UNIVERSITÀ CATTOLICA del Sacro Cuore

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Abstract. Applying Panel SVAR modelling to 1995-2017 regional data, we estimate fiscal multipliers in Italy at national and sub-national level and find that expansionary fiscal policies produce positive and persistent effects on GDP. Fiscal multipliers remain larger than 1 even 10 years after a discretionary fiscal policy is implemented. Government investment stimulates output more than government consumption. Moreover, fiscal multipliers are higher in Centre-Northern regions than in Southern ones. Such evidence is confirmed when fiscal foresight is considered. Our findings support the Keynesian perspective, indicating that Italy should increase public investments to foster economic growth especially in the poorest Southern regions.

Keywords: Fiscal multipliers; Government consumption and investment; Panel SVAR; Italian regions; North-South divide

J.E.L Codes. C33, E62, H70, R58.

1. Introduction

After the 2007 financial crisis, fiscal consolidation policies have been implemented throughout Europe to stimulate economic growth, reduce the debt-to-GDP ratio, and mitigate financial market instability by decreasing sovereign debt bond spreads. Such measures were supposed to foster private consumption and investment growth thanks to the existence of zero or even negative fiscal multipliers (Alesina et al., 2019). However, they proved to be ineffective in the face of economic stagnation and the increase in the debt-to-GDP ratio. In light of this, the hysteresis theory has thus preconized that austerity would produce persistent and negative effects on actual and potential output (Ball, 2014; Fatás and Summers, 2018). Recent theoretical and empirical advancements have been proposed in this framework (Blanchard and

Summers, 2017; Girardi et al., 2020), also with respect to fiscal multipliers (Engler and Tervala, 2018). Besides such critique, a further, growing body of literature has challenged the effectiveness of fiscal consolidation policies by demonstrating that fiscal multipliers assume positive values. Blanchard and Leigh (2013), for instance, show that fiscal multipliers assume positive values around 1.5, suggesting that fiscal consolidation produces a Keynesian effect by generating a recession rather than economic expansion. Similarly, the International Monetary Fund (2020) has recently advocated for a public investment push to allow economies recovering from stagnation and to overcome social crises like the one generated by the COVID-19 pandemic. The literature on fiscal multipliers now demonstrates that expansionary government spending stimuli engender real GDP increases (Blanchard and Perotti, 2002; Auerbach and

Gorodnichenko, 2012), even if their magnitude varies across studies (Gechert, 2015). Furthermore, while the main literature focuses on multipliers associated with total government expenditure, only a few studies separate government consumption from investment, providing mixed results (Perotti, 2004; Auerbach and Gorodnichenko, 2012; Boehm, 2019).

The present paper starts from these premises to estimate fiscal multipliers of aggregate government expenditures and those related with government investment and consumption for Italian regions. To that aim, Panel Structural Vector Autoregressive modelling (P-SVAR) is applied to regional (NUTS-2) annual data for the 1995-2017 period. The Italian study case is an interesting one for manifold reasons. First, because Italy has a long history of regional inequalities in terms of productivity, employment, and demographic growth

(Lagravinese, 2015) often referred to as the *Southern Question*, a term used to denote Southern regions as an unsolved social, economic and financial problem. In such a context, the distribution of public spending and the study of its effectiveness need to be analysed at sub-national level to verify if and to what extent public interventions differently affect territories and local economies. Second, Italy was one of the European countries most affected by post-crisis austerity policies (Kitson et al., 2011), where government expenditure was cut by about 12% and government investment by nearly 50% during the 2009-2017 period (Deleidi, 2020). That makes even more compelling to verify how different fiscal policies could influence economic growth, both at the time of their implementation and in the future. In this regard, the application of P-SVAR modelling to the large dataset of 460 observations – constituted by 20 territorial units by

23 years of observation – allows indentifying exogenous fiscal policy shocks at the regional level and to compute impulse response functions (IRFs) to assess their effects on the output level both at their impact and in subsequent years. Previous research on the Italian case has never employed P-SVAR techniques (Pedroni, 2013) to estimate fiscal multipliers at the sub-national level while also breaking down total government expenditure data into consumption and investment and considering fiscal expectations. The effectiveness of the different fiscal policies considered can thus be evaluated across Italian macro-areas in order to compare the estimated multipliers for Centre-Northern and Southern regions.

Our findings show that a Keynesian effect is at play as an increase in the level of government expenditure produces persistent and positive effects on the GDP level. Furthermore, investment multipliers are higher than

consumption ones and they are found to be lower in Southern regions than in the Centre-North of the country. Such evidence has important policy implications, which translate into a decisive public intervention in the economy especially in the form of investment, as also recently suggested by the IMF (2020). Results also offer elements for discussion in light of the existing regional disparities, as public investment would facilitate regional convergence among advanced and depressed areas like the Italian South (Graziani, 1978; Garegnani, 2015).

In what follows, the paper provides a review of the literature on fiscal multipliers in Section 2. In Section 3, data and methods used are discussed in light of the most recent methodological literature advancements. Section 4 presents the results net of fiscal expectations, while Section 5 presents the estimated multipliers including

fiscal foresight. Section 6 concludes and draws some policy implications.

2. Literature review

2.1 Fiscal multipliers: an overview

The literature usually focuses on fiscal multipliers associated with total spending (Blanchard and Perotti, 2002; Caldara and Kamps, 2017). Little research is instead devoted to the estimation of multipliers for selected categories of public expenditures, like public consumption, government investment, military and non-military spending (Perotti, 2004; Auerbach and Gorodnichenko, 2012; Boehm, 2019). Some authors demonstrate that, compared to government consumption, government investment produces larger multiplicative effects on GDP (Burriel et al. 2010; Auerbach and

Gorodnichenko, 2012) by combining the short-run effects of supporting effective demand with the long-run supply-side effects on production, and by creating positive externalities in the private sector (Baxter and King, 1993). Another strand of literature claims the opposite is true (Perotti, 2004; Pappa 2009; Ilzetzki et al., 2013; Boehm, 2019). On a more general note, although it is usually shown that GDP increases after a fiscal policy expansion, the magnitude of multipliers differs among studies (Gechert, 2015). Such diversity is usually attributed to the state of the business cycle (Auerbach and Gorodnichenko, 2012) and to country specificities, like the accumulated public debt, the degree of development, the exchange rate regime and the openness to trade (Ilzetzki et al., 2013; Ramey, 2019). Furthermore, a vast debate on the size of the state-dependent multiplier exists. In their recent research, Auerbach and Gorodnichenko (2012, 2017) find

that fiscal multipliers are higher during recessions than during economic expansion. Several studies support the same evidence using alternative empirical methods and different sets of countries and times spans (Fazzari et al., 2015; Riera-Crichton et al., 2015). These findings are explained by the fact that crowding-out effects on private consumption and investment is weaker during economic downturns because of a slower responsiveness of prices and interest rates. However, the idea of state-dependent multipliers has been questioned by Owyang et al. (2013) and Ramey and Zubairy (2018) who find evidence of an acyclical spending multiplier.

2.2 Empirical literature

To compute fiscal multipliers, the empirical macroeconomic literature relies on an array of estimation methods. The most common family of models is that of

Vector Autoregressive (VAR) models, which allow obtaining exogenous fiscal policy shocks by imposing suitable identification strategies among the considered variables. Alternative methods are based on simulations obtained through Dynamic Stochastic General Equilibrium (DSGE) models (Christiano et al., 2011; Leeper et al., 2017) and by using empirical techniques grounded on the Local Projections (LPs) approach (Jordà, 2005).[1] Regardless of the method used, government multipliers are generally estimated in a range of positive values. Analysing US data through VAR modelling,

[1] The LPs approach uses specific variables capturing fiscal policy shocks, such as military expenditure, forecast errors of the rate of growth of government spending, and fiscal consolidation episodes. More recently, the LPs approach has been combined with the property of SVAR models, by introducing the shocks identified through SVAR models in the LPs equation. For a review, see Auerbach and Gorodnichenko (2017), Ramey and Zubairy (2018) and Boehm (2019).

Blanchard and Perotti (2002) estimate a government expenditure impact multiplier of 0.84 and a peak effect of 1.29. Beetsma et al.'s (2008) VAR estimates generate multipliers for EU countries in the 1.17–1.50 range, whilst Burriel et al. (2010) find similar multipliers (0.76 and 0.75, respectively) for US and European government spending. Estimated VAR models for the US economy have also provided fiscal multipliers of 4.5 after 12 quarters in the pre-1979 period and a multiplier of 2.38 in the post-1983 period (Bilbiie et al., 2008); an impact multiplier of 0.84 (Bachmann and Sims, 2012); an impact multiplier of 0.91 and a peak multiplier above 1 (Galí et al., 2007); an impact multiplier of 1.3 (Cimadomo and Bénassy-Quéré, 2012); and multipliers close to 1 and ranging between 1 and 1.3 (Auerbach and Gorodnichenko, 2012; Caldara and Kamps, 2017).

Among the studies breaking down government spending into consumption and investment, Burriel et al. (2010) find an investment multiplier close to 2 for the US economy and of 1.56 for Euro area countries using VAR modelling as well. Both estimates are higher than multipliers of government consumption attaining 0.49 on impact for the US and 0.86 for the Eurozone. Using the same method, Auerbach and Gorodnichenko (2012) estimate a peak fiscal multiplier of government consumption equal to 1.21 and a multiplier associated with government investment of 2.12. Evidence that government investment has a larger impact on the economy compared with government consumption is also conveyed by more recent research by Boitani and Perdichizzi (2018). Using the LPs approach, the authors estimate investment multipliers larger than 4 and public consumption ones close to 3.20 for Eurozone countries.

Finally, fiscal multipliers of government investment is 1 on impact and close to 3.5 at its peak in European countries also according to Bénétrix and Lane (2010) and Deleidi et al. (2020). On the other hand, using both the VAR and LPs methods, Perotti (2004), Pappa (2009), Ilzetzki et al. (2013) and Boehm (2019) show that government consumption is more effective than government investment in increasing GDP.

2.3 Fiscal multipliers for Italy

The literature on Italy also proposes a range of estimates for fiscal multipliers computed implementing different methods. By means of a DSGE model, Kilponen et al. (2019) find a first-year consumption fiscal multiplier of 0.79 and 0.86 assuming a zero lower bound. A first-year multiplier lower than 1, with no significant differences between government investment and

consumption, is also obtained by Carreras et al. (2016) using the National Institute Global Econometric Model (NiGEM). De Nardis and Pappalardo (2018) estimate a structural macro-econometric model (MeMo-It) to find that government investment multipliers are higher than consumption ones. The scholarly literature employing VAR modelling is even wider. Batini et al. (2012) employ regime-switching VAR models to show that fiscal multipliers of government spending fluctuate between 0.6 and 0.9, highlighting that they are higher during recessions than economic expansions. Using Threshold VAR, Caprioli and Momigliano (2013) estimate a government consumption multiplier of 1.04 on impact with a peak effect close to 1.8 after three years. The same technique is employed by Afonso et al. (2018) who estimate multipliers varying in the 0.6–1.36 interval in high-stressed financial regimes, whereas low stressed

financial regimes are characterized by multipliers ranging between 0.12 and 0.27. A government spending multiplier varying between 0.8 and 1.5 is found by Cimadomo and D'Agostino (2016) via time-varying VAR modelling. Finally, SVAR models are used by Giordano et al. (2007) to estimate multipliers of 2.4 in the 4th quarter, 2.4 in the 8th quarter, and 1.7 in the 12th quarter, and by Deleidi (2020) who estimates a government expenditure peak multiplier of 1.87, and government consumption and investment multipliers of 3.17 and 4.72, respectively.

Finally, looking at the research carried out by Italian policy-making institutions, estimated multipliers are positive over a horizon of 5 years and no significant differences between government consumption and investment are detected. Implementing the Italian Treasury Econometric Model (ITEM), the Italian Ministry of Economy and Finance (MEF) obtains a peak

government expenditure multiplier as high as 1.1 2 years after the launch of a discretionary fiscal policy, and government consumption and government investment generate a peak effect of 1.3 and 1.2 respectively (MEF, 2017). The Bank of Italy estimates multipliers through the quarterly econometric model—providing estimates for government consumption multipiers close to 0.8 in the first year and 0.6 in the second one—as well as by means of a DSGE model (Bulligan et al., 2017; Busetti et al., 2019). The latter indicates that, in absence of an accommodating monetary policy, government investment generates a short-run multiplier of 0.7 and a medium-run effect of 1.5.

2.4 Regional multipliers

A strand of literature estimates fiscal multipliers for sub-national levels of analysis or employing regional data.

Using NUTS-3 level Italian data and a quasi-experiment approach, Acconcia et al. (2014) find a multiplier ranging between 1.5 and 1.9. Brückner and Tuladhar (2014) implement a dynamic panel data approach on annual Japanese prefecture spending data to find a public investment multiplier of 0.93 and a local government expenditure multiplier of 0.78. Nakamura and Steinsson (2014) consider regional variation in military expenditures to estimate a State GDP multiplier of 1.43 and a regional GDP multiplier of 1.85 for the US. Suárez et al. (2016) examine the impact of federal spending on county income in the US and find a local income multiplier of government spending ranging between 1.7 and 2. Dupor et al. (2019) estimate an aggregate consumption fiscal multiplier for the US, aggregating the local multiplier in a New Keynesian model with heterogeneous agents and non-complete market. Starting

from cross-regional data, they find a positive aggregate consumption fiscal multiplier equal to 0.64, which is higher than the local consumption fiscal multiplier (0.29). Finally, based on Italian regional annual data, Piacentini et al. (2016) study the effect of fiscal policies in Italian macro-areas for the 2011-2013 period using full-scale macro-economic simultaneous equation model. According to the authors, spending cuts produce larger adverse effects in Southern Italian regions than in Northern ones. Moreover, on impact, consumption spending multipliers are equal to 0.44 in Northern regions and 0.84 in Southern ones. In contrast, cumulative multipliers are estimated at 0.27 in Northern regions and equal to 0.70 in Southern ones. Focusing on investment expenditure, an impact multiplier of 1.45 is estimated on impact and a cumulative multiplier of 1.48 is found in Northern regions. Conversely, in Southern regions an

impact multiplier of 1.37 and a cumulative multiplier of 1.85 are estimated.

In the surveyed literature, no research, to the best of our knowledge, implements P-SVAR techniques to estimate fiscal multipliers associated with different fiscal policies by using sub-national data and simultaneously controlling for fiscal expectations. To fill these gaps, we apply P-SVAR modelling to Italian NUTS-2 regional data in order to assess fiscal multipliers (i) associated with total government expenditure, and (ii) by breaking down public spending into consumption and investment expenditure. All considered models are first computed net of fiscal foresight, and then augmented by fiscal expectations. To contribute to the debate on the Italian North-South divide, multipliers are computed and commented at the macro-area level.

3. Data and methods

3.1. Data

The statistical information employed in this paper is an integrated data source built using the annual regional data provided by the Organization for Economic Co-operation and Development (OECD), the National Institute of Statistics (Istat), and European Commission's AMECO, covering all Italian NUTS-2 regions over the 1995-2019 period.[2] Variables include the regional GDP (Y), government expenditure for each region (G) broken down by government consumption (G_C) and investment

[2] The considered variables are summarised in Appendix A (Table A1). The choice of variables is dictated by data availability since Istat provides regional data on public expenditure on annual basis only. Many scholarly contributions on fiscal policy estimate multipliers using annual data (Beetsma et al. 2008; Born and Müller, 2012; Auerbach and Gorodnichenko, 2017). For an in-depth discussion on the use of annual and quartely data, see Born and Müller (2012).

(G_I). Such information is provided by Istat and displayed in Figures 1–4. To consider fiscal expectations, we use the Italian government expenditure forecasts (G^F) provided by OECD at national level. Variables are transformed from nominal to real terms using the GDP deflator (Y_DEF) at the national level provided by AMECO.[3]

To compare the effect of fiscal policies among Italian regions while maintaining a North-South divide perspective, we divide our sample into the two subgroups of Centre-Northern and Southern regions.[4] Italian regions

[3] We do not include taxes in our models since the Istat database does not provide such variables on a regional basis. That, however, has been demonstrated to not alter the value of multipliers (Auerbach and Gorodnichenko, 2017; Ramey and Zubairy, 2018).

[4] The Centre-Northern macro-area includes Valle d'Aosta, Piemonte, Lombardia, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Emilia-Romagna, Toscana, Marche, Umbria, and Lazio. Southern regions include Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, and Sardegna.

and areas differ sensibly in terms of both GDP and public expenditure growth. As shown in Table 1, the Italian average annual GDP growth rate was 0.18% between 1995 and 2017. During that period, Northern regions grew by 0.12% per year, while the overall Southern annual percentage variation of GDP was negative (-0.22%). Territorial disparities even exacerbated after the hit of the Great Recession. Indeed, during the pre-crisis period, the two macro-areas grew at a quite similar pace – the Centre-North at 0.55% and the South at 0.39%, respectively. After 2008, the North observed an average GDP growth rate of -0.49% per year, while the South fell at -1.11% yearly. A similar pitcure is conveyed by variations in the distribution of government expenditure and its components. Total public spending in Italy grew by 1.51% before the crisis, and by -1.28% after 2008. While government expenditure growth rate was very similar

between the two macro-areas during the pre-crisis period (1.36% per year in the North, 1.35% per year in the South), it attained -1.34% yearly in the Centre-North and -1.71% in the South after the Great Recession. Looking at the dynamics of the components of government spending, public investment was more negatively affected than consumption by post-crisis austerity policies, registering a change of -5.62% in the South and of -5.13% in the Centre-North over the 2008-2017 period. The variation in government consumption expenditure attained instead -0.82% in the Centre-North and -1.26% in the South.

Table 1. Average annual rate of growth of GDP, public expenditure, public consumption and public investment in Italian regions. 1995-2017

Regions	Y			G			G_C			G_I		
	1995-2017	1995-2008	2008-2017	1995-2017	1995-2008	2008-2017	1995-2017	1995-2008	2008-2017	1995-2017	1995-2008	2008-2017
Abruzzo	-0.06	0.30	-0.58	0.32	1.03	-0.70	0.15	0.92	-0.96	1.76	2.06	1.32
Basilicata	-0.09	0.36	-0.74	-0.19	1.09	-2.04	-0.09	1.11	-1.84	-1.05	0.87	-3.82
Calabria	-0.24	0.53	-1.34	0.34	1.32	-1.07	0.55	1.24	-0.43	-1.95	2.00	-7.66
Campania	-0.13	0.48	-1.02	0.27	2.00	-2.23	0.37	1.79	-1.68	-0.87	3.87	-7.71
Emilia-Romagna	0.56	0.93	0.04	0.42	1.25	-0.79	0.59	1.18	-0.26	-1.01	1.74	-4.98
Friuli-Venezia Giulia	-0.01	0.36	-0.54	0.13	1.74	-2.20	0.38	1.69	-1.52	-1.65	2.01	-6.95
Lazio	0.18	0.74	-0.63	0.52	1.88	-1.45	0.74	2.09	-1.21	-0.83	0.73	-3.09
Liguria	-0.04	0.61	-0.97	-0.50	0.13	-1.41	-0.30	0.35	-1.23	-2.15	-1.55	-3.02
Lombardia	0.36	0.65	-0.06	0.63	1.45	-0.55	0.88	1.66	-0.25	-1.12	0.13	-2.92
Marche	0.13	0.85	-0.92	0.28	1.22	-1.09	0.34	1.19	-0.89	-0.46	1.49	-3.27
Molise	-0.68	0.34	-2.16	-0.15	1.63	-2.72	0.00	1.23	-1.78	-1.05	3.59	-7.76
Piemonte	-0.11	0.23	-0.59	0.29	1.73	-1.80	0.57	1.91	-1.36	-2.35	0.39	-6.32
Puglia	-0.20	0.13	-0.67	0.50	1.63	-1.13	0.50	1.50	-0.96	0.60	2.94	-2.78
Sardegna	-0.01	0.68	-1.01	-0.18	0.81	-1.61	-0.04	0.56	-0.91	-1.23	2.25	-6.25
Sicilia	-0.38	0.34	-1.41	-0.16	1.27	-2.22	0.08	1.18	-1.50	-3.05	2.00	-10.33
Toscana	0.26	0.63	-0.26	0.35	1.32	-1.05	0.42	1.18	-0.68	-0.32	2.54	-4.45
Trentino Alto Adige	0.68	0.63	0.76	0.65	1.68	-0.85	0.95	1.61	0.00	-0.74	1.94	-4.60
Umbria	-0.36	0.47	-1.56	-0.03	1.21	-1.83	0.21	1.08	-1.04	-2.56	2.16	-9.38
Valle d'Aosta	-0.49	-0.07	-1.08	-0.44	1.07	-2.62	0.12	1.13	-1.35	-3.48	0.81	-9.68
Veneto	0.34	0.63	-0.08	0.74	1.58	-0.47	0.88	1.54	-0.08	-0.13	1.84	-2.99
Centre-North	0.12	0.55	-0.49	0.25	1.36	-1.34	0.48	1.38	-0.82	-0.85	1.18	-5.13
South	-0.22	0.39	-1.11	0.09	1.35	-1.71	0.19	1.19	-1.26	-1.40	2.44	-5.62
Italy	0.18	0.61	-0.43	0.37	1.51	-1.28	0.53	1.51	-0.87	-0.86	1.61	-4.45

Figure 1. Total government expenditure, Italian NUTS-2 regions. 1995-2017

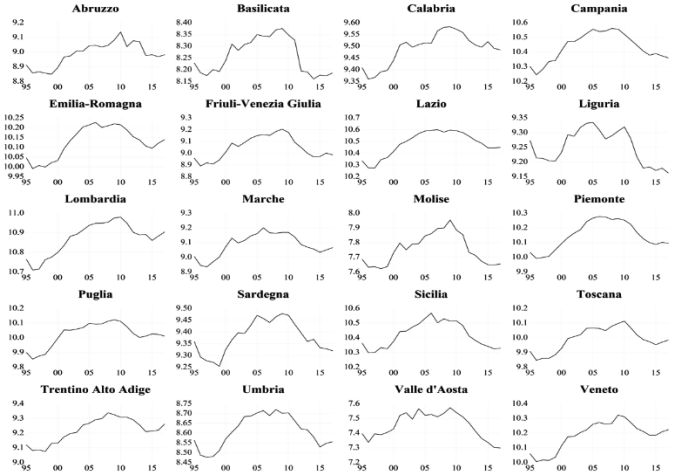


Figure 2. Government consumption expenditure, Italian NUTS-2 regions. 1995-2017

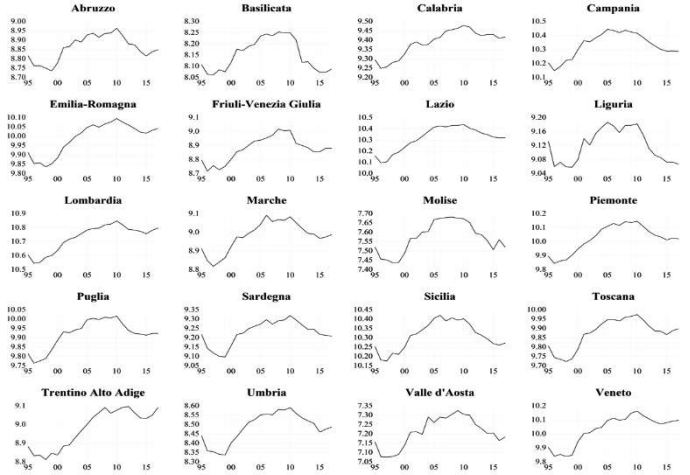


Figure 3. Government investment expenditure, Italian NUTS-2 regions. 1995-2017

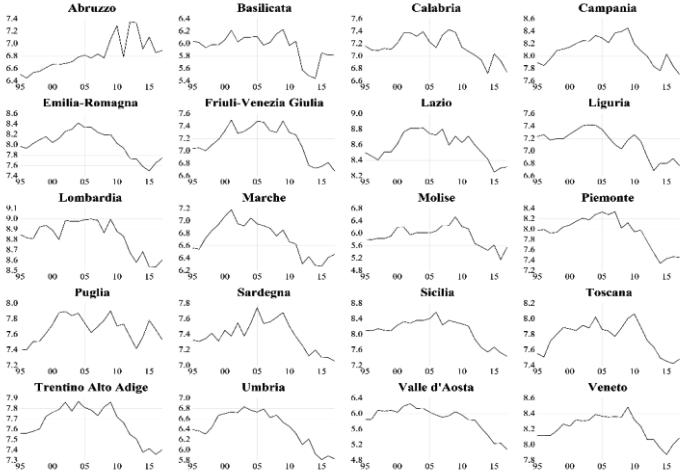
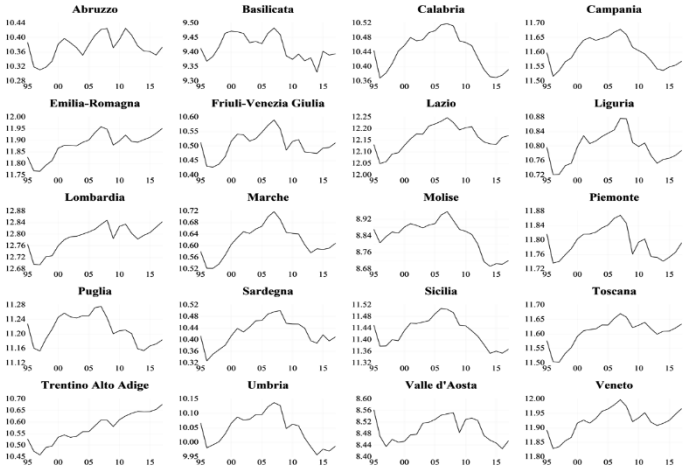


Figure 4. Gross domestic product, Italian NUTS-2 regions. 1995-2017



3.2. Methods

To assess the effectiveness of fiscal policies carried out in Italy during the 1995-2017 period in terms of economic growth, we specify two models: in Model 1, we estimate the fiscal multiplier associated with total government expenditure (G), while in Model 2 government expenditure is broken down by government investment (G_I) and government consumption (G_C). To both specifications, P-SVAR modelling is applied. As a first step, we estimate a reduced-form panel VAR(n) as in equation (1):

$$y_{i,t} = A_i(L)y_{i,t-n} + \varepsilon_{i,t} \qquad (1)$$

where y is the vector of variables, $A_i(L)$ is a polynomial of lagged coefficients and ε is the error term of the

reduced-form Panel VAR.[5] The selected lag is 2 for both Model 1 and Model 2 and is obtained through the GTOS (general-to-specific) criteria (Pedroni, 2013). A P-SVAR is then obtained by imposing an identification strategy to the reduced-form panel VAR(n) that, in turn, enables retrieving a structural model as in equation (2):

$$B_{0i}y_{i,t} = B_i(L)y_{i,t-n} + w_{i,t} \qquad (2)$$

where B_{0i} represents the matrix of contemporaneous coefficients, B_i is the matrix of lagged coefficients, and $w_{i,t}$ is the vector of serially uncorrelated structural shocks. The identification of the structural model requires to

[5] All variables are taken at levels as it allows preserving any cointegrating relationship that may exist among the considered variables (Auerbach and Gorodnichenko, 2012, ft. 6; Kilian and Lütkepohl, 2017).

impose restrictions on B_{0i} that are directly derived from the economic theory (Kilian and Lütkepohl, 2017). The identification allows obtaining exogenous fiscal policy shocks. As surveyed by Caldara and Kamps (2008), four main identification strategies can be distinguished in the empirical literature. The first one is the recursive approach based on a Cholesky factorisation (Bilbiie et al., 2008; Bachmann and Sims, 2012; Deleidi and Mazzucato, 2020). The second one is the so-called Blanchard and Perotti approach, which adds to the recursive ordering an external coefficient representing the elasticity of taxes to GDP (Blanchard and Perotti, 2002; Auerbach and Gorodnichenko, 2012). In the third one, known as the sign restriction approach, restrictions are imposed on the sign of the response functions (Pappa, 2009; Mountford and Uhlig, 2009). The last one is called the narrative approach and consists in creating dummy variables for exogenous

historical events that change fiscal policy stances (Ramey and Shapiro; 1998; Ramey, 2011).[6]

Models 1 and 2 are recursively identified by using short-run restrictions. In the case of Model 1, we assume the identification summarised in (3):

$$B_{0i}y_{it} = \begin{bmatrix} - & 0 \\ - & - \end{bmatrix} \begin{bmatrix} G_{i,t} \\ Y_{i,t} \end{bmatrix} \qquad (3)$$

where '−' indicates an unrestricted parameter and a '0' represents a zero restriction. The identification strategy in (3) is commonly implemented when estimating fiscal

[6] The first three identification strategies estimate a SVAR model using either short-run zero restrictions or the sign restriction approach and has the advantage to capture the effects associated with a broader set of fiscal policies. Compared to the SVAR approach, the narrative one is limited in that it only allows assessing the effects of fiscal shocks associated with a very narrow classes of fiscal policy. For a comparison between these methods, see Perotti (2007) and Kilian and Lütkepohl (2017, Ch. 6).

multipliers and is based on the idea that government expenditures are not affected by the output level in the contemporaneous relationship because there exist both an information delay in releasing GDP data and an implementation lag when a discretionary fiscal policy is designed (Blanchard and Perotti, 2002).

Government investment is deemed more exogenous than government consumption, under the idea that government investment is dependent on strategic decisions usually based on long-term political goals, as well as on bureaucratic and institutional decisions grounded on feasibility studies that involve different policy-making institutions and take a long time to be implemented (Deleidi et al., 2020). Hence, when total government expenditure is broken down into investment (G_I) and consumption (G_C), we assume a suitable identification strategy (4) to be:

$$B_{0i}y_{it} = \begin{bmatrix} - & 0 & 0 \\ - & - & 0 \\ - & - & - \end{bmatrix} \begin{bmatrix} G\_I_{i,t} \\ G\_C_{i,t} \\ Y_{i,t} \end{bmatrix} \quad (4)$$

Once that restrictions are imposed, the structural shocks are obtained, and the P-SVAR is estimated, IRFs are calculated to detect the dynamic effect of the rate of public expenditure and its components on the GDP level. IRFs are estimated over a period of 10 years and then reported with 95% confidence interval bands estimated by bootstrapping standard errors. Since variables are in logarithmic form, the IRFs are interpretable as elasticities.[7] Additionally, we estimate the so-called cumulative multipliers, namely the cumulative GDP gain

[7] To estimate fiscal multipliers, elasticities need to be converted by the corresponding *ex-post* conversion factors calculated as average ratios of GDP and the considered government expenditures.

relative to the cumulative government spending during a given period (Ramey and Zubairy, 2018).

4. Fiscal multipliers without fiscal forecasts

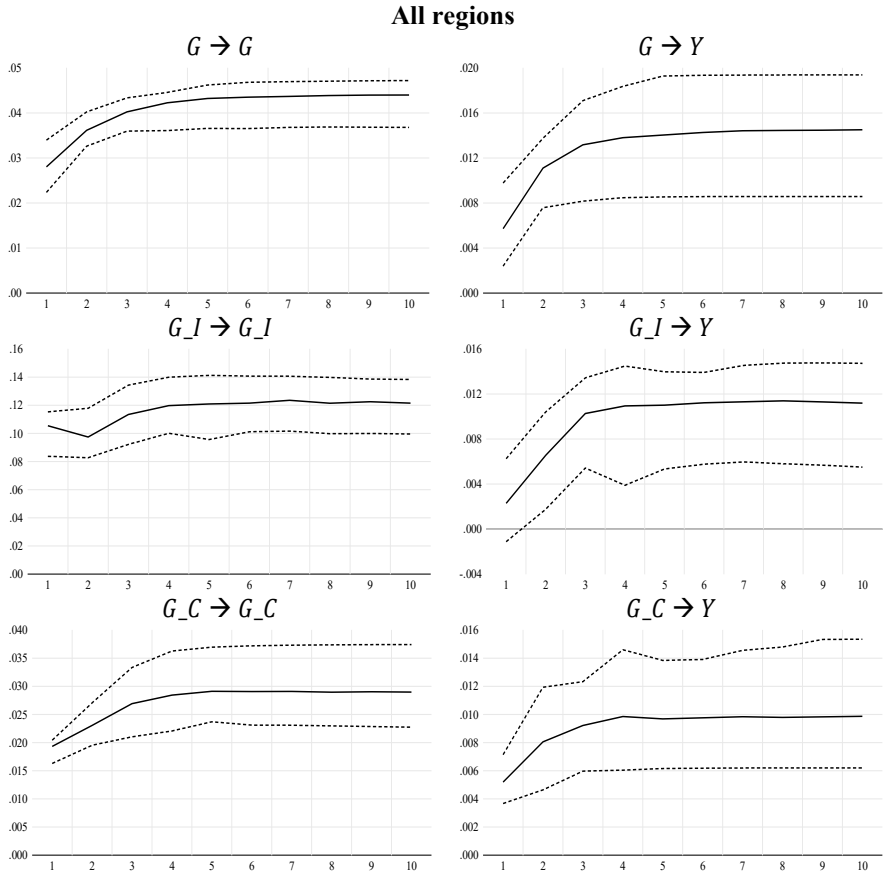
In this Section, we plot the IRFs relative to total public expenditure (G), followed by the IRFs broken down by public investments (G_I) and public consumption (G_C) estimated without considering fiscal foresight.

When all Italian regions are considered (Figure 5), shocks in G, G_I, and G_C are highly persistent as they remain significantly positive throughout the whole 10-years period. IRFs also show that the GDP response to a government spending shock is positive over the whole 10-years period and for all three classes of expenditures. The same evidence is found from the analysis of IRFs applied to macro-areas considered separately (Figure 6): steadily

positive IRFs reflect the high persistence of government spending shocks in the output level for the whole time span, both in Centre-Northern and Southern Italy.

Such evidence is even more clearly delivered by converting IRFs into cumulative fiscal multipliers (Table 2). In the case of all Italian regions, with the exception of the multiplier at the impact that is smaller than 1 (0.850), G generates significantly positive multipliers in all subsequent years, with a peak multiplier of 1.375 in the 7th year and an overall average of 1.307. Looking at government expenditure components, public investments show the highest multipliers – 2.881 on average, higher than 2 in the 2nd year and consistently higher than 3 thereafter – with a peak of 3.281 in the 8th year.

Figure 5. Impulse Response Functions (IRFs), Models 1 and 2 without fiscal foresight estimated for all regions. Figures display elasticities. Dotted lines are 95% confidence bands estimated through a Bootstrapping procedure (1000 repetitions).



Multipliers associated to government consumption are also always higher than 1 though slightly lower than

investment ones, showing a peak of 1.676 at the 2nd year and an overall average of nearly 1.6.

Concerning the two Italian macro-areas, general public expenditure is found to positively stimulate output levels in both the Centre-North and the South, with multipliers respectively averaging 1.499 and 1. The main difference between the two macro-areas is the timing at which multipliers are at their highest: for Centre-Northern regions, the peak is reached at the 10th year (1.611), while for Southern regions the peak multiplier is found at year 3 (1.077). G_I multipliers are highest than G_C ones in both macro-areas, with Centre-Northern and Southern regions showing average government investment multipliers as high as 3.542 and 2.040 respectively. The largest multipliers associated to public investments are found in the Centre-North, with a peak multiplier of 4.066, while in the South the shock engenders the highest G_I

multiplier of 2.293. In both macro-areas, for this class of public spending the peak is reached at year 8. As shown before, consumption multipliers are smaller than investment ones, especially in Southern regions where IRFs estimate a 0.906 multiplier at the impact and multipliers that range between 1.326 (year 2) and 1.368 (year 4). In sum, IRFs and cumulative fiscal multipliers demonstrate that, even after 10 years, increases in general public spending and in its components engender a persistently positive increase in GDP.

Figure 6. Impulse Response Functions (IRFs), Models 1 and 2 without fiscal foresight by macro-area. Figures display elasticities. Dotted lines are 95% confidence bands estimated through a Bootstrapping procedure (1000 repetitions).

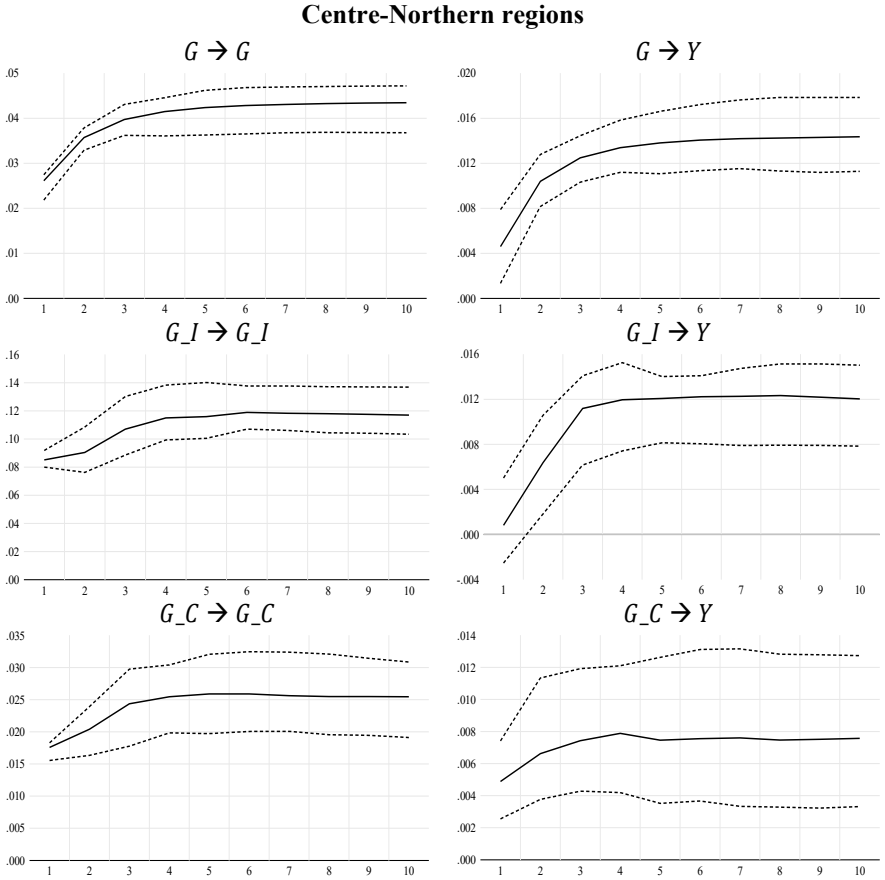


Figure 6 (continued)

Southern regions

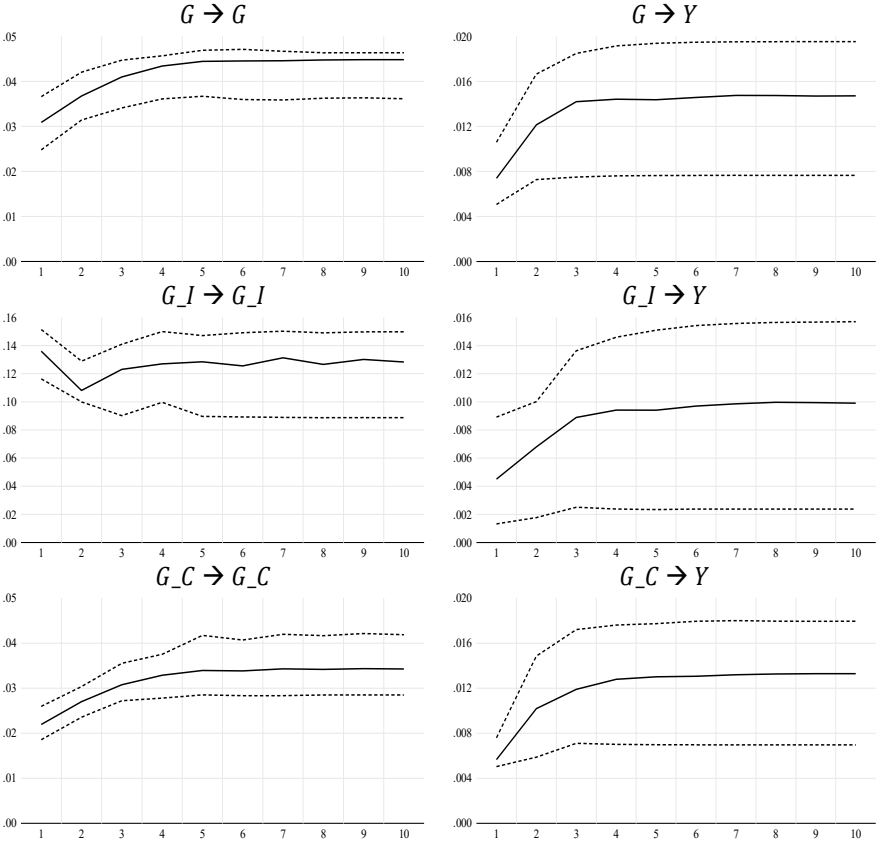


Table 2. Cumulative Multipliers, Models 1 and 2 estimated without fiscal foresight for: all regions, Centre-Northern and Southern Regions. In bold significant multipliers, 95% confidence bands. The impact multiplier is the multiplier at year 1; 2Y to 10Y are the multipliers at different years; Peak is the maximum multiplier; Av. is the average multiplier.

Cumulative fiscal multipliers – without fiscal forecast								
	Impact	2Y	4Y	6Y	8Y	10Y	Peak	Av.
All regions								
G	**0.850**	**1.280**	**1.361**	**1.366**	**1.372**	**1.374**	**1.375 (7)**	1.307
G_I	0.757	**2.351**	**3.195**	**3.228**	**3.281**	**3.221**	**3.281 (8)**	2.881
G_C	**1.289**	**1.676**	**1.662**	**1.611**	**1.622**	**1.634**	**1.676 (2)**	1.598
Centre-Northern regions								
G	**0.859**	**1.419**	**1.572**	**1.600**	**1.604**	**1.611**	**1.611 (10)**	1.499
G_I	0.365	**2.746**	**4.044**	**4.001**	**4.066**	**4.001**	**4.066 (8)**	3.542
G_C	**1.571**	**1.836**	**1.751**	**1.650**	**1.657**	**1.684**	**1.836 (2)**	1.685
Southern regions								
G	**0.744**	**1.027**	**1.033**	**1.018**	**1.025**	**1.021**	**1.077 (3)**	1.000
G_I	**0.965**	**1.833**	**2.160**	**2.249**	**2.293**	**2.250**	**2.293 (8)**	2.040
G_C	**0.906**	**1.326**	**1.368**	**1.357**	**1.365**	**1.363**	**1.368 (4)**	1.311

5. Expectations and fiscal multipliers

We now present IRFs considering fiscal foresight and the corresponding fiscal multipliers. Also this set of results is presented both as a country average computed from regional data and for the Centre-Northern and Southern macro-areas separately.

Fiscal foresight is regarded as playing a fundamental role when assessing the magnitude of fiscal multipliers (Ramey, 2011; Auerbach and Gorodnichenko, 2012). Due to the existence of legislative and implementation lags, private agents may anticipate their expenditures since a certain amount of time usually passes between the fiscal policy announcement and when it becomes effective. For that reason, not including information arising from fiscal policy news in models may lead to draw inaccurate conclusions. Considering

fiscal expectations in SVAR models allows isolating both anticipated (expected) and unanticipated (unexpected) fiscal policy shocks (Ben Zeev and Pappa, 2017). To cope with that, we augment both Models 1 and 2 with a variable referred to fiscal foresight. Starting from government expenditure forecasts (G^F) released by OECD, we calculate the rate of growth of G^F ($\Delta G^F_{i,t|t-1}$) as seen in Auerbach and Gorodnichenko (2012). Then we add it both in Model 1 and 2 as first ordered variables assuming the following recursive factorisation: (i) Model 1, $[\Delta G^F_{i,t|t-1}, G_{i,t}, Y_{i,t}]'$; (ii) Model 2, $[\Delta G^F_{i,t|t-1}, G\_I_{i,t}, G\_C_{i,t}, Y_{i,t}]'$. As expectations are not provided at the regional level, for the sake of simplicity we assume that $\Delta G^F_{i,t|t-1}$ is homogenous across Italian regions. Hence, we are finally able to distinguish between the shocks corresponding to fiscal

expectations representing an anticipated fiscal policy shock, from the ones associated with effective fiscal variables representing unexpected fiscal policy shocks. In this Section, we report IRFs and multipliers aimed at assessing the effect of unanticipated fiscal policy shocks.

The plot of IRFs allows seeing the effect of unexpected public expenditure shocks on the GDP level, considering general government expenditure and its decomposition into government investment and government consumption. Figures 7 and 8 show that, when all Italian regions are considered, shocks in G, G_I, and G_C are highly persistent and remain positive during the subsequent 10 years. Moreover, the effect of an unanticipated public spending shock on the output level is increasingly positive over the 10-year period considered, especially when the shock is given on the investment side (G_I). IRFs for Centre-Norther and Southern regions are

also augmented with fiscal foresight (Figures 8). In both cases, fiscal expectations do not alter the primary picture: positive and persistent effects on G, G_I, and G_C produce long-lasting and persistent effects on the output level.

Table 3 summarises cumulative multipliers augmented by fiscal foresight. When $\Delta G^{F}_{i,t|t-1}$ is included in the model, multipliers remain greater than 1. Specifically, G generates peak multipliers as high as 1.578 at the country level – 1.842 for Centre-Northern regions, and 1.199 for Southern regions. Government investment multipliers are confirmed to be higher than government consumption ones, with a peak effect of 3.348, when all regions are considered; 4.115 for the Centre-North; and 2.401 for the South. Finally, G_C peak multipliers attain 1.942 at the country level, 2.241 in the Centre-North, and 1.464 in Southern regions. In sum, also cumulative fiscal

multipliers estimated with fiscal expectations confirm that increases in government expenditure – be it for investment or consumption – engender a persistent and positive rise in the GDP level.

Figure 7. Impulse Response Functions (IRFs), Models 1 and 2 with fiscal foresight $[\Delta G^{F}_{i,t|t-1}]$ estimated for all regions. Figures display elasticities. Dotted lines are 95% confidence bands estimated through a Bootstrapping procedure (1000 repetitions).

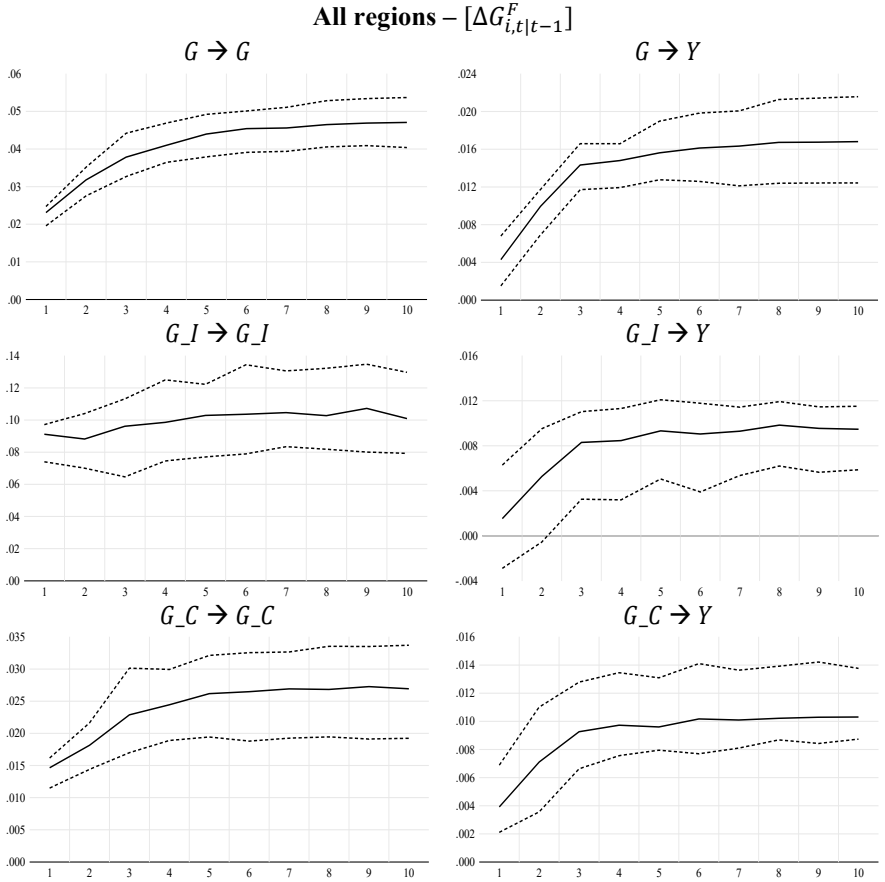


Figure 8. Impulse Response Functions (IRFs), Models 1 and 2 with fiscal foresight $[\Delta G^F_{i,t|t-1}]$ by macro-area. Figures display elasticities. Dotted lines are 95% confidence bands estimated through a Bootstrapping procedure (1000 repetitions).

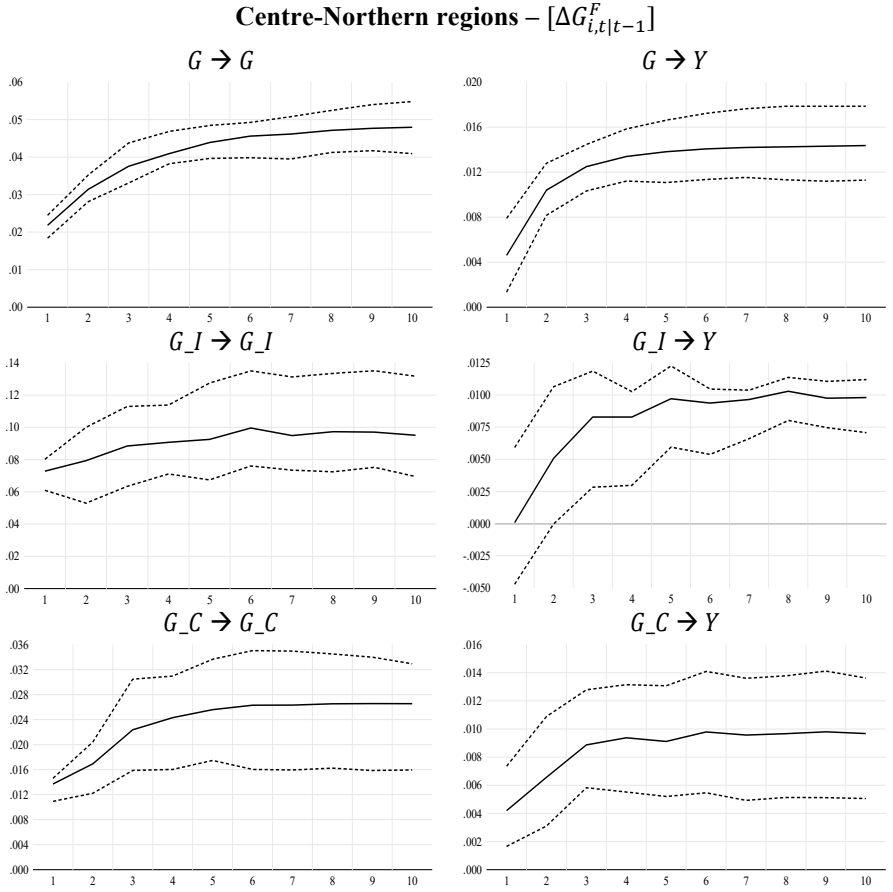


Figure 8 (continued)

Southern regions – $[\Delta G^{F}_{i,t|t-1}]$

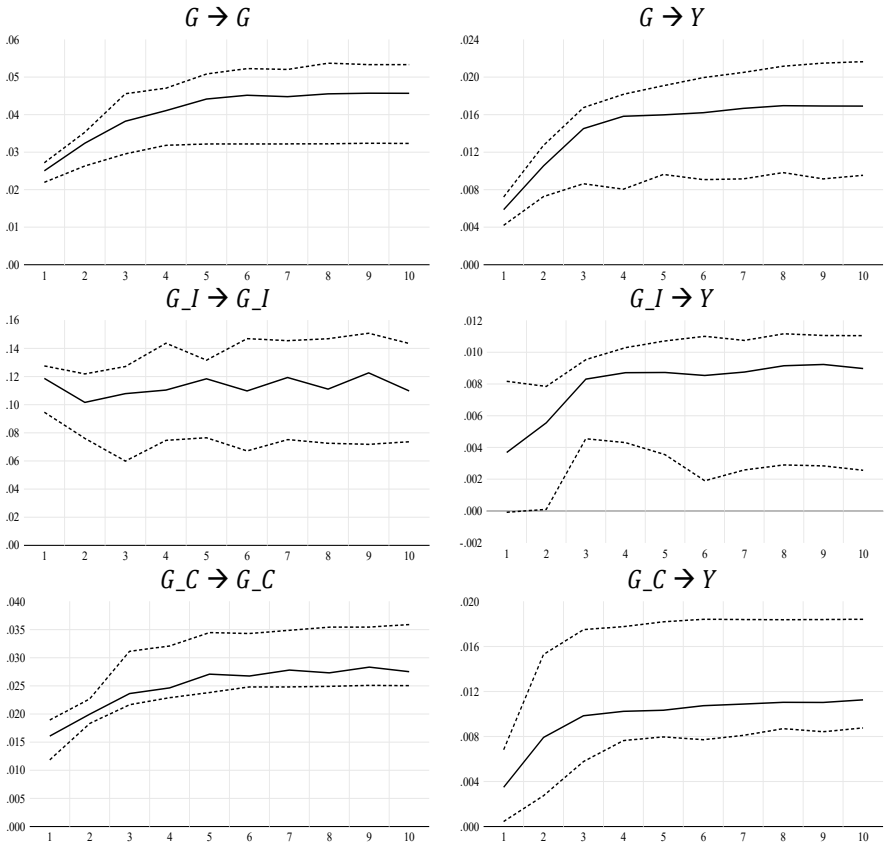


Table 3. Cumulative Multipliers, Models 1 and 2 estimated with fiscal forecasts for: all regions, Centre-Northern and Southern Regions. In bold significant multipliers, 95% confidence bands. The impact multiplier is the multiplier at year 1; 2Y to 10Y are the multipliers at different years; Peak is the maximum multiplier; Av. is the average multiplier.

Cumulative fiscal multipliers – with fiscal forecast ($\Delta G^F_{i,t\|t-1}$)								
	Impact	2Y	4Y	6Y	8Y	10Y	Peak	Av.
All regions – $\Delta G^F_{i,t\|t-1}$								
G	**0.773**	**1.304**	**1.505**	**1.479**	**1.499**	**1.488**	**1.578 (3)**	1.409
G_I	0.584	2.090	**3.003**	**3.053**	**3.348**	**3.282**	**3.348 (8)**	2.777
G_C	**1.282**	**1.879**	**1.908**	**1.842**	**1.827**	**1.836**	**1.942 (3)**	1.789
Centre-Northern regions – $\Delta G^F_{i,t\|t-1}$								
G	0.723	**1.482**	**1.681**	**1.717**	**1.712**	**1.700**	**1.842 (3)**	1.596
G_I	0.041	**2.492**	**3.556**	**3.663**	**4.115**	**4.009**	**4.115 (8)**	3.348
G_C	**1.734**	**2.191**	**2.180**	**2.104**	**2.061**	**2.061**	**2.241 (3)**	2.073
Southern regions – $\Delta G^F_{i,t\|t-1}$								
G	**0.729**	**1.012**	**1.199**	**1.116**	**1.158**	**1.151**	**1.199 (4)**	1.098
G_I	0.905	**1.592**	**2.299**	**2.266**	**2.401**	**2.381**	**2.401 (8)**	2.057
G_C	**0.762**	**1.394**	**1.461**	**1.411**	**1.421**	**1.437**	**1.464 (3)**	1.343

6. Conclusion and policy implications

After the Great Recession, several consolidation fiscal policies and labour market reforms aimed at reducing public expenditure have been implemented in Italy and other peripherical EU countries. Their alleged purpose was to restore economic growth, reduce public indebtedness, and mitigate financial market instability on sovereign bonds. However, despite austerity has been particularly strong in Italy, fiscal policy retrenchment did not lead to the expected positive effects. Conversely, endorsing a Keynesian perspective allows to rethink at how cutting public expenditure could not be of help neither in terms of economic recovery nor of stabilization of the debt-to-GDP ratio. In fact, over the last years, the effectiveness of fiscal consolidation policies in fostering economic growth has been questioned by a growing body

of literature that has demonstrated that fiscal multipliers are positive while austerity policies produce negative effects on the output level. More recently, scholars supporting the hysteresis perspective too have warned policy-makers and institutions about the possible long-lasting dangers of implementing fiscal consolidation policies, especially in times of economic recession (Ball, 2014; Blanchard and Summers, 2017; Fatàs and Summers, 2018).

This paper's aim was to contribute to such a debate by estimating fiscal multipliers associated with government expenditure and its components – i.e., public consumption and investment – focusing on the Italian case. To do this, P-SVAR modelling was applied to Italian regional data for the 1995-2017 period. We computed the multipliers both at the country level and by breaking them down into two macro-areas, namely the Centre-North and

the South, to elaborate on the Italian North-South divide. Furthermore, additional models were specified to incorporate fiscal expectations in the estimation of multipliers. Our results support the idea that expansionary fiscal policies produce Keynesian effects: an increase in government expenditures engenders a long-lasting and persistent rise in the GDP level, also suggesting that strong hysteresis effects of fiscal policy are at play. When we consider the average multiplicative effect of public spending observed in Italian regions, the estimated multipliers attain positive values that are larger than one, even 10 years after the fiscal policy shock. Moreover, when government expenditure is split into consumption and investment, the latter shows a higher multiplicative effect on the GDP than the former. Both when we do not consider expectations and when we add fiscal forsight, government investment generates a higher multiplier

compared with the one obtained for government consumption. Concerning the Centre-Northern and the Southern macro-areas, the available data indicates that after the Great Recession public expenditure was cut more harshly in the South than in the North of the country. In the light of the results obtained in the present analysis, such kind of policy may exacerbate the long-established economic divergence between the two areas (Agnello et al., 2016). Cumulative multipliers at the macro-area level are positive and higher than one in both the Centre-North and the South. However, in the North multipliers are generally higher than in Southern regions, especially those associated to public consumption. Such evidence is confirmed also when fiscal expectations are modelled.

In conclusion, our findings suggest that the government should implement expansionary fiscal policies in light of their ability to generate positive and

persistent effects on the GDP level. Being investment multipliers always higher than those associated with government consumption, public investment represents the most effective way to spend public funds with the aim of stimulating growth. However, also the positive effects produced by public consumption should not be disregarded. Despite some economists suggest to increase wage flexibility to foster growth in Southern regions (Boeri et al., 2019), our findings highlight that expansionary fiscal policies should be pursued instead, since a boost in government spending would increase the GDP level also of economically depressed regions. Such a view is also supported by the IMF (2020), according to which a public investment plan—combining the short-run effects of supporting aggregate demand with the long-run structural transformation effects—would facilitate the economic recovery after the COVID-19 pandemic and

alleviate chronic regional divergence, like the one between the Centre-North and the South of Italy.

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Appendices

Appendix A

Table A1. Data description

Data	Description	Source
Y	Gross Domestic Product of Italian regions, Market Prices, Millions of Euro, Annual data	ISTAT (Conti e aggregati economici territoriali)
G	Government Expenditures (Market Prices), Market Prices, Millions of Euro, Annual data	ISTAT (Conti e aggregati economici territoriali)
G_C	Government Final Consumption Expenditures, Market Prices, Millions of Euro, Annual data	ISTAT (Conti e aggregati economici territoriali)
G_I	Government Gross Fixed Capital formation, Market Prices, Millions of Euro, Annual data	ISTAT (Conti e aggregati economici territoriali)
G^F	Government Expenditure Forecasts, Market Prices, Millions of Euro, Annual data	OECD (Economic Outlook database, Fall issue)
Y_DEF	GDP Deflator (2010=100), Annual data	AMECO

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