{1} & -\boldsymbol{\alpha}_{yt} \\ -\boldsymbol{\alpha}_{tg} & -\boldsymbol{\alpha}_{ty} & \mathbf{1} \end{bmatrix}, \tag{2}$$

where:

$\boldsymbol{\alpha}_{gy}$ is the short-term output elasticity of government spending,

$\boldsymbol{\alpha}_{gt}$ is the short-term tax elasticity of government spending,

$\boldsymbol{\alpha}_{yg}$ is the short-term government spending elasticity of the output,

$\boldsymbol{\alpha}_{yt}$ is the short-term tax elasticity of the output,

$\boldsymbol{\alpha}_{tg}$ is the short-term government spending elasticity of taxes,

$\boldsymbol{\alpha}_{ty}$ is the short-term output elasticity of taxes.

The model can be written in the following way:

$$g_t = \boldsymbol{\alpha_{gy}} y_t + \boldsymbol{\alpha_{gt}} t_t + b_1' x_{t-1} + u_t^g \ , \qquad (3)$$

$$y_t = \boldsymbol{\alpha_{yg}} g_t + \boldsymbol{\alpha_{yt}} t_t + b_1' x_{t-1} + u_t^y \ , \qquad (4)$$

$$t_t = \boldsymbol{\alpha_{tg}} g_t + \boldsymbol{\alpha_{ty}} y_t + b_1' x_{t-1} + u_t^t \ , \qquad (5)$$

where g_t, y_t, t_t are the levels of the government spending gap, output gap and tax revenues gap in quarter t. Therefore, each row of the $\boldsymbol{A}$ matrix may be interpreted as a different type of rule such as a spending rule, aggregate output rule and tax revenue rule.

The standard assumption in the literature, which has been adopted in this study, is to set $\boldsymbol{\alpha_{gt}}$, i.e. short-term tax elasticity of government spending, to zero (see Angelini et al., 2023; Blanchard & Perotti, 2002, Caldara & Kamps, 2017). This means that during one quarter, changes in tax revenues do not affect government spending. The remaining elements of the $\boldsymbol{A}$ matrix have the following distributions:

$$\boldsymbol{\alpha_{gy}} \sim t_3(0{,}0.4), \boldsymbol{\alpha_{yg}} \sim t_3^+(0.5{,}0.4), \boldsymbol{\alpha_{yt}} \sim t_3^-(-0.5{,}0.4), \boldsymbol{\alpha_{tg}} \sim t_3(0{,}0.4)\ \boldsymbol{\alpha_{ty}} \sim t_3^+(2.00{,}0.4),$$

where $t_3(a, b)$ is the *t*-Student distribution with 3 degrees of freedom and location equal to a and scale equal to b. $t_3^+(a, b)$ means that the distribution is truncated to be positive and $t_3^-(a, b)$ means that distribution is truncated to be negative.

The density functions can be described as the following family of asymmetric *t*-Student distributions:

$$p(h) = k\sigma_h^{-1} \tilde{\phi}_{v_h} \left(\frac{h - \mu_h}{\sigma_h} \right) \Phi \left(\frac{\lambda_h h}{\sigma_h} \right), \qquad (6)$$

where k is a constant to make density integrate to 1. Φ denotes the cumulative distribution function for a standard N (0,1) variable, $\tilde{\phi}_{v_h}$ denotes the *t*-Student distribution with v_h degrees of freedom:

$$\tilde{\phi}_{v_h}(x) = \frac{\Gamma\left({}^{(v_h+1)}/_2 \right)}{\sqrt{v_h \pi}\, \Gamma\left({}^{v_h}/_2 \right)} \left(1 + \frac{x^2}{v_h} \right)^{-{}^{(v_h+1)}/_2} , \qquad (7)$$

λ_h governs the asymmetry of the distribution. When $\lambda_h = 0$, $p(h)$ is the density of a symmetric *t*-Student variable with location parameter μ_h, scale parameter σ_h, degrees of freedom v_h, and with the k = 2 integrating constant.

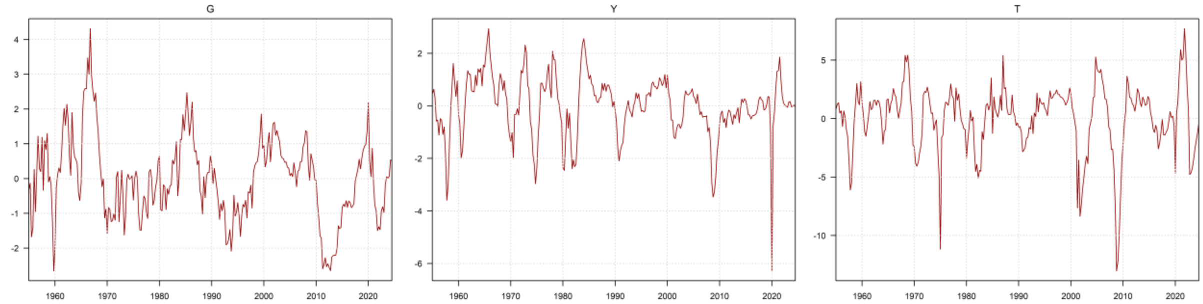
When $\lambda_h \rightarrow \infty$, $\Phi\left(\frac{\lambda_h h}{\sigma_h}\right)$ goes to 0 for any negative h and goes to 1 for any positive h, it means that when $\lambda_h \rightarrow \infty$ and $v_h = 3$, (6) becomes a Student $t_3^+(a,b)$ variable truncated to be positive. When $\lambda_h \rightarrow -\infty$, (6) becomes a Student $t_3^-(a,b)$ truncated to be negative. For further information, see Baumeister and Hamilton (2018).

We set the location parameters based on Blanchard & Perotti (2002) and Sznajderska et al. (2026), whereas the scale parameters based on Baumeister and Hamilton (2018). For instance, the prior mode for $\boldsymbol{\alpha_{ty}}$ is equal to 2.00, whereas Blanchard and Perotti (2002) set 2.08 and Favero and Giavazzi (2012) set 1.97. Additionally, we set the prior for the determinant of the $\boldsymbol{A}$ matrix, h_1 as done in Baumeister and Hamilton (2019). It is assumed that it follows asymmetric *t*-Student distribution At_3 $(3.0{,}1.6)$ with parameters selected in a simulation as in Baumeister and Hamilton (2019), which gives a 93% probability of being positive.

We use the following endogenous variables in our model: nominal general government consumption and gross investment expenditures (NIPA Table 3.9.5, line 1), nominal GDP (NIPA Table 1.1.5, line 1) and nominal general government current tax receipts (NIPA Table 3.1, line 2). All series are deflated with the implicit GDP deflator (from NIPA Table 1.1.9, line 1) and *per capita*. Next, the data are logarithmised and detrended using the modified Beveridge-Nelson filter of Kamber et al. (2025). The transformations are standard in fiscal VAR literature (see Blanchard & Perotti, 2002; Caldara & Kamps, 2017).

The model is estimated on quarterly data for the United States between Q1 1955 and Q4 2024, which gives a total of 280 observations. The data are presented in Figure 1. The Table shows the descriptive statistics for the endogenous variables. All variables oscillate around a zero mean. The greatest variability is observed for tax revenues. T ranges between 13.03 and 7.70.

Figure 1. Government spending gap (G), output gap (Y) and tax gap (T) calculated using the modified Beveridge-Nelson filter



Source: author's calculations based on data from NIPA tables.

Table. Descriptive statistics

	Mean	SD	Min	Max	Skew.	Kurt.	AR(1)
G	-0.0052	1.1826	-2.6581	4.3164	0.2783	3.3958	0.8653
Y	0.0003	1.1651	-6.2858	2.9462	-0.9769	6.1099	0.8082
T	-0.0022	2.8864	-13.0316	7.7036	-1.2070	6.1813	0.8306

Source: author's calculations.

4. Results

The results are presented in three steps. First, we discuss short-term elasticities, then we focus on the impulse response functions and finally, we present fiscal multipliers with a robustness check for different prior distributions of output tax elasticity. Lastly, we show historical decomposition for real GDP.

Figure 2 depicts the prior and posterior distributions for the elements of the $\boldsymbol{A}$ matrix. The baseline prior distribution is represented using solid red lines, whereas the posterior is presented using light green histograms. Below, we discuss the posterior distributions for the five short-term elasticities.

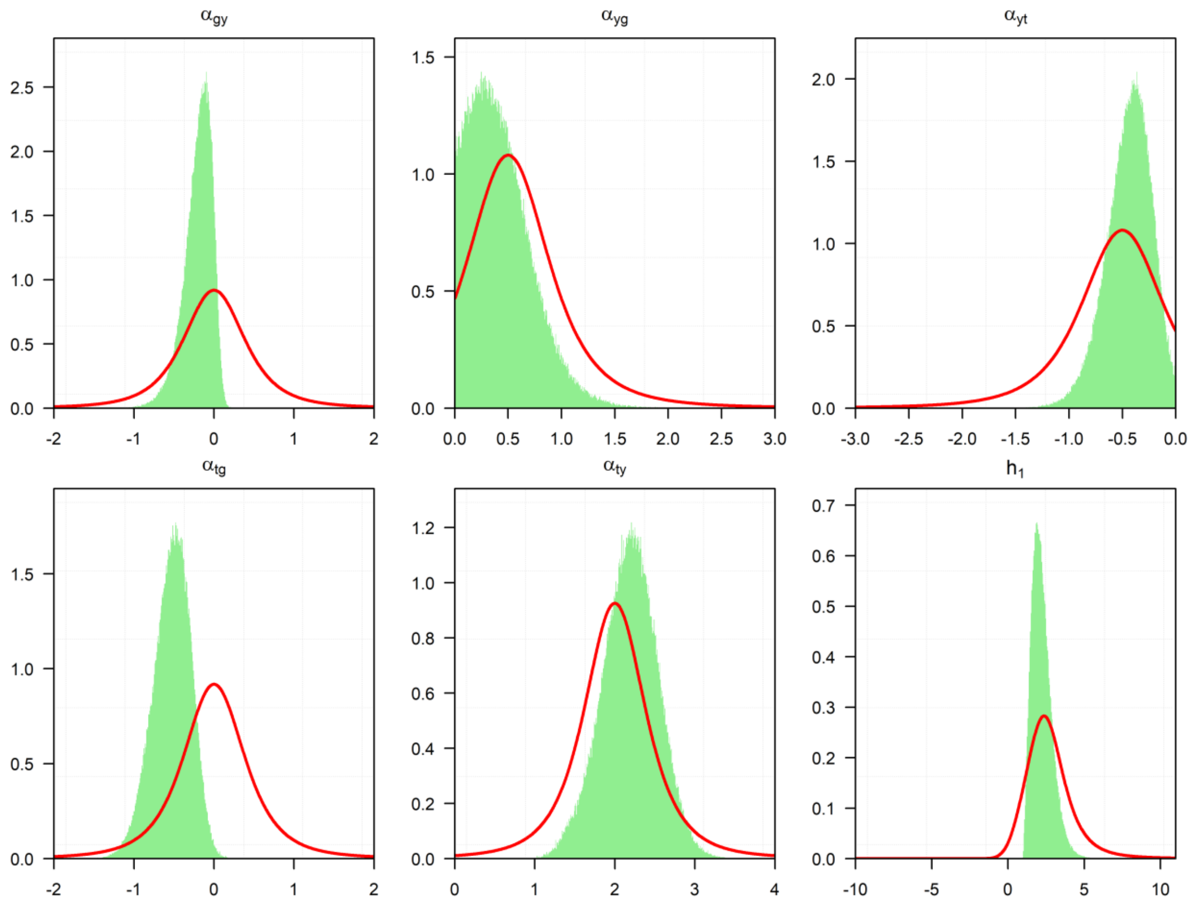
The median posterior value for $\boldsymbol{\alpha_{gy}}$, i.e. the output elasticity of government spending, amounts to merely -0.17 and the posterior 95% credible set includes 0. Our interpretation is that the value of the output does not affect the level of government spending in the same quarter. This is in line with our expectations, as spending decisions are usually made and announced earlier and implemented with a lag.

The data revise our prior beliefs about contemporaneous output elasticities. The posterior median for government spending elasticity of output $\boldsymbol{\alpha_{yg}}$ is equal to 0.39 and is lower than the assumed prior mode of 0.50. The posterior median for $\boldsymbol{\alpha_{yt}}$ is close to our prior, with its posterior median equalling -0.42. Our estimated posterior values for output elasticities are lower than the corresponding values in Blanchard and Perotti (2002).

Tax elasticity of government spending $\boldsymbol{\alpha_{tg}}$ is negative and equal to about -0.51 with a 95% posterior credible set (-0.93, -0.17), thus, the data revise our prior beliefs. The negative values for this elasticity are also reported in Caldara and Kamps (2017). The aforementioned values of tax elasticity could indicate that increases in government spending have a low negative effect on tax revenues in the current quarter.

Lastly, but most importantly, short-term output elasticity of taxes is slightly above our prior beliefs. The posterior median for $\boldsymbol{\alpha_{ty}}$ equals 2.20 and a 90% credible set (1.60, 2.75). The value is almost the same as found in a five-equation model by Sznajderska et al. (2024). It is a bit higher than in Blanchard and Perotti (2002), who assert that the output elasticity of net taxes is equal to 2.08. Additionally, it is higher than in Caldara and Kamps (2008), Favero and Giavazzi (2012), and Perotti (2008), where the value is 1.85, but it is almost the same as in Caldara and Kamps (2017), who assume its value is 2.18. Angelini et al. (2023), on the other hand, propose a range from 2.15 to 4.40. Thus, our estimates are within this range. In the sensitivity check, we test a model with a different prior assumption for $\boldsymbol{\alpha_{ty}}$. These results are shown in Figure 5 and discussed below.

Figure 2. Prior and posterior distributions for the $\boldsymbol{A}$ matrix



Source: author's calculations.

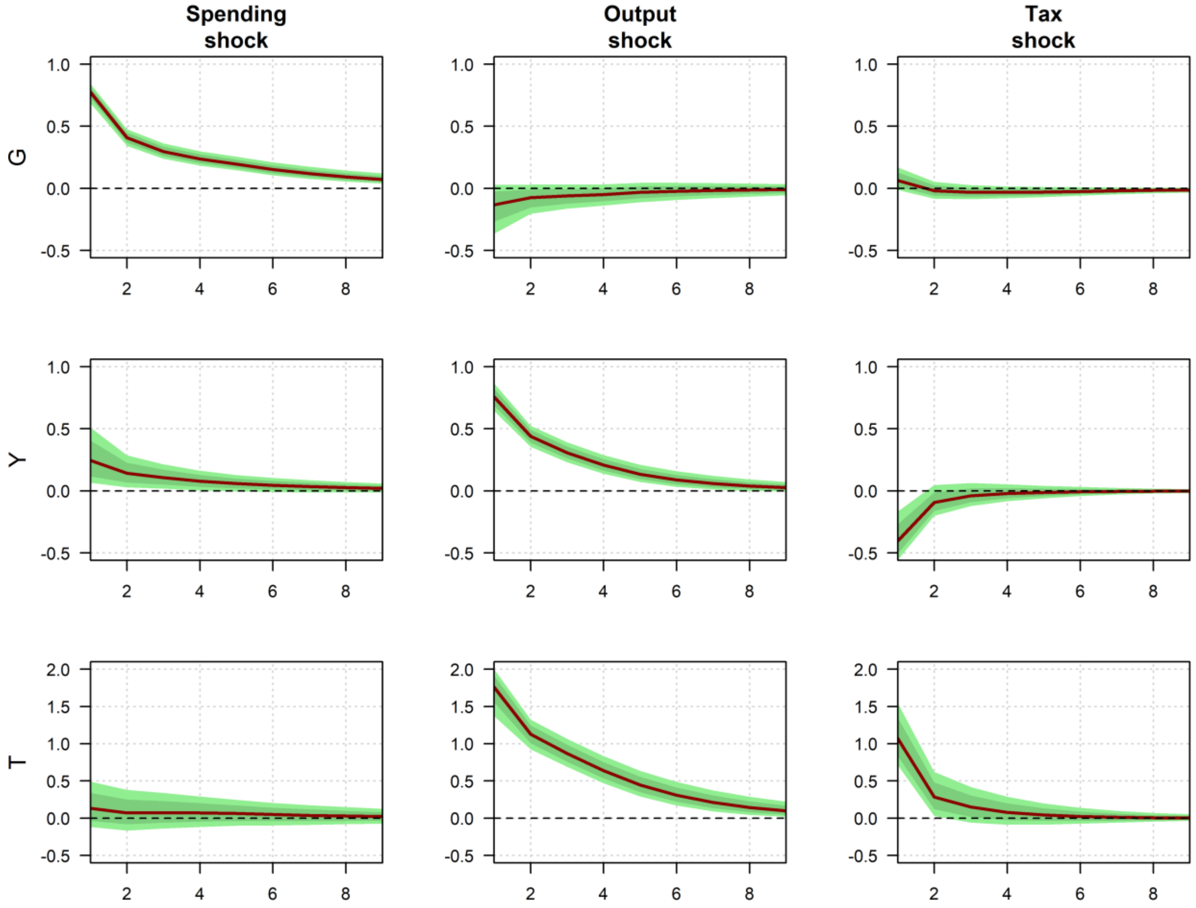
The impulse response functions from our baseline model are shown in Figure 3. The red solid lines represent the Bayesian median posterior response. The green areas denote 68% and 90% posterior credible sets. This study focuses on the results for the 68% posterior credible set. Each column in Figure 3 presents the response of endogenous variables to a spending, output and tax shock.

An unexpected increase in government spending of 0.77% leads to an increase in output, equal to 0.25% on impact. The response of the output is statistically significant for nine quarters. Moreover, tax revenues do not react to the government spending shock.

Next, an unexpected positive output shock, equal to 0.76% on impact, leads to a very large reaction of tax revenues (1.76%). This is a result of an increase in the tax base. Interestingly, after a positive output shock, we observe a decrease in government spending equal to -0.13% on impact, significant for three quarters. This could imply a slight counter-cyclicality of the fiscal policy.

The third column in Figure 3 shows the reactions to a positive tax shock, equal to 1.06% on impact. The increase in tax revenues causes a decrease in output equal to -0.40% on impact and it is statistically significant for two quarters. We observe a small increase in government spending equal to 0.06% on impact.

Figure 3. Impulse response functions from the baseline model



Source: author’s calculations.

We follow the definition of a fiscal multiplier often found in the literature (see (8). It is the dollar response of the output to a one-dollar change in government spending or tax revenues. It is calculated as the ratio of output response at horizon h to a (one-standard deviation) fiscal policy shock to the value of fiscal policy shock on impact divided by the scaling factor (cf. Angelini et al., 2023). The scaling factor is the ratio of the mean across the nominal fiscal spending or tax revenues sample (not in logs) to the mean across the level of output sample (nominal GDP, not in logs). Scaling factor $\frac{\bar{P}}{\bar{Y}}$ for both government spending and tax revenues is equal to 0.19 in the sample.

$$M_{ph} = \frac{IRF_{yh}}{IRF_{p0}} \frac{1}{\frac{\bar{P}}{\bar{Y}}} \quad . \tag{8}$$

Figure 4 presents the median values for fiscal multipliers with 68% and 90% posterior credible sets from the baseline model. The spending multiplier is positive and statistically significant for nine quarters. The value of the median posterior of the spending multiplier is

1.65 on impact, 0.53 after one year and 0.18 after two years. The tax multiplier is negative and statistically significant for two quarters. The value of the median posterior the of the tax multiplier is -2.00 on impact, -0.10 after one year and -0.02 after two years. The values of the fiscal multipliers are similar to those obtained using the five-equation model with monetary policy (see Sznajderska et al., 2024). Sznajderska et al. (2024) report the spending multiplier to be equal to 1.25 initially and 0.57 after a year, and the tax multiplier to equal -3.24 initially and -0.72 after a year. Thus, in absolute terms, the reported spending multiplier is slightly larger and the tax multiplier slightly lower. It is worth noting that the baseline model in Sznajderska et al. (2024) ends in Q4 2019 and does not include the COVID-19 pandemic.

Figure 5 shows how the results change when the prior beliefs concerning output tax elasticity are changed. We assume that $\boldsymbol{\alpha_{ty}} \sim t_3^+(3.00{,}0.4)$, meaning that the prior mean is increased from 2.00 (the value used in Blanchard & Perotti, 2002; Favero & Giavazzi, 2012; Perotti, 2008) to 3.00 (the value reported in Mertens & Ravn, 2014). The priors for all other parameters of the model remain the same as in the baseline specification. The posterior median for $\boldsymbol{\alpha_{ty}}$ equals 2.79. We observe significant differences in the values of the fiscal multipliers. The spending multiplier decreases reaching 1.23 on impact, 0.44 after one year and 0.16 after two years. What is more, it is surrounded by lower uncertainty. In contrast, the posterior median for the tax multiplier decreases to -3.95 on impact, -0.44 after one year and -0.11 after two years. Thus, in absolute terms, tax multiplier is much larger in the first quarter than the spending multiplier. We confirm the result found in Mertens and Ravn (2014) for a proxy VAR model that the higher output elasticity of the tax revenues is associated with the higher values of tax multipliers in absolute terms. Furthermore, the obtained values of the tax multipliers are similar to those found by Mertens and Ravn (2014).

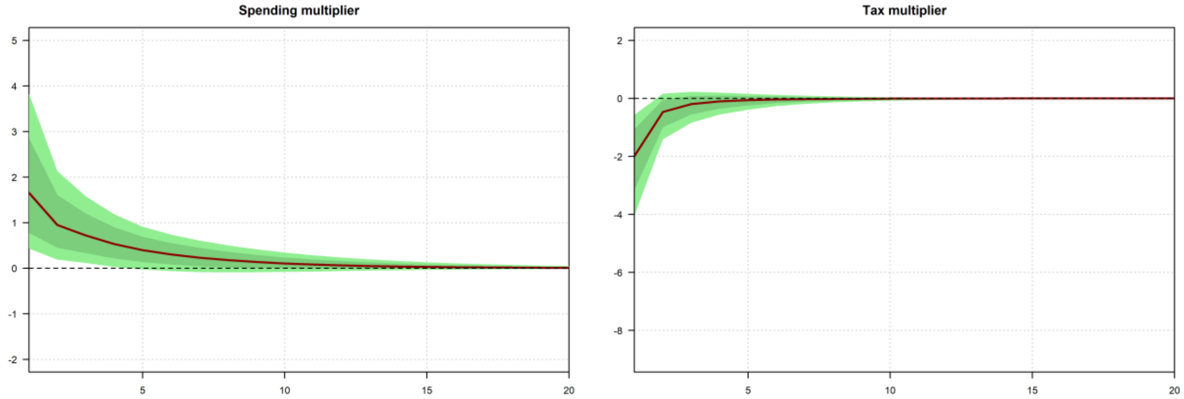
Figure 6 also shows the fiscal multipliers for Blanchard and Perotti (2002) model. The purpose of this exercise is to show that the application of the Baumeister and Hamilton method may significantly change the results. We follow equation 7 in Čapek and Cuaresma (2020):

$$\begin{bmatrix} \mathbf{1} & 0 & 0 \\ -\boldsymbol{\alpha_{yg}} & \mathbf{1} & -\boldsymbol{\alpha_{yt}} \\ 0 & -1.85 & \mathbf{1} \end{bmatrix} \begin{bmatrix} \varepsilon_t^g \\ \varepsilon_t^y \\ \varepsilon_t^t \end{bmatrix} = \begin{bmatrix} \mathbf{1} & 0 & 0 \\ 0 & \mathbf{1} & 0 \\ \beta_{tg} & 0 & \mathbf{1} \end{bmatrix} \begin{bmatrix} \varepsilon_t^g \\ \varepsilon_t^y \\ \varepsilon_t^t \end{bmatrix} \tag{9}$$

The fiscal multipliers from the Blanchard and Perotti model are lower in absolute terms than the ones obtained from the baseline model. The government spending multiplier is statistically insignificant. This is difficult to justify and highlights the superiority of the Baumeister and

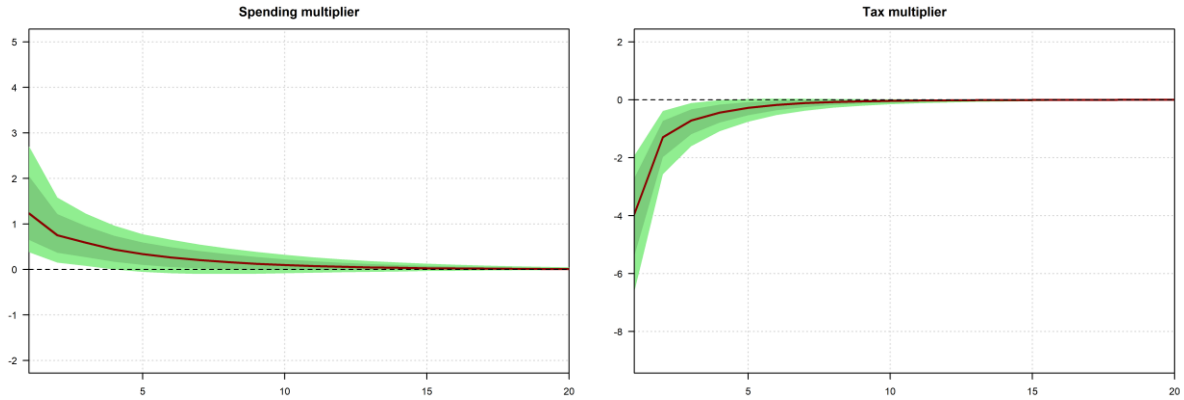
Hamilton method. The tax multiplier is equal to -1.20 on impact and then it steadily increases and becomes insignificant after the third quarter.

Figure 4. Fiscal multipliers for the baseline model



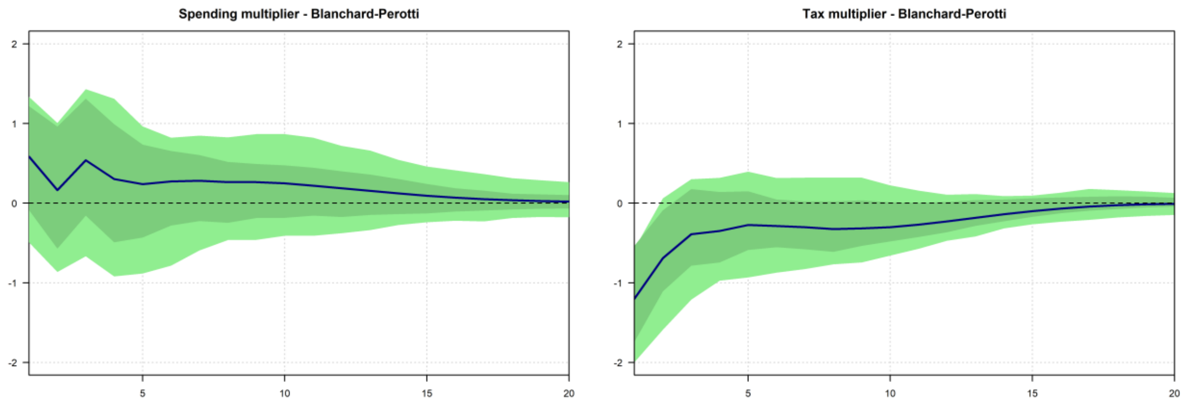
Source: author's calculations.

Figure 5. Fiscal multipliers for the model with higher output tax elasticity



Source: author's calculations.

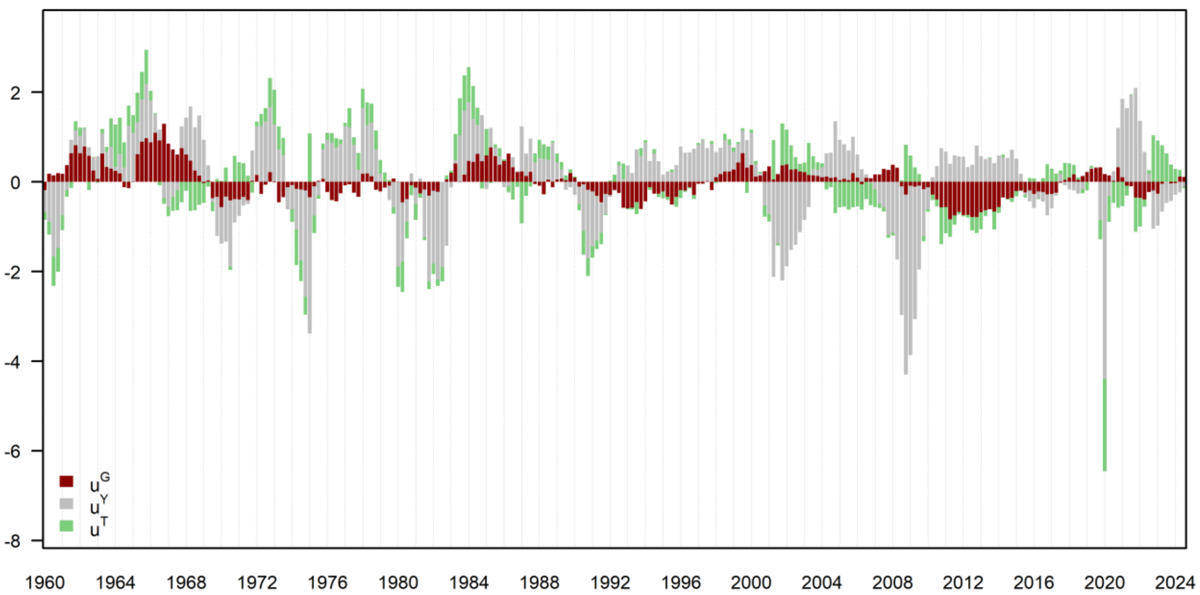
Figure 6. Fiscal multipliers estimated for the Blanchard and Perotti model, namely parameters c_1, c_2, a_2 from Table II in the paper by Blanchard and Perotti (2002). 68% and 90% bootstrap confidence intervals are presented in green



Source: author's calculations.

Lastly, Figure 7 shows the contribution of each identified structural shock to the GDP deviation from its long-term trend according to the baseline model. A historical decomposition enables us to assess the individual impacts of government spending, output and tax shocks at specific points in time, compared to other structural shocks. The main driver of GDP deviations is the output shock (in grey in Figure 7). The contribution of government spending shocks (in red) is also substantial, with the biggest negative impact in 2011–2013 and the biggest positive impact in 1965–1966. The contribution of tax shocks (in green) is relatively smaller, with the biggest negative impact at the beginning of the COVID-19 pandemic and the biggest positive impact in Q1 1975 and Q4 2022.

Figure 7. Historical decomposition for GDP deviations from its long-term trend from the baseline model



Source: author's calculations.

We performed several robustness checks, such as estimating the model for the sample that ends before the COVID-19 pandemic, increasing the tightness parameter (λ_0) or increasing the scale parameters to 0.6 for all prior distributions. These changes do not affect our results and are available from the author upon request.

5. Discussion and conclusions

This paper is devoted to tracing the effects of fiscal policy shocks in the United States. We apply the Baumeister and Hamilton (2015, 2018 and 2019) method to calculate the level of fiscal multipliers in a three-variate fiscal VAR à la Blanchard and Perotti (2002). The method allows us to apply different priors on the parameters describing the contemporaneous relations in the structural form VAR model. We incorporate our knowledge and uncertainty in the model by setting sign restrictions and determining the parameters of the prior distributions of the $\boldsymbol{A}$ matrix.

Importantly, the baseline model is estimated for quarterly data between 1955 and 2024 including the COVID-19 pandemic. However, the results are robust to shortening the sample, i.e. the pre-COVID-19 sample provides similar results.

The most important result is that the one-period spending multiplier is equal to 1.65 on impact, 0.53 after one year and 0.18 after two years, and the tax multiplier is equal to -2.00 on impact, -0.10 after one year and -0.02 after two years. The posterior output elasticity of taxes is equal to 2.20, which is in the range of the values reported in the literature. An increase in the prior mode for output elasticity of taxes results in a lower tax and spending multipliers.

The study shows that both increasing spending and decreasing taxes can stimulate the economy. However, the effects of tax decreases may be larger for the economy. This confirms the findings of Mountford and Uhlig (2009) and Mertens and Ravn (2014).

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