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FULL ARTICLE

Quantifying fiscal multipliers in Italy: A Panel SVAR analysis using regional data

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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, Italian regions, North–South divide, panel SVAR

JEL CLASSIFICATION
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, economists from different streams of thought have begun to challenge the effectiveness of fiscal consolidation policies, arguing that

austerity would produce persistent and negative effects on actual and potential output (Ball, 2014; Blanchard & Leigh, 2013; Fatás & Summers, 2018). Even the International Monetary Fund (2020) 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. In fact, the literature on fiscal multipliers demonstrates that expansionary government spending stimuli engender real GDP increases (Auerbach & Gorodnichenko, 2012; Blanchard & Perotti, 2002). However, multipliers' magnitude varies across studies (Gechert, 2015) and only a little research separates the general total government expenditure category into consumption and investment, providing mixed results (Auerbach & Gorodnichenko, 2012; Boehm, 2020; Perotti, 2004). Investment and consumption multipliers are even more rarely computed for sub-national territorial entities with the aim of investigating how fiscal policy exerts its effects in the context of regional disparities.

The present paper starts from these premises to estimate fiscal multipliers associated with aggregate government expenditures as well as 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 period 1995–2017. The Italian study case is an interesting one for many reasons. First, Italy has a long history of uneven internal development in terms of productivity, employment, infrastructure endowment, and demographic growth (Belloc & Tilli, 2013; Giacinto & Nuzzo, 2006). Such an internal disparity is often referred to as the *Southern Question*, a term used to denote Southern regions as an unsolved social, economic and financial problem (Arestis et al., 2017). In such a context, it is essential to analyse the distribution of public spending and to study its effectiveness at sub-national level to verify if and to what extent public interventions differently affect diverse local economies. Second, a continuous process of slowdown in the redistributive fiscal flows among regions has occurred in Italy since the end of the 1990s and became even more severe after the implementation of post-crisis fiscal consolidation policies, which amplified—rather than reduced—interregional disparities (Gandullia & Leporatti, 2020; Giannola et al., 2016; Petraglia et al., 2020). Third, Italy was one of the European countries most affected by post-crisis austerity policies, where government expenditure and government investment were cut by about 12% and 50% respectively, during the period 2009–2017 (Deleidi, 2021). 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—that is, 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. Moreover, the present research has also the goal to embody fiscal foresight in the evaluation of multipliers to consider the possibility that private agents anticipate their expenditures due to the existence of lags between fiscal policy announcements and the time when it becomes effective. The impact of the different fiscal policies considered can thus be evaluated across Italian macro-areas to compare the estimated multipliers for Centre-Northern and Southern regions separately as the two spatial aggregates of main political relevance in the country.

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. 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 (Garegnani, 2015; Giannola & Prezioso, 2017; Graziani, 1978; SVIMEZ, 2019).

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 & Perotti, 2002; Caldara & Kamps, 2017). Little research is idevoted to the estimation of multipliers for selected categories of public expenditures, like public consumption, government investment, military and non-military spending (Auerbach & Gorodnichenko, 2012; Boehm, 2020; Perotti, 2004). Some authors demonstrate that, compared to government consumption, government investment produces larger multiplicative effects on GDP (Auerbach & Gorodnichenko, 2012; Burriel et al., 2010) 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 & King, 1993; Ramey, 2020). Another strand of literature claims the opposite is true (Boehm, 2020; Ilzetzki et al., 2013; Pappa, 2009; Perotti, 2004). 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 & 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).[1]

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).[2] Regardless of the method used, government multipliers are generally estimated in a range of positive values. Analysing US data through VAR modelling, 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, while 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 & 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 & Bénassy-Quéré, 2012); and multipliers close to 1 and ranging between 1 and 1.3 (Auerbach & Gorodnichenko, 2012; Caldara & 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 (2020) show that government consumption is no 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 (2021) 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 Serrato and Wingender (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. (2021) 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 associated with total government expenditure, and government consumption and investment expenditures. 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. The latter analysis becomes particularly relevant in light of the recent contributions stressing that Italian regional asymmetries in fiscal policy have been exacerbated after the implementation of post-crisis fiscal consolidation policies (Gandullia & Leporatti, 2020; Giannola et al., 2016; Petraglia et al., 2020).

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 period 1995–2017.[3] Variables include the regional GDP (*Y*), general government consumption (*G_C*), general government investment (*G_I*), and total general government expenditure (*G*), calculated as the sum of *G_C* and *G_I*. Such information—displayed in Figures 1-4 —is provided by Istat and represents general government expenditure and its components allocated at the regional level. 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.

To compare the effect of fiscal policies among Italian regions while maintaining a North–South perspective, we divide our sample into the two subgroups of Centre-Northern and Southern regions, also in accordance with a cultural politics of scales approach (González, 2011).[4] Italian regions and areas differ sensibly in terms of both GDP and public expenditure growth (SVIMEZ, 2019). 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.

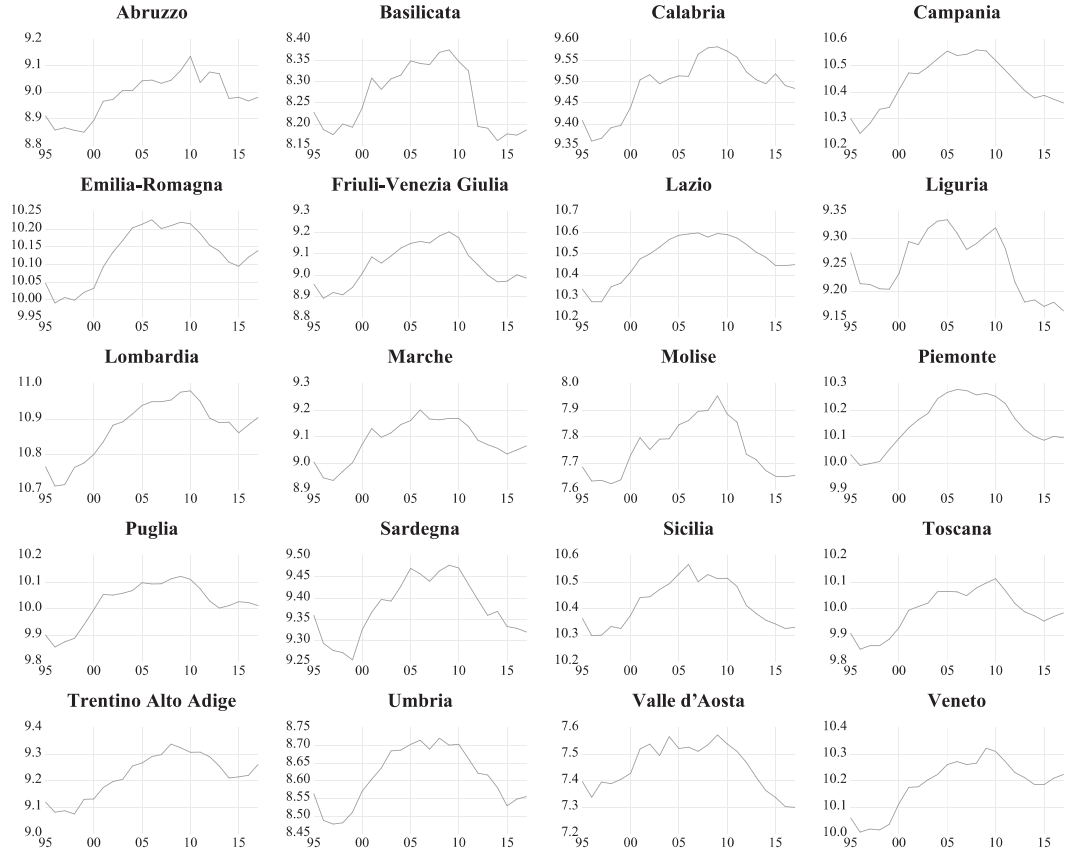

FIGURE 1 Total government expenditure, Italian NUTS 2 regions, 1995–2017

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:

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

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 general-to-specific (GTOS) 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:

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

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 impose

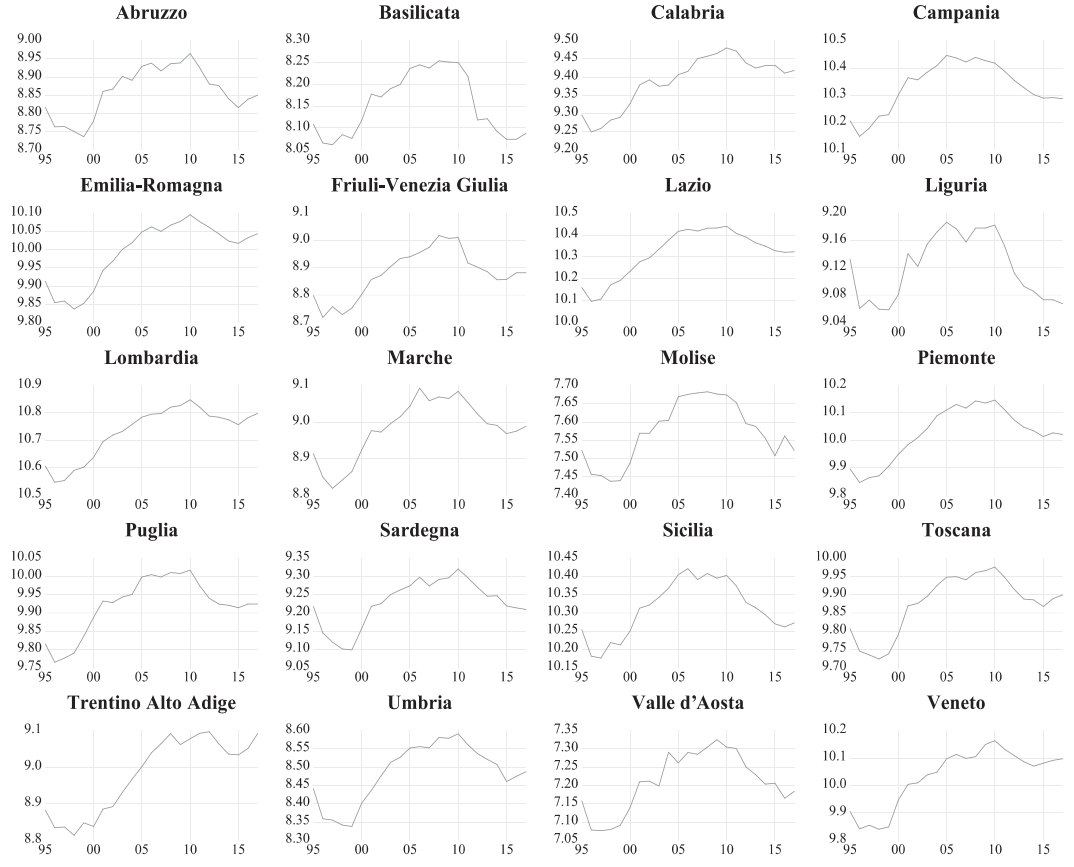

FIGURE 2 Government consumption expenditure, Italian NUTS 2 regions, 1995–2017

restrictions on B_{0i} that are directly derived from the economic theory (Kilian & 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 (Bachmann & Sims, 2012; Bilbiie et al., 2008; Deleidi & Mazzucato, 2021). 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 (Auerbach & Gorodnichenko, 2012; Blanchard & Perotti, 2002). In the third one, known as the sign restriction approach, restrictions are imposed on the sign of the response functions (Mountford & Uhlig, 2009; Pappa, 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, 2011; Ramey & Shapiro, 1998).

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):

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

where "–" indicates an unrestricted parameter and a "0" represents a zero restriction. The identification strategy in (3) is commonly implemented when estimating fiscal multipliers and is based on the idea that government

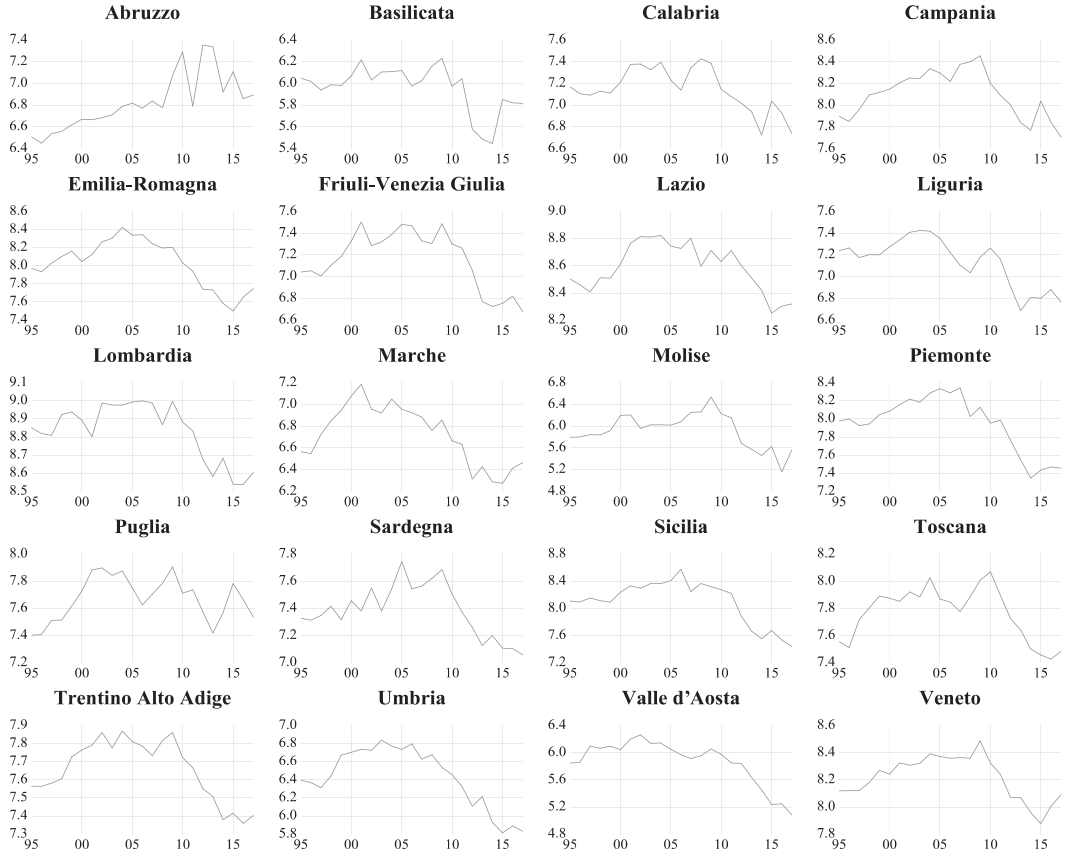

FIGURE 3 Government investment expenditure, Italian NUTS 2 regions, 1995–2017

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.

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 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:

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

Once restrictions are imposed, IRFs are calculated to detect the dynamic effect of public expenditure and its components on the GDP level. IRFs are estimated over a period of 10 years and then reported with 68% confidence interval bands estimated by bootstrapping standard errors. Since variables are in logarithmic form, the IRFs are interpretable as elasticities.[6] Additionally, we estimate the so-called cumulative multipliers, namely the cumulative GDP gain relative to the cumulative government spending during a given period (Ramey & Zubairy, 2018).

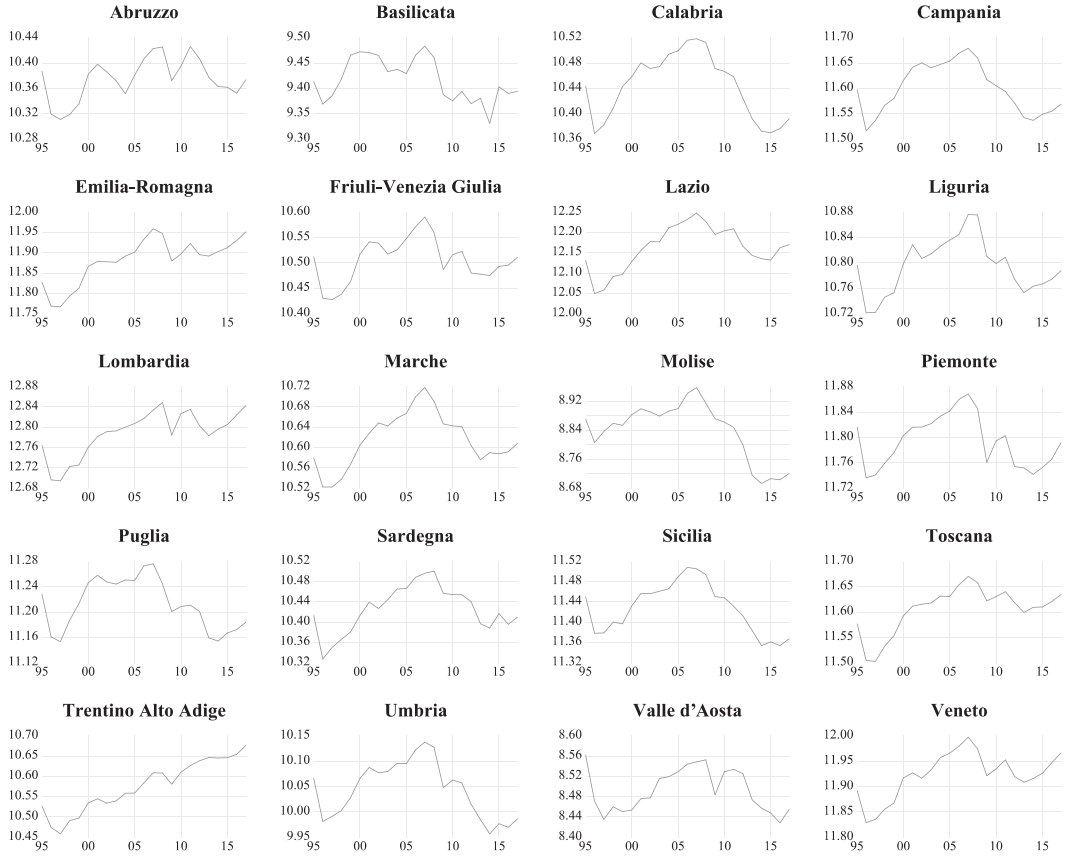

FIGURE 4 Gross domestic product, Italian NUTS 2 regions, 1995–2017

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-year period. IRFs also show that the GDP response to a government spending shock is positive over the whole 10-year 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. Multipliers associated with 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.

TABLE 1 Average annual rate of growth of GDP, public expenditure, public consumption and public investment in Italian regions, 1995–2017

	Y			*G*			*G_C*			*G_I*		
Regions	**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

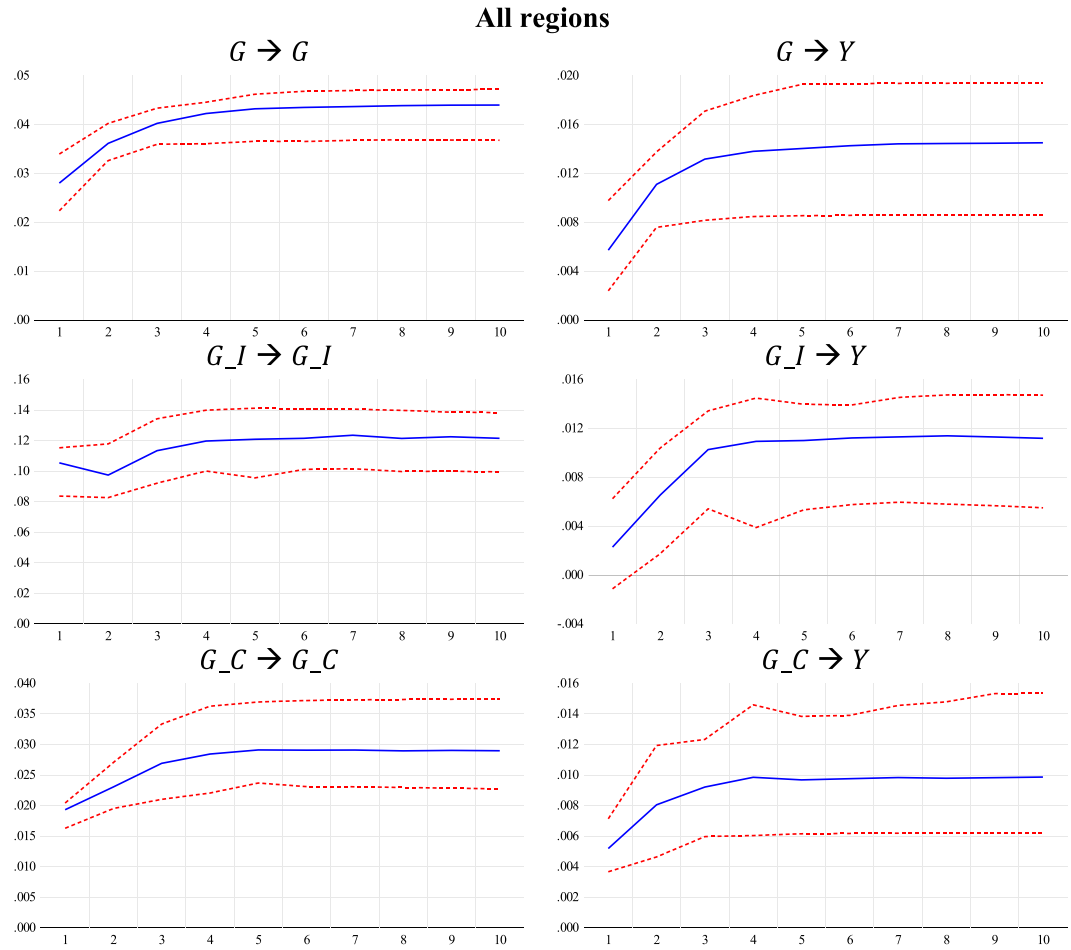

FIGURE 5 Impulse Response Functions (IRFs), Models 1 and 2 without fiscal foresight estimated for all regions. Figures display elasticities. Dotted lines are 68% confidence bands estimated through a Bootstrapping procedure (1,000 repetitions)

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 higher 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 with 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. Cumulative multipliers are close to 1 on impact and greater than 1 in the subsequent periods. Our estimates confirm the superiority of government

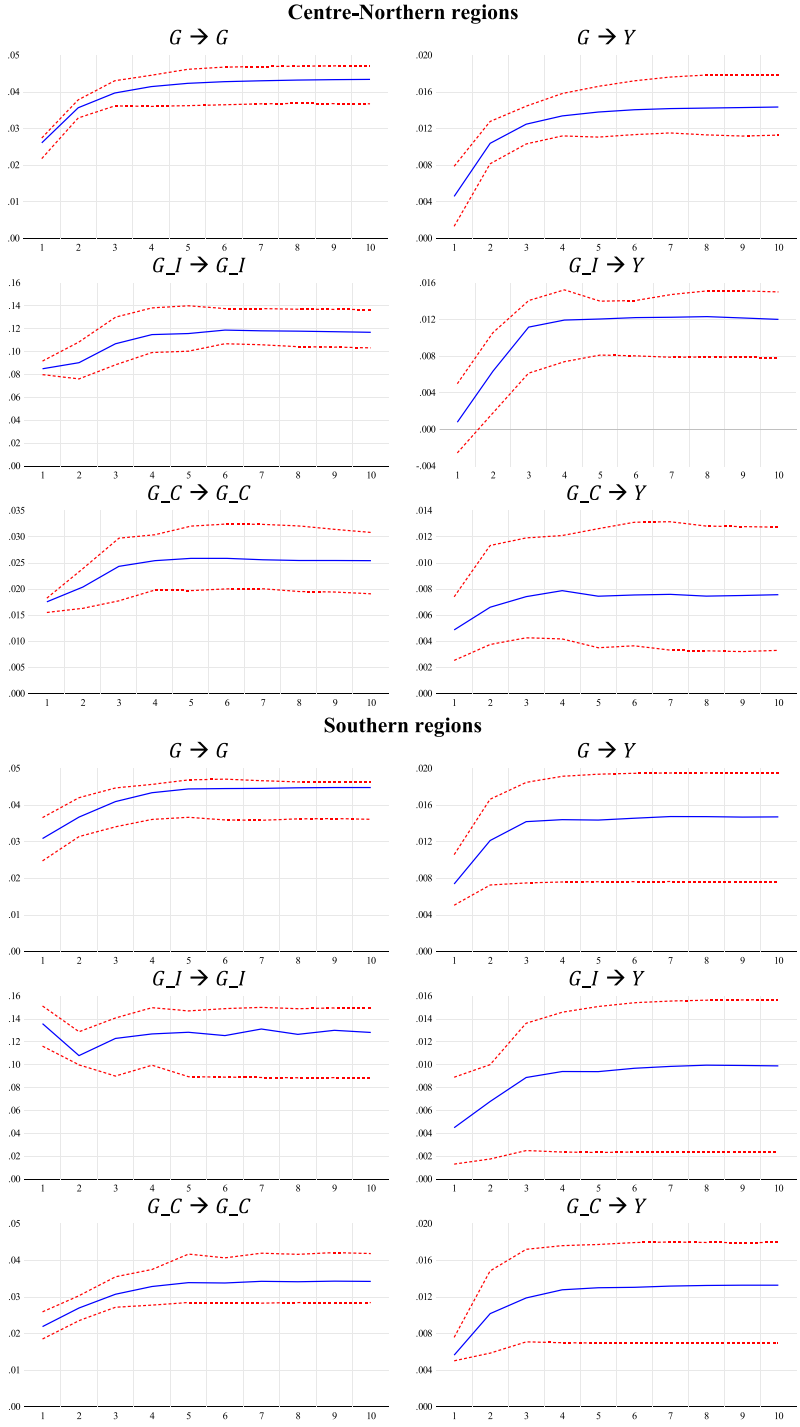

FIGURE 6 Impulse response functions (IRFs), Models 1 and 2 without fiscal foresight by macro-area. Figures display elasticities. Dotted lines are 68% confidence bands estimated through a Bootstrapping procedure (1,000 repetitions)

TABLE 2 Cumulative multipliers, Models 1 and 2 estimated without fiscal foresight for: all regions, Centre-Northern and Southern Regions. In bold significant multipliers. 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

investment in stimulating GDP (Auerbach & Gorodnichenko, 2012; Deleidi, 2021; Gechert, 2015) and are generally greater than those computed by the national policy-making institutions such as the Bank of Italy and the Italian Ministry of Economics and Finance. The use of regional data allows us to establish that multipliers are higher on average in Centre-Northern regions than in Southern ones, contrary to previous results obtained by Piacentini et al. (2016).

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 (Auerbach & Gorodnichenko, 2012; Ramey, 2011). Due to the existence of 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. 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, $\left[\Delta G^F_{i,t|t-1}, G_{i,\,t}, Y_{i,t}\right]'$; and (ii) Model 2, $\left[\Delta G^F_{i,t|t-1}, G\_I_{i,t}, G\_C_{i,t}, Y_{i,t}\right]'$. 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-Northern 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 summarizes 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, cumulative fiscal multipliers estimated with fiscal expectations confirm that increases in government expenditure—be it for investment or consumption—

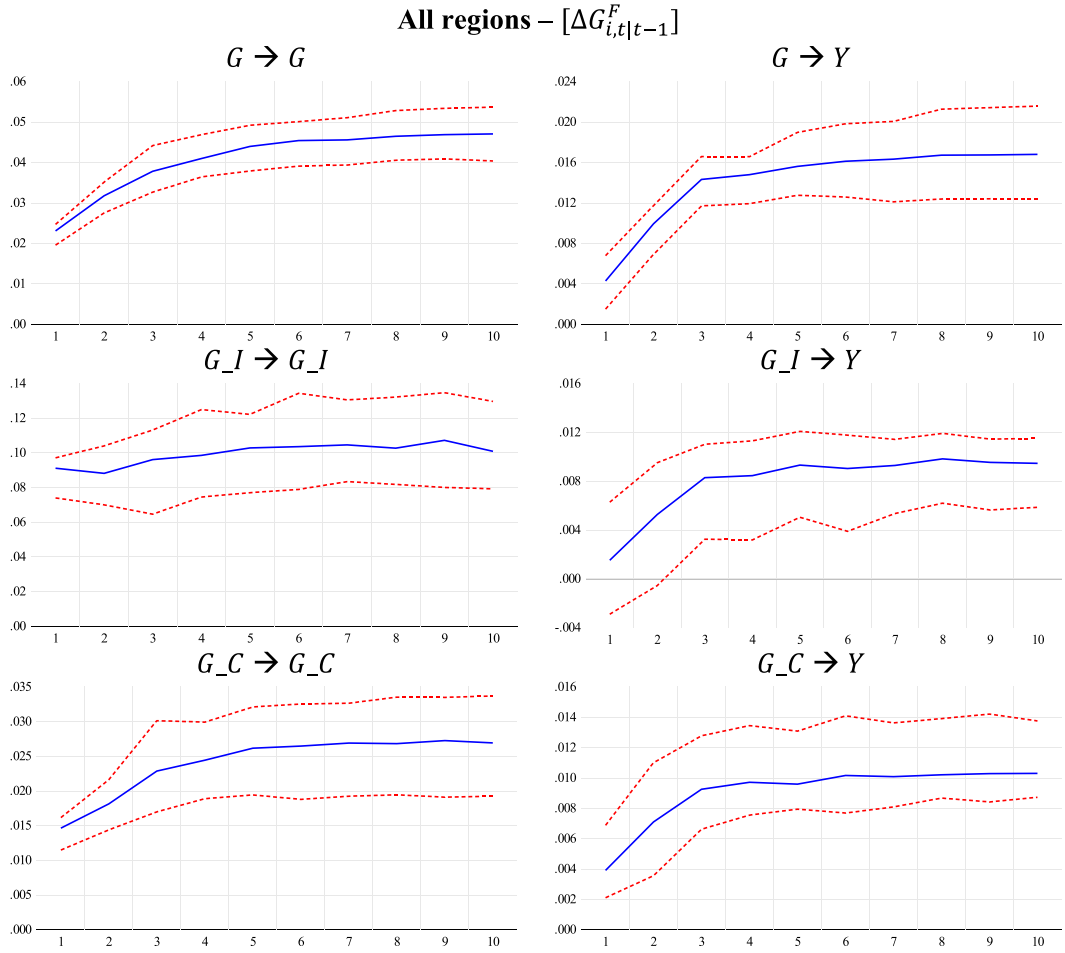

FIGURE 7 Impulse response functions (IRFs), Models 1 and 2 with fiscal foresight $\left[\Delta G^F_{i,t|t-1}\right]$ estimated for all regions. Figures display elasticities. Dotted lines are 68% confidence bands estimated through a Bootstrapping procedure (1,000 repetitions)

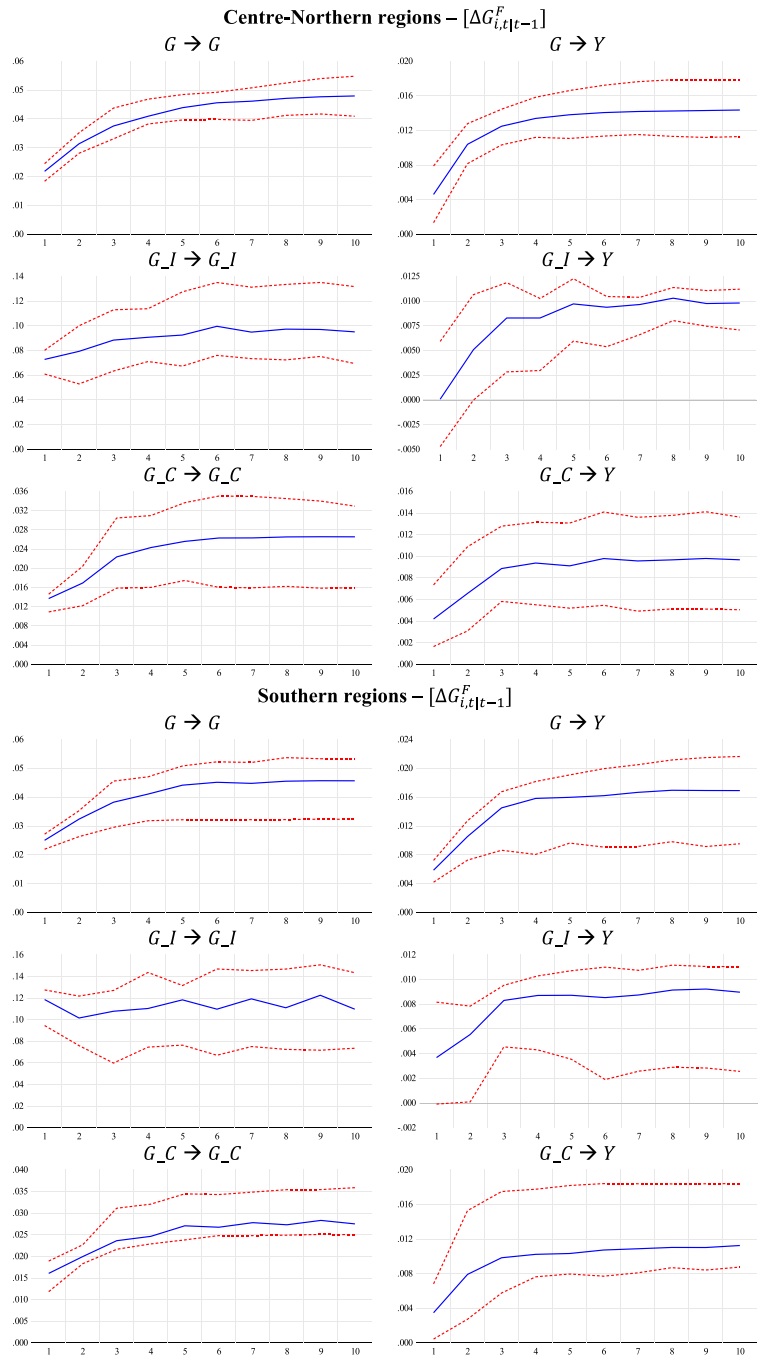

FIGURE 8 Impulse response functions (IRFs), Models 1 and 2 with fiscal foresight $\left[\Delta G^F_{i,t|t-1}\right]$ by macro-area. Figures display elasticities. Dotted lines are 68% confidence bands estimated through a Bootstrapping procedure (1,000 repetitions)

engender a persistent and positive rise in the GDP level. Furthermore, in models augmented by fiscal expectations, multipliers of government investment are higher than government consumption and estimated multipliers are found to be larger in the Centre-North than in the South.

TABLE 3 Cumulative multipliers, Models 1 and 2 estimated with fiscal forecasts for: all regions, Centre-Northern and Southern Regions. In bold significant multipliers. 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

In this paper, we aimed to evaluate the effectiveness of fiscal policy in Italy by estimating fiscal multipliers associated with government expenditure and its components, namely public consumption and investment. To do this, P-SVAR modelling was applied to Italian regional data for the period 1995–2017. We computed the multipliers both at the country level and for the two main subnational macro-areas, that is, the Centre-North and the South, to elaborate on the Italian North–South divide. Furthermore, additional models were specified to incorporate fiscal expectations. 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. When we consider the multiplicative effect of public spending, 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, even when considering fiscal expectations. Concerning the two 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. 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. Such evidence is confirmed also when fiscal expectations are modelled.

In conclusion, public investment seems to represent the most effective way to spend public funds with the aim of stimulating GDP, even if also the positive effects produced by public consumption should not be disregarded. Despite some economists point to opposite solutions—for example, to increase wage flexibility and human capital accumulation to foster growth in Southern regions (Boeri et al., 2019; Lo Cascio 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 of economically depressed areas. 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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ENDNOTES

[1] For an in-depth review of state-dependent multipliers, see among others, Auerbach and Gorodnichenko (2012, 2017), Fazzari et al. (2015), and Ramey and Zubairy (2018).

[2] 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) and Ramey and Zubairy (2018).

[3] The considered variables are summarized in Appendix 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 (Auerbach & Gorodnichenko, 2017; Beetsma et al., 2008; Born & Müller, 2012). For an in-depth discussion on the use of annual and quarterly data, see Born and Müller (2012). Furthermore, in line with Gandullia and Leporatti (2020), one may use the annual data provided by "Conti Pubblici Territoriali," which is available broken down by regions, spending categories and types of public administration for a shorter timespan (2000–2018) than the one provided by Istat.

[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.

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

[6] 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.

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APPENDIX

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, Millions of Euro, Annual data ($G = G\_C + G\_I$)	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