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The Size and Uncertainty of Government Spending Multipliers in Italian Regions

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Abstract

This study evaluates the effectiveness of Italian local fiscal policy by estimating regional government spending multipliers at the NUTS-2 and NUTS-1 levels, using annual data from 1995 to 2021. We employ a novel econometric methodology to comprehensively capture the heterogeneous effects of exogenous government spending across regions, disentangling the effects of public investment from those of public consumption. Our analysis is based on Factor-Augmented Vector Autoregressive (FA-VAR) models, where an external instrument is used to indirectly identify fiscal spending shocks. To address the challenge of identifying valid external instruments in a context of limited cross-sectional data, we use factor analysis to construct a non-fiscal instrument capturing the "common" (national) component driving the dynamics of Italian regional output. This instrument is applied across all regions to estimate fiscal reaction functions. We find that while expansionary fiscal shocks induce positive short-term effects - particularly when public regional investment is analyzed separately from public regional consumption - the uncertainty surrounding these effects is remarkably high. This crucial aspect, often overlooked in the existing literature, complicates the empirical assessment of the effectiveness of regional fiscal policy. Based on our bootstrap-based robust confidence intervals, the effects of fiscal spending shocks tend to dissipate in a few years. We also detected significant regional disparities, with fiscal multipliers being larger in the Center-North regions compared to the Southern regions. This pattern persists even when analyzing Italian macro-areas (NUTS-1 level), underscoring the need for tailored regional fiscal policies.

Keywords: Fiscal Multipliers, Identification, Instrumental Variables, Structural Vector Autoregressions
JEL codes: C32, C50, E62, R58

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Non-technical Summary

We evaluate the effectiveness of local fiscal policy in Italy by estimating how much one euro of public spending increases local economic output at both the regional and macro-area levels, using annual data from 1995 to 2021. Our analysis employs a novel econometric methodology that specifically addresses regional heterogeneity and data scarcity challenges. The key finding reveals a complex reality: while government spending generally has a positive effect on a region's economy, this effect is often short-lived and its size is remarkably difficult to predict with confidence, presenting significant challenges for policy planning and implementation.

The results reveal that the effectiveness of public spending depends critically on the type of policy instrument deployed. Public investment shocks generate larger and comparatively more persistent effects on regional output than government consumption shocks. However, these benefits from investment emerge only gradually over several years. In contrast, public consumption, which covers current expenditures, provides a more immediate but generally smaller and less sustained boost to regional economies.

Crucially, our research reveals that while expansionary fiscal shocks induce positive effects, the uncertainty surrounding these effects remains remarkably high. The positive impacts of government spending, regardless of type, tend to dissipate within a few years following the initial shock at both regional and macro-area levels, raising doubts about the long-term efficacy of fiscal spending.

Our analysis further detects profound geographical heterogeneity in fiscal policy effectiveness across Italian regions. Centre-Northern regions demonstrate significantly greater efficiency in converting public spending into tangible economic growth compared to their Southern counterparts. This performance gap reflects the ancient and persistent North-South divide in Italy's economic landscape. The consistent nature of these disparities underscores the need for regionally tailored fiscal policies rather than uniform national approaches.

1 Introduction

The Global Financial Crisis (GFC) and the subsequent European sovereign debt crisis intensified scrutiny of fiscal policy's role as a stabilizer of economic fluctuations, particularly as monetary policy faced constraints. Many countries adopted fiscal consolidation policies aiming to stimulate growth and reduce debt, yet their effectiveness was mixed and, in some instances, even detrimental. Research highlighting the potential negative and persistent effects of fiscal policies on potential output through hysteresis further complicated the debate, see Fatás and Summers (2018).

At the core of this debate lies the concept of the fiscal multiplier—how much output responds to changes in government spending. Accurate quantification of these multipliers is of paramount importance, as inaccurate estimations can misguide policymakers and harm economies: underestimating them can lead to harmful austerity, while overestimating them may fuel unsustainable deficits. Notably, the failure of austerity policies has, in part, been attributed to larger-than-expected fiscal multipliers (Blanchard and Leigh, 2013). While the literature generally agrees that expansionary fiscal stimuli boost output, the magnitude of this effect varies considerably across studies (Gechert, 2015). The discussion on what policy instrument is more effective is still open. For instance, some studies indicate that government investment is less effective than other type of government spending (e.g. Pappa, 2009), while others support the opposite view (e.g. Auerbach and Gorodnichenko, 2012).

The COVID-19 pandemic reignited interest in fiscal policy and multiplier magnitudes, as governments worldwide intervened amidst monetary policy limitations. The pandemic also exacerbated regional disparities, particularly in Italy, where it deepened the longstanding North-South divide. Italy's National Recovery and Resilience Plan (NRRP) aims to address this by directing substantial public investments, especially to the Southern regions.

Recent years have seen a growing effort to estimate Italian fiscal multipliers at the subnational level (see, for instance, Deleidi et al., 2021; Destefanis et al., 2022; Frangiamore, 2024; Lucidi, 2022; Matarrese and Frangiamore, 2023; Zezza and Guarascio, 2024). These studies have explored the effects of fiscal policies, emphasizing the importance of estimating government spending multipliers and, when possible, differentiating between investment and consumption multipliers. Many of these contributions often report peak fiscal multipliers exceeding one in magnitude and exhibiting time persistence, suggesting therefore a preference for deficit-financed fiscal expansions over austerity measures. However, these studies do not adequately explain why metrics like, for example, the deficit-to-GDP ratio, persist at high levels despite the “high and persistent” fiscal expansions.

This paper contributes to the empirical literature by estimating fiscal multipliers at the Italian regional and macro-area (NUTS-2 and NUTS-1) level, employing annual data spanning from 1995 to 2021 and a novel methodology designed to address two key issues.

One is our acknowledgment of the substantial heterogeneity characterizing the effects of fiscal policy in the regions. In this respect, as in Canova and Pappa (2025), we move beyond the typical panel data approach and the limitations of these methodologies when computing average dynamic macroeconomic objects like multipliers or elasticities in spatial settings. Canova and Pappa (2025) demonstrates that the common practice of calculating fiscal multipliers by panel data methods is valid only under stringent statistical requirements and homogeneity in the dynamic response of local units to policy changes. When dynamic heterogeneity is a concern, estimates obtained through traditional methods, even those employing instrumental variables, are invalid. To address this issue, we analyze each region individually while accounting for cross-sectional interrelations through factor analysis. Our approach, based on the specification and estimation of factor-augmented VAR models (FA-VARs) for each region, allows us to capture the local dimension of fiscal policy, identify potential spillover effects, and subsequently aggregate results and the national level.

Second, we tackle the challenge of identifying valid instruments for fiscal shocks at the regional level under conditions of data scarcity. In our framework, data scarcity involves not only the time dimension of fiscal policy, characterized by relatively short time series, but also the cross-sectional dimension, as only a limited number of regional fiscal variables are available from official, reliable sources. Inspired by Leeper et al. (1996) and Caldara and Kamps (2017), we estimate regional fiscal reaction functions by instrumenting non-fiscal shocks, which in our framework primarily consist of output shocks. We can recover the fiscal shock of each region as the structural error component of regional fiscal reaction functions. However, while Caldara and Kamps (2017) use total factor productivity to instrument output, we construct a proxy for regional output from factor analysis.

To our knowledge, Frangiamore (2024) and Matarrese and Frangiamore (2023) apply an identification strategy targeted to instrument non-fiscal shocks in a panel data framework. They consider Bartik-type instruments for regional output shocks. These instruments are constructed by interacting the share of manufacturing sector value added of the regions (a highly relevant but potentially endogenous instrument) with the international oil price (a potentially weak but highly exogenous instrument). We address the problem of finding valid instruments for regional output from a different viewpoint. Our methodology once again leverages factor analysis. Specifically, we conduct a Principal Component Analysis (PCA) on the 20 time series of per capita regional output to derive a summary measure of regional economic activity. Subsequently, we orthogonalize the resulting measure with respect to a summary measure of per capita regional government spending, also obtained through PCA on the 20 time series of regional government spending. The resulting time series, denoted as z_t, is intended to be by construction relevant for output in each region and potentially exogenous to regional government spending shocks. In other words, z_t serves as a valid instrument for regional output across all 20 Italian regions.

We investigate the effects of shocks on public consumption, public investment and total public expenditure. Our findings confirm that expansionary government spending shocks have a positive and significant effect on regional output. Shocks to public consumption are particularly effective within the year, with peak effects mostly detected on impact and, in a few cases, shortly after the shock. Conversely, peak multipliers for public investment are generally reached after several periods, as this type of intervention is likely to yield returns with a time lag. However, the effect of fiscal stimuli on regional output is generally short-lived and uncertain, as indicated by our bootstrap confidence intervals. We rarely find significant multipliers exceeding one at longer horizons.

After deriving region-specific peak fiscal spending multipliers, we provide evidence of disparities in the effectiveness of fiscal policies across regions. In particular, we observe lower impact and peak multipliers in the South compared to the Centre-North area, confirming previous, more general results that point to greater effectiveness of fiscal policy in developed countries (Ilzetzki et al., 2013). These findings have obvious implications for the design of policies aimed at reducing territorial inequalities in Italy.

The reminder of the paper is structured as follows. Section 2 reviews the literature on fiscal multipliers with a special focus on the case of Italy. Section 3 describes the data used in the analysis. Section 4 introduces the econometric methodology. Section 5 presents the main findings and offers a comparison with the literature. Section 6 concludes.

2 Literature

In this section, we briefly review the approaches commonly employed in the literature to estimate fiscal multipliers. Subsequently, we focus our attention on the specific case of Italy. What we observe, in general, is a special focus on the size of fiscal multiplies, less on the uncertainty surrounding estimates.

2.1 Fiscal Multipliers Estimation: an Overview

There exist several approaches to estimate fiscal multipliers, typically grounded in theoretical models or reliant on econometric techniques. The former often involves simulations based on calibrated Dynamic Stochastic General Equilibrium (DSGE) models, while the latter employs Structural Vector Autoregressions (SVARs) inspired by the seminal Blanchard and Perotti (2002) (BP henceforth) approach. Although theoretical models generally agree that fiscal expansions lead to increases in output and employment, there are ongoing discussions regarding the specific channels through which this positive effect manifests. The different assumptions made by competing theories lead to a wide range of multipliers values – see, *inter alia*, Christiano et al. (2011); Eggertsson (2011); Ercolani and e Azevedo (2019); Galí et al. (2007); Hall (2009); Leeper et al. (2017). Moreover, the DSGE approach is often criticized due to its dependence on the functional form and parameters calibration they assume, which may not accurately reflect the statistical properties of the data (Canova and Ciccarelli, 2013). Think, for instance, to consumer's preferences or to real and nominal frictions.

SVARs are widely used in the literature. They are flexible and allow one to isolate exogenous fiscal policy shocks through several identification strategies. Once the shock is identified, computing the multiplier becomes straightforward.

As pointed out by Caldara and Kamps (2008), there are four main approaches for isolating fiscal policy shocks in SVARs.

1. The **recursive approach** based on the standard Cholesky decompositions, which uses zero restrictions to address endogeneity issues, see, *e.g.*, Fatás and Mihov (2001).

2. The **institutional information approach** which, using recursive schemes, captures the contemporaneous relationship between taxes and output; see Blanchard and Perotti (2002).

3. The **sign restriction approach**, where exogenous fiscal shocks are identified by imposing restrictions on the sign of impulse response functions (IRFs); see, *e.g.*, Pappa (2009) and Mountford and Uhlig (2009) (MU henceforth).

4. The **narrative approach**, which uses qualitative information derived from fiscal policy news to determine innovation in fiscal stance; see, *e.g.*, Mertens and Ravn (2013) for changes in taxation and Ramey and Shapiro (1998) and Ramey (2011) for government spending.

Very recently, fiscal multipliers are also estimated by Local Projections (LPs) (Stock and Watson, 2018). Prominent works in this strand include, *inter alia*, Auerbach and Gorodnichenko (2017); Deleidi et al. (2020); Ramey and Zubairy (2018).

2.2 Fiscal Multipliers in Italy

Considering the Italian case, fiscal multipliers have been examined through a wide array of models and methodologies. Most studies focus on the national level. Only a few contributions are devoted to regions and macro-areas reflecting, perhaps, inherent difficulties in the availability of data.

At the national level, the existing literature seems to support the hypothesis that fiscal multipliers are positive, with investment-related multipliers often higher than consumption-related ones. This holds true for model-based approaches (see, for instance, Kilponen et al. (2019) for DSGE and De Nardis and Pappalardo (2018) for large structural models) as well as for SVAR-based analyses. For the latter, using a time-varying coefficient VAR, Cimadomo and D'Agostino (2016) documents a government spending multiplier between 0.8 and 1.5. Batini et al. (2012) use a regime-switching VAR and find that spending multipliers range between 0.6 and 0.9, with higher values during recession than in economic expansions. Using a Threshold VAR (TVAR), Caprioli and Momigliano (2013) and Afonso et al. (2018) also find positive spending multipliers. The former report an impact multiplier on government consumption of 1.04 and a peak of approximately 1.8 after three years. The latter identifies larger multipliers (ranging from 0.6 to 1.4) during periods of high financial stress compared to periods of low-stress (from 0.1 to 0.3).

SVAR models are also employed by Giordano et al. (2007), who estimate a government purchases multiplier of 2.4 in the 4-th and 8-th quarters and 1.7 in the 12-th, and by Deleidi (2022), who estimates a peak for total spending multiplier of 1.87, and consumption and investment multipliers of 3.17 and 4.72, respectively. Fratianni et al. (2025) investigate the size of the Italian fiscal multiplier during the period 1872-2006, instrumenting total expenditure with defense expenditure, using a variety of specifications and controls. They find that the Italin fiscal multiplier, generally, is not statistically different from unity and displays weak state dependence.]

Turning to the sub-national level, the literature appears narrower. Acconcia et al. (2014) employ a quasi-experimental approach using provincial data and estimate an infrastructure multiplier ranging between 1.5 and 2. Piacentini et al. (2016) use a large-scale macroeconometric model to estimate fiscal multipliers for the Italian regions (NUTS-2) for the period 2011-2013. They find that fiscal multipliers are higher in Southern Italy compared to the North for both current and investment expenditures. Spending cuts have more severe negative effects in the South. The impact multiplier for consumption spending is 0.44 in the North and 0.84 in the South, with cumulative multipliers of 0.27 and 0.70, respectively. For investment expenditures, the North has an impact multiplier of 1.45 and a cumulative multiplier of 1.48, while the South has 1.37 and 1.85.

More recently, many works have combined Panel VARs (PVAR) methods taken to annual regional (NUTS-2) data, as sourced by the Italian Institute of Statistics (ISTAT). In this strand of the literature, Deleidi et al. (2021) use Choleski-based short run restrictions for identification and find that investment multipliers are higher than consumption multipliers. Investment multipliers are generally higher in the Centre-North, peaking at 4.07, compared to 2.29 in the South. Consumption multipliers peak at 1.84 in the Centre-North and 1.36 in the South. At the aggregate level, investment multipliers peak at 3.28 and consumption multipliers at 1.68. Total expenditure multipliers are generally lower, with peaks of 1.37 for Italy, 1.61 for the Centre-North, and 1.08 for the South.

Destefanis et al. (2022) estimate region-specific cumulative multipliers for threes sources of public spending: EU Structural Funds, Government Investment and Government Current Expenditures. Their identification methods are based on recursive Choleski schemes. Their findings are mixed: significant government consumption multipliers are positive for Liguria, Toscana, Abruzzo, Campania, Puglia, and Sicilia, and negative for Trentino Alto Adige and

Molise. Significant investment multipliers are positive for Marche, Lazio, Abruzzo, and Campania, and negative for Lombardia and Valle d'Aosta. Investment multipliers are generally larger than consumption multipliers, especially for EU Structural Funds.

Using sign restriction, Lucidi (2022) estimates region- and macro-area-specific multipliers for government consumption, investment and net tax revenues, revealing a discrepancy in fiscal multipliers between southern and northern regions. Impact consumption multipliers range from 1 (Veneto and Toscana) to 2.2 (Lazio) in the Centre-north, while in the South and Islands, most are below 1.5, with Calabria and Sardegna lower than 1. Investment multipliers are higher, with impact effect ranging from 1.3 (Toscana) to 7.8 (Trentino) in the Centre-North and from 1.3 (Sardegna) to 2.4 (Basilicata) in the South and Islands. Tax multipliers are lower than consumption multipliers, peaking around the 4^{th} horizon and being less permanent, with consumption and investment multipliers peaking at horizons ≤ 2 and ≥ 4, respectively.

Zezza and Guarascio (2024) evaluate the regional effects of public investments across three domains (green, digital and education), reporting heterogeneous results. Overall, they find that fiscal policy shocks have positive and long-lasting effects on GDP and private investments. Moreover, they find an aggregated effect of a public investment shock on GDP between 1.9 (impact) and 5.4 for Italy. Impact multipliers are higher in Centre-North (2.8) compared to the Sounth and Islands (1.9), but they converge to around 5.5 at longer horizons.

Recently, Matarrese and Frangiamore (2023) and Frangiamore (2024) use the Proxy-VAR approach in a panle framework, instrumenting government spending shocks with Bartik-type instruments. They show that fiscal policy has positive and long-lasting effects on output, with cumulative multipliers ranging from 1.24 to 1.26. They also document that multipliers are higher in the Centre-North (from 1.64 to 1.79) compared to the South and Islands (from 0.76 to 0.91).

3 Data

Europe is divided into territorial units called NUTS (Nomenclature of territorial units for statistics), whose composition is decided and regulated by the EU. There are several NUTS layers. NUTS-1 corresponds to macro areas within each country while NUTS-2 to regions within a country. We primarily consider Italian NUTS-2 units, as they are the ones typically considered in the literature evaluating the effectiveness of local fiscal policies and use the classification established in 2016, roughly corresponding to the 20 Italian administrative regions (we include Provincia Autonoma di Bolzano and Provincia Autonoma di Trento as part of the Trentino Alto Adige region).

We also consider the NUTS-1 classification, corresponding to five macro areas: North-West (Piemonte, Valle d'Aosta, Liguria and Lombardia), North-East (Trentino Alto Adige, Veneto, Friuli-Venezia Giulia and Emilia-Romagna), Centre (Toscana, Umbria, Marche and Lazio), South (Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia) and Isles (Sardegna and Sicilia). In some analyses we find it convenient to group Isles with South.

Data is sourced from the Italian Institute of Statistics (ISTAT) and is freely downloadable from the *"Conti e aggregati economici territoriali"* section of the national accounts.[1] For each NUTS2 (NUTS1) unit, our time series spans the period 1995-2021. As such, our analysis can only partially evaluate the impact of increased fiscal spending in the aftermath of the COVID-19 pandemic on regional economies. We consider the following variables: Gross Domestic Product (gdp), Government Consumption (gc), Government Investment (gi) and Government Spending (g), where the latter is obtained as the sum of Government Consumption and Investment. The nominal variables are transformed into real terms using the national GDP deflator provided by AMECO (def_{dgp}). We compute per-capita aggregates dividing observed variables by the annual average population (pop), again provided by ISTAT.

The variables used in the econometric analyses presented in the following are expressed as logarithmic units except where explicitly indicated. Table 3 provides a detailed description of the series and the transformation we apply.

Table 4 reports some descriptive statistics. It can be noticed that Southern regions have lower GDP per capita with respect to Center-Northern regions, reflecting the North-South divide that characterizes Italy. In contrast with the output per capita, the southern regions show a higher share of government spending. This confirms the struggle of the southern regions in translating fiscal stimuli into output.

[1] Available at https://www.istat.it/en/analysis-and-products/databases/statbase

4 Econometric Framework

In this section, we illustrate our econometric methodology assuming, except where explicitly indicated, that the analysis is conducted at the NUTS-2 level.

4.1 Model and Fiscal Policy Rules

For each region i, $i = 1, ..., n = 20$, we consider a vector containing $m = 3$ variables $Y_{i,t} = (p_{i,t}, gdp_{i,t}, f_{gdp,t})'$, where $p_{i,t}$ is the (log of per capita) policy variable in region i, with $p \in \{g, gc, gi\}$, $gdp_{i,t}$ is the log of per capita output in region i and $f_{gdp,t}$ is a factor extracted from the set of regional GDPs: $\{gdp_{1,t}, \ldots, gdp_{20,t}\}$ by PCA, common to all regions. The variable $f_{gdp,t}$ is intended to capture the cross-sectional interrelations that might characterize fiscal policy.

For ease of exposition, and without loss of generality, throughout, we omit the subscript i to indicate a region and assume that Y_t follows a FA-VAR(ℓ) of the form:

$$Y_t = \Pi X_t + u_t, \qquad t = 1, \ldots, T \tag{1}$$

where $X_t = (Y'_{t-1}, \ldots, Y_{t-\ell})$ collects the ℓ lags of Y_t, $\Pi = (\Pi_1, \ldots, \Pi_\ell)$ is a $m \times m\ell$ matrix of autoregressive parameters and $u_t = (u_{p,t}, u_{gdp,t}, u_{f,t})'$ is an m-vector of reduced form disturbances with $\mathbb{E}(u_t) = 0$ and $\mathbb{E}(u_t u'_t) = \Sigma_u$, Σ_u being positive definite. The specification in (1) omits deterministic terms for notation brevity (a constant and a linear trend will be included region-wise in the empirical analyses presented below.)

The VAR disturbances u_t are linked to the structural shocks ε_t through the linear mapping $u_t = B\varepsilon_t$, where $\varepsilon_t = (\varepsilon_{p,t}, \varepsilon_{gdp,t}, \varepsilon_{f,t})'$ and the $m \times m$ matrix $B = (B_{\bullet p}, B_{\bullet gdp}, B_{\bullet f})$ is non-singular and contains, under proper identification restrictions, the on-impact coefficients, i.e., the instantaneous impact of the structural shocks on the variables. The ε_t are assumed cross-uncorrelated and are normalized such that $\mathbb{E}(\varepsilon_t \varepsilon'_t) = I_m$, implying $\Sigma_u = BB'$. We have

$$u_t = B_{\bullet p}\varepsilon_{p,t} + B_{\bullet gdp}\varepsilon_{gdp,t} + B_{\bullet f}\varepsilon_{f,t} \tag{2}$$

Let us define the h periods ahead responses of the j-th variable to $\varepsilon_{p,t}$ as

$$IRF_{j,p}(h) = e'_j(S_m C^h S'_m)B_{\bullet p} \tag{3}$$

where $S_m = (I_m, 0_{m\times m(\ell-1)})$, C is the companion matrix associated with the FA-VAR in (1) and e_j is the j-th column of I_m.

As finding reliable proxies for fiscal shocks is problematic—especially at the regional level—we employ an alternative (inverse) strategy that entails instrumenting the non-target shocks to recover the target ones (see Angelini et al., 2024; Caldara and Kamps, 2017)

For $A = B^{-1}$, we can rewrite the VAR in (1) as

$$AY_t = A\Pi X_t + \varepsilon_t \tag{4}$$

where $Au_t = \varepsilon_t$ and the matrix A captures the structural relationships characterizing the variables. The equation system in (4) defines the structural shocks in ε_t as a function of current and past values of Y_t.

The equation of $Au_t = \varepsilon_t$ associated with the target shock reads

$$A_{p\bullet}u_t = a_{p,p}u_{p,t} + a_{p,gdp}u_{gdp,t} + a_{p,f}u_{f,t} = \varepsilon_{p,t}$$

For $a_{p,p} \neq 0$ and imposing $a_{p,f} = 0$, we rearrange terms and obtain the regional policy reaction function

$$u_{p,t} = \psi_p u_{gdp,t} + \sigma\varepsilon_{p,t} \tag{6}$$

where $\psi_p = -a_{p,p}^{-1}a_{p,gdp}$ is the elasticity of the policy variable to output and $\sigma_p = a_{p,p}^{-1}$ is the standard deviation of the fiscal shock.

If we can estimate the policy rule above, we can retrieve the coefficients in $A_{p\bullet}$. The estimation of $B_{\bullet p}$ and the IRFs in (3) follow indirectly from the relation $B_{\bullet p} = \Sigma_u A'_{p\bullet}$ (see Angelini et al., 2024). Since $u_{gdp,t}$ is correlated with the government spending shock, we need an instrument for this variable. We discuss the construction of such instrument in Section 4.2.1.

4.2 Identification

The identification of structural shocks requires restrictions on the matrix B or A. The standard proxy-SVAR approach imposes covariance restrictions by means of a set of $r > k$ observable instruments, w_t, that are correlated with the structural fiscal shocks of interest $\varepsilon_{p,t}$, and orthogonal to all other structural shocks in the system, denoted as $\varepsilon_{-p,t}$. To consistently identify the relevant entries in the sub-matrix $B_{\bullet p}$ (see Section 4) the vector w_t must satisfy two key conditions:

$$\mathbb{E}(w_t \varepsilon'_{p,t}) = \Phi_p \neq 0 \qquad (\textit{relevance})$$
$$\mathbb{E}(w_t \varepsilon'_{-p,t}) = 0_{k\times(m-k)} \qquad (\textit{exogeneity})$$

Under these conditions, the impulse responses to fiscal shocks can be directly estimated, as in Mertens and Ravn (2013), using fiscal instruments.

An alternative strategy, discussed in Caldara and Kamps (2017), is to use non-fiscal proxies to estimate the coefficients of the fiscal policy rule, recovering the fiscal shock from the latter. This strategy is particularly useful when the instruments w_t available for the fiscal shocks are suspected to be weak for $\varepsilon_{p,t}$, while valid instruments for the non-target shocks are potentially available (see Angelini et al., 2024).

Let z_t be a vector of $s \leq m-k$ non-policy instruments satisfying the following conditions

$$\mathbb{E}(z_t \varepsilon'_{-p,t}) = \Phi_{-p} \qquad (\textit{relevance}) \tag{7}$$
$$\mathbb{E}(z_t \varepsilon'_{p,t}) = 0_{s\times k} \qquad (\textit{exogeneity}) \tag{8}$$

where Φ_{-p} is $s \times (m-k)$. These conditions imply that z_t must be correlated with the non-policy shocks and orthogonal to fiscal shocks. When satisfied, z_t can be used to instrument the non-policy reduced-form disturbances $u_{-p,t}$. In our framework, we require just one valid non-policy instrument, i.e. $s = 1$—specifically, for the output shock—to estimate the fiscal reaction coefficient ψ_p.

The next section details how we construct the proxy variable z_t using a factor-based approach tailored to the regional data context.

4.2.1 Building External Instruments in a Data-Scarce Environment

As discussed above, estimating the fiscal policy rule in equation (6) requires a valid instrument for the non-policy VAR disturbance $u_{gdp,t}$. With such a proxy at hand, we can estimate the elasticity parameter ψ_p by standard IV regressions and then recover the implied structural fiscal shock $\varepsilon_{p,t}$.

In the absence of suitable external instruments for our regional context, and to avoid to rely on Bartik-type instruments, we define a novel strategy where an instrument common to all regions is used for regional output shock.

Let $f_{gdp,t}$ denote the first principal components, obtained via PCA, from the full set of regional per-capita GDP series, $\{gdp_{1,t}, \ldots, gdp_{20,t}\}$. Similarly, for each fiscal variable of interest—total government expenditure, public consumption and public investment—we extract a common factor from the corresponding set of regional series, obtaining $f_{p,t}$ with $p \in \{g, gc, gi\}$.

We then project, separately for each fiscal instrument, the factor $f_{gdp,t}$ onto the space generated by $f_{p,t}$ and $f_{dgp,t-1}$:

$$f_{gdp,t} = \beta_p f_{p,t} + \beta_{gdp} f_{gdp,t-1} + z_{p,t} \tag{9}$$

obtaining the projection residual $z_{p,t}$. In the case of public investment, we consider a one-period lag in the fiscal factor to account for the delayed transmission typically associated to capital spending.[2]

$$f_{gdp,t} = \beta_{gi} f_{gi,t-1} + \beta_{gdp} f_{gdp,t-1} + z_{gi,t} \tag{10}$$

In all cases, $z_{p,t}$ represents, by construction, the component of aggregate regional output that is orthogonal to fiscal policy— i.e., the variation in GDP not explained by the common dynamics driving the corresponding fiscal aggregate. We interpret this as a non-fiscal output proxy to use as an instrument for $u_{gdp,t}$ region-wise.

To be valid, this proxy must satisfy the standard relevance and exogeneity conditions in (7)-(8). As is common in the literature, we evaluate proxy strength running a battery of first-stage regressions. Specifically, for each region i, we regress the estimated non-policy residuals $u_{gdp,t}$ on the constructed proxy $z_{p,t}$. According to Stock et al. (2002) and a simple rule-of-thumb, an F-statistic below 10 signals a weak instrument. Table 1 summarizes the results. We notice that for all regions, the F-statistics exceed the threshold of 10.

As for exogeneity, we argue that each $z_{p,t}$ plausibly satisfies this condition for two main reasons. First, by construction, $z_{p,t}$ is the projection residual resulting from the regression of the GDP factor on the spending factor, making it orthogonal to common fiscal dynamics.

[2]Total expenditure includes also a share of public investment. Given that this share is relatively small compared to consumption, we treat total expenditure contemporaneously.

Second, from an economic perspective, the proxy captures output fluctuations unrelated to fiscal policy—such as commodity prices or productivity shocks—which are likely exogenous to regional government decisions.

In summary, our factor-based instrument reasonably isolates economically meaningful variations in regional output that are uncorrelated with fiscal shocks, making it a suitable tool for identifying the regional fiscal reaction functions.

	z_g		z_{gc}		z_{gi}	
North-West	102.92	(0.00)	104.24	(0.00)	149.56	(0.00)
Piemonte	31.65	(0.00)	30.75	(0.00)	43.57	(0.00)
Valle d Aosta	21.36	(0.00)	19.41	(0.00)	21.22	(0.00)
Liguria	84.28	(0.00)	90.10	(0.00)	126.94	(0.00)
Lombardia	92.02	(0.00)	108.94	(0.00)	119.26	(0.00)
North-East	42.39	(0.00)	44.78	(0.00)	73.21	(0.00)
Prov. Aut. Bolzano	37.30	(0.00)	33.17	(0.00)	26.53	(0.00)
Prov. Aut. Trento	53.02	(0.00)	43.65	(0.00)	106.68	(0.00)
Veneto	49.95	(0.00)	52.31	(0.00)	118.54	(0.00)
Friuli-Venezia Giulia	61.37	(0.00)	59.48	(0.00)	85.07	(0.00)
Emilia-Romagna	28.45	(0.00)	26.52	(0.00)	44.90	(0.00)
Trentino Alto Adige	57.49	(0.00)	45.13	(0.00)	72.92	(0.00)
Centre	145.96	(0.00)	179.20	(0.00)	232.41	(0.00)
Toscana	104.75	(0.00)	102.15	(0.00)	126.04	(0.00)
Umbria	139.50	(0.00)	97.86	(0.00)	181.65	(0.00)
Marche	135.88	(0.00)	103.97	(0.00)	51.46	(0.00)
Lazio	65.82	(0.00)	76.80	(0.00)	92.88	(0.00)
South	55.69	(0.00)	84.94	(0.00)	33.43	(0.00)
Abruzzo	39.84	(0.00)	33.77	(0.00)	42.08	(0.00)
Molise	24.86	(0.00)	31.50	(0.00)	45.68	(0.00)
Campania	93.06	(0.00)	144.78	(0.00)	47.12	(0.00)
Puglia	28.90	(0.00)	26.76	(0.00)	31.28	(0.00)
Basilicata	57.78	(0.00)	68.13	(0.00)	75.11	(0.00)
Calabria	43.19	(0.00)	51.42	(0.00)	144.93	(0.00)
Islands	48.53	(0.00)	49.10	(0.00)	173.04	(0.00)
Sicilia	47.72	(0.00)	45.20	(0.00)	143.73	(0.00)
Sardegna	42.02	(0.00)	42.01	(0.00)	60.27	(0.00)

Table 1: *First stage regression. The table reports the F-statistics, along with the associated p-values in brackets, for the regression of* $u_{gdp,t}$ *on the non-fiscal instrument* $z_{p,t}$*, with* $p \in \{g, gc, gi\}$*, for each region*

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4.3 Definition of Fiscal Multiplier

We adopt two standard definitions of fiscal multipliers that capture distinct dimensions of the fiscal transmission mechanism. We refer to Ramey (2019) for a thorough discussion.

Following BP, we consider the ratio of the output response to a fiscal shock at a given horizon

h to the on-impact response of the fiscal variable:

$$\mathbb{M}^{BP}_{p,h} = \frac{IRF_{gdp,p}(h)}{IRF_{p,p}(0)} \times \alpha_p \tag{11}$$

Alternatively, following MU, we compute the *cumulative multiplier* as the ratio of the cumulative response of output over the entire h-period horizon to the cumulative response of the fiscal variable over the same period:

$$\mathbb{M}^{MU}_{p,h} = \frac{\sum_{j=0}^{h} IRF_{gdp,p}(j)}{\sum_{j=0}^{h} IRF_{p,p}(j)} \times \alpha_p \tag{12}$$

The scalar α_p is a policy-specific scaling factor converting elasticities to the euro equivalent. This is necessary because the variables are expressed in log changes, thus the ratios between the two IRFs are interpreted as elasticities. We set the scaling factor to the sample average of the ratio $\exp(gdp)/\exp(p)$—see *inter alia* Caldara and Kamps (2017) and Angelini et al. (2024). Moreover, since such scalar may differ significantly among regions, we compute them at macro-area level (Lucidi, 2022).[3]

The two multipliers offer complementary measures of fiscal policy effectiveness. The BP multiplier measures the euro response of output at time horizon h to an instantaneous ($h = 0$) one-euro fiscal shock, while the MU formulation better captures the medium- to long-term effect of sustained fiscal interventions, taking into account the multi-year response.

5 Empirical Results

This section presents the estimated regional fiscal multipliers for Italy over the period 1995–2021 by government spending category: consumption, investment, and total expenditure. For each spending category $p \in \{g, gc, gi\}$, we evaluate the effectiveness of public spending using four measures: (*i*) the impact multiplier, which captures the instantaneous response of output to a fiscal shock and is—by construction—common across methods, $\mathbb{M}_{p,0} = \mathbb{M}^{BP}_{p,0} = \mathbb{M}^{MU}_{p,0}$; (*ii*) the peak BP multiplier, $\mathbb{M}^{BP}_{p,peak}$; (*iii*) the peak MU multiplier, $\mathbb{M}^{MU}_{p,peak}$; and (*iv*) the long-run multiplier, $\mathbb{M}^{MU}_{p,\infty}$, obtained as the value of the MU multiplier at the infinite horizon, approximated at a 10-year horizon. We consider separately the uncertainty surrounding the four estimated

[3] Alternatively, one may consider variables in levels divided by a measure of potential output, as for instance in Bernardini et al. (2020); Gordon and Krenn (2010) and Destefanis et al. (2022). See Lucidi (2022) for a discussion.

measures of multipliers.

Table 2 reports point estimates and the associated nominal confidence level, based on confidence intervals computed by the Moving Block Bootstrap (MBB), see Jentsch and Lunsford (2022). The 68% and 90% confidence intervals are reported in Appendix **??**.

Results tend to confirm that expansionary fiscal shocks have, on average, positive effects on regional output. They also reveal a substantial heterogeneity in the size of estimated government spending multipliers across Italian NUTS-2 and NUTS-1 regions. The size of fiscal multipliers varies not only geographically but also across policy instruments: investment shocks induce larger responses relative to consumption or aggregate spending, although the degree of significance of these responses differs markedly.

	Total Expenditure				Consumption				Investment			
	$\mathbb{M}_{g,0}$	$\mathbb{M}^{BP}_{g,peak}$	$\mathbb{M}^{MU}_{g,peak}$	$\mathbb{M}^{MU}_{g,\infty}$	$\mathbb{M}_{gc,0}$	$\mathbb{M}^{BP}_{gc,peak}$	$\mathbb{M}^{MU}_{gc,peak}$	$\mathbb{M}^{MU}_{gc,\infty}$	$\mathbb{M}_{gi,0}$	$\mathbb{M}^{BP}_{gi,peak}$	$\mathbb{M}^{MU}_{gi,peak}$	$\mathbb{M}^{MU}_{gi,\infty}$
Italy	1.548^{**}	2.043^{**} (1)	1.951^{**} (2)	1.754^{**}	1.925^{**}	2.498^{**} (1)	2.526^{**} (2)	1.921^{*}	0.614^{**}	2.595^{**} (1)	3.111^{*} (5)	2.929
North-West	2.359^{**}	2.359^{**} (0)	2.456^{**} (1)	2.200^{**}	3.222^{**}	3.222^{*} (0)	3.497^{**} (1)	2.903^{**}	0.849^{*}	3.792^{**} (1)	5.389^{**} (10)	5.389^{**}
Piemonte	2.551^{**}	3.254^{**} (1)	2.810^{**} (1)	1.894^{*}	3.211^{**}	4.706^{**} (1)	3.959^{**} (1)	2.446^{*}	0.204^{*}	2.925^{*} (1)	3.110^{*} (5)	2.821^{*}
Valle d Aosta	0.584^{*}	1.472^{**} (1)	1.664^{*} (8)	1.650^{*}	0.331	2.727^{**} (1)	2.496^{*} (7)	2.468^{*}	0.423	2.069^{*} (1)	2.399 (4)	1.852
Liguria	0.724^{*}	1.963^{*} (3)	2.801^{*} (10)	2.801^{*}	1.667^{**}	2.971^{*} (2)	4.179^{**} (10)	4.179^{**}	−1.422	2.741 (4)	3.929 (10)	3.929
Lombardia	2.532^{**}	2.532^{**} (0)	2.532^{**} (0)	2.238^{**}	3.473^{**}	3.473^{**} (0)	3.492^{**} (1)	2.905^{**}	1.395	4.601^{*} (1)	6.570^{*} (10)	6.570^{*}
North-East	1.489^{**}	2.901^{**} (1)	2.263^{**} (2)	1.374^{*}	1.751^{**}	3.429^{*} (1)	2.824^{**} (1)	0.652	−0.127	3.089^{**} (1)	2.776^{*} (4)	1.922
Prov. Aut. Bolzano	−0.937	−0.034 (1)	−0.622 (2)	−0.738	−0.856	0.576 (1)	0.578 (10)	0.578	−3.469	−0.157 (10)	-3.094^{**} (2)	-3.192^{**}
Prov. Aut. Trento	0.328	0.328 (0)	0.328 (0)	0.054	0.558	0.558 (0)	0.558 (0)	−0.679	−0.711	0.628 (2)	0.814 (10)	0.814
Veneto	1.800^{**}	2.832^{**} (1)	2.515^{**} (1)	1.447^{*}	1.728^{*}	3.160^{*} (1)	2.957^{*} (2)	1.759^{*}	0.453	2.886 (1)	2.693 (2)	0.494
Friuli-Venezia Giulia	1.193^{**}	1.602^{*} (1)	1.561^{*} (2)	1.337^{*}	1.306^{*}	1.505 (1)	1.564 (1)	0.902	0.449	4.033^{*} (2)	4.894^{*} (10)	4.894^{*}
Emilia-Romagna	1.708^{*}	4.157^{**} (1)	2.878^{**} (2)	1.746^{*}	2.449^{*}	5.342^{*} (1)	4.108^{*} (1)	2.004	−0.285	4.735^{*} (2)	3.743^{*} (5)	3.163^{*}
Trentino Alto Adige	−0.221	0.004 (9)	−0.221 (0)	−0.226	−0.300	0.046 (10)	−0.300 (0)	−8.712	−2.273	0.423 (3)	0.079 (10)	0.079
Centre	1.130^{**}	1.971^{**} (2)	2.279^{**} (10)	2.279^{**}	1.189^{**}	2.279^{*} (1)	2.809^{**} (10)	2.809^{**}	0.851^{*}	1.970 (2)	2.956 (10)	2.956
Toscana	0.726^{**}	1.559 (2)	1.879^{*} (10)	1.879^{*}	0.344^{*}	2.070 (2)	2.390 (10)	2.390	0.206	1.959 (2)	3.366 (10)	3.366
Umbria	1.639^{**}	1.686^{*} (1)	2.103^{*} (10)	2.103^{*}	2.291^{*}	2.291^{*} (0)	2.291^{*} (0)	1.805	1.426^{**}	3.576^{*} (1)	5.335^{*} (10)	5.335^{*}
Marche	0.958^{**}	2.406^{**} (1)	3.035^{**} (10)	3.035^{**}	1.945^{**}	2.094^{*} (1)	3.341^{*} (10)	3.341^{*}	−0.780	5.181^{**} (3)	6.944^{**} (10)	6.944^{**}
Lazio	1.339^{**}	2.192^{**} (2)	2.369^{**} (10)	2.369^{**}	1.384^{**}	2.602^{**} (1)	3.057^{**} (10)	3.057^{**}	1.502^{*}	1.502^{*} (0)	1.643 (4)	1.585
South	0.840^{**}	0.875^{**} (1)	0.971^{*} (2)	0.846	0.807^{**}	0.807^{*} (0)	0.911^{**} (1)	0.542	0.769^{*}	0.769^{*} (0)	0.974 (2)	−0.922
Abruzzo	0.891^{**}	0.891^{**} (0)	0.891^{**} (0)	0.694^{*}	0.986^{**}	0.986^{**} (0)	1.021^{*} (4)	1.015^{*}	1.521^{*}	1.521^{*} (0)	2.050^{**} (1)	0.482
Molise	0.615^{*}	0.615^{*} (0)	0.615^{*} (0)	0.393	0.483^{*}	0.483^{*} (0)	0.483^{*} (0)	0.310	0.453	0.453 (0)	0.453 (0)	−4.809
Campania	1.098^{**}	1.098^{**} (0)	1.196^{*} (10)	1.196^{*}	0.976^{**}	0.976^{**} (0)	1.363 (10)	1.363	1.038^{*}	1.038^{*} (0)	1.038^{*} (0)	−5.300
Puglia	0.760^{*}	1.277^{*} (1)	1.110^{*} (2)	0.514	0.833^{*}	1.447^{*} (1)	1.217^{*} (1)	0.108	0.364	1.971 (2)	2.947 (5)	2.667
Basilicata	0.204	0.204 (0)	0.204 (0)	−0.032	0.204	0.204 (0)	0.204 (0)	−0.016	−0.842	0.000 (10)	−0.842 (0)	-2.303^{*}
Calabria	0.416	0.416 (0)	1.004 (10)	1.004	0.326	0.326 (0)	0.326 (0)	−1.332	0.733	1.878 (2)	5.215 (10)	5.215
Islands	0.912^{**}	1.466^{**} (1)	1.361^{**} (4)	1.346^{**}	1.306^{**}	1.863^{*} (1)	1.803^{**} (4)	1.777^{**}	0.783^{*}	2.334^{**} (1)	3.337^{*} (10)	3.337^{*}
Sicilia	1.022^{**}	1.402^{**} (1)	1.373^{**} (7)	1.372^{**}	1.469^{**}	1.903^{**} (1)	1.861^{**} (5)	1.857^{**}	0.888^{*}	1.807 (2)	3.110 (10)	3.110
Sardegna	0.613^{**}	1.639^{**} (1)	1.341^{**} (3)	1.277^{*}	0.865^{**}	1.757^{**} (1)	1.649^{*} (4)	1.563^{*}	0.500^{*}	3.840^{**} (1)	4.008^{**} (5)	3.950^{**}

Table 2: *Italian Regional Fiscal Multipliers*. *For each fiscal policy $p \in \{g, gc, gi\}$, the table displays four metrics: (i) impact multipliers, equal across methods (i.e. , $\mathbb{M}_{p,0} = \mathbb{M}^{BP}_{p,0} = \mathbb{M}^{MU}_{p,0}$); (ii) peak BP multipliers, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multipliers, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multipliers $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. ** indicates 10% nominal significance level, * indicates 32% nominal significance level, otherwise the nominal significance is below 32% Confidence intervals are derived using MBB.*

Results, NUTS-2 level

North-Western Regions display high fiscal multipliers across all spending categories. Lombardia exhibits the highest impact multipliers: 2.53 for total expenditure and 3.47 for consumption. These are among the few estimated multipliers that remain significantly persistent over time, and they both peak on-impact, reflecting the rapid absorption of such shocks. The investment multiplier is lower and non-significant on-impact but becomes significantly positive at longer horizons. Piemonte displays similarly robust on-impact and peak responses to consumption and total expenditure—all exceeding 2.5—and long-run multipliers above 1, while the size of investment multipliers is relatively lower (0.20). Notably, all these estimates are statistically significant. Liguria and Valle d'Aosta follow a similar pattern for total expenditure and consumption but report relatively lower and more uncertain effects for investment.

In the North-East, Veneto and Emilia-Romagna exhibit strong responses to both total expenditure and public consumption. Impact multipliers for total spending reach 1.80 and 1.71, respectively, while those for consumption rise above 2.5. In both cases, the peak multipliers (both BP and MU) occur at very short horizons and the long-run MU multipliers remain significantly above 1, indicating sustained fiscal effects. By contrast, government investment in these regions is not significant on impact; while peak responses are reached after a few years, they remain not statistically significant in Veneto, reflecting a more delayed and uncertain transmission of capital spending. The remaining North-Eastern regions report greater uncertainty surrounding estimates. Friuli-Venezia Giulia yields consistently positive but moderate multipliers across all spending types, though significance remains an issue for government consumption. Trentino-Alto Adige, even when analyzed separately for the provinces of Bolzano and Trento, presents a more perplexing case. The estimated multipliers are often statistically insignificant, and occasionally negative, with wide confidence intervals. This is likely due to institutional peculiarities, as both provinces enjoy a high degree of fiscal autonomy, which may introduce region-specific dynamics and weaken the identification of common fiscal shocks.

All Central Regions—Toscana, Umbria, Marche, and Lazio—exhibit significantly positive impact and peak multipliers, often exceeding 2, for both total expenditure and consumption. This result points to an effective use of government resources across the area. In most cases, consumption multipliers exceed those of total expenditure, while remaining lower than investment multipliers. Notably, investment spending typically displays smaller and sometimes insignificant impact responses, yet its effects grow considerably over time. For instance, Marche shows a negative, non-significant impact multiplier to investment shocks, while its long-run MU exceeds 6.5. This pattern is recurrent in the region and suggests a gradual transmission of capital spending into economic activity.

Southern Regions are characterized by lower fiscal multipliers compared to those of the Centre-North. Nonetheless, estimates for total expenditure and public consumption are often statistically different from zero, indicating a measurable—though weaker—response. In both categories, Abruzzo and Campania stand out, with multipliers consistently above 1, suggesting relatively effective spending transmission. In contrast, Basilicata, Molise, and Puglia display more fragile outcomes, with multipliers frequently below 1 and greater variability across spending instruments. Calabria, while reporting positive point estimates across all types of expenditure, fails to produce statistically significant results in any case. Across the board, investment multipliers are associated with the greatest degree of uncertainty and are rarely statistically significant.

By contrast, the Islands display more promising dynamics. Sicilia and Sardegna report multipliers that lie between those of the South and Centre-North. Across all categories of expenditure, they show positive and statistically significant effects, with impact multipliers typically exceeding 1. The only exception is investment, for which on-impact multipliers remain below 1, although long-run responses tend to be stronger.

Results, NUTS-1 level and Policy Implications

The macro-area (NUTS-1) multipliers are computed as GDP-weighted averages of the regional multipliers within each area. Similarly, the national (NUTS-0) multipliers are obtained considering all the regions using their respective GDP share as weights.[4]

At the macro-area level (NUTS-1), the results closely mirror regional findings. The North-West records the highest multipliers, followed by the Centre and North-East, while the South and Islands lag behind. For consumption and total expenditure, multipliers remain relatively stable across horizons, but for investment, we observe a substantial increase over time, reflecting

[4] As a robustness exercise, we also estimate macro-areas multipliers directly using macro-area data and then aggregating them to compute the national multipliers. The results are reported in Table 11 of Appendix D.

the delayed transmission of capital spending.

National multipliers are positive and statistically different from zero across all categories—except for long-run investment multiplier—suggesting that public spending in Italy is effective on average. However, our regional and macro-area analysis demonstrates that the effectiveness of public spending can vary significantly depending on the policy instruments and on specific regional and macroeconomic conditions. While the aggregate data suggest an overall efficacy, our results underscore an endemic struggle for some regions—typically in the South—in translating spending into long-term growth. This pattern calls for more regionally tailored fiscal policies to maximize the potential of public spending.

Two insightful results emerge from comparing BP and MU estimates:

1. **Timing of Peaks**: MU peak multipliers tend to occur later in time than BP peaks—especially for investment—capturing the delayed impact of capital accumulation. By contrast, BP multipliers typically peak on impact or shortly after, reflecting the immediate nature of current spending.

2. **Long-Run Uncertainty**: Long-run multipliers frequently lack statistical significance. This result is particularly relevant for policymakers as it highlights the substantial uncertainty surrounding the estimated multipliers. The lack of significance in long-term multipliers suggests caution when interpreting the long-term effects of fiscal policies, as these estimates are subject to greater variability and less precision over extended periods.

5.1 Comparison with the Literature

In this section, we compare our findings with results from the literature. For comparative purposes, we focus on the MU multiplier, which is the most commonly computed multiplier in regional analyses. For the purpose of this initial comparison, however, we deliberately abstract from the uncertainty associated with the estimated MU.

Our national estimates for fiscal multipliers are significantly positive and frequently greater than 1 for all types of spending, suggesting that expansionary fiscal policies effectively raise the GDP level. This result partially contrasts with studies by Batini et al. (2012), Caprioli and Momigliano (2013), Cimadomo and D'Agostino (2016) and Afonso et al. (2018), who find positive but smaller multipliers (less than 1). Conversely, our estimates closely align with those of Giordano et al. (2007), who estimate a government spending peak multiplier of 2.4, and Deleidi (2022), who report a total government spending peak of 1.87.

Our empirical evidence tends to align with the strand of literature that documents larger multipliers associated with investment compared to consumption. Our national peak multipliers for consumption (2.53) and investment (3.11) are consistent with Deleidi (2022), who report values of 3.17 and 4.72, respectively. Zezza and Guarascio (2024)'s aggregated investment multiplier is larger than ours on impact (1.9 against our 0.61), as well as for its peak value (5.4 against our 3.11). Piacentini et al. (2016) also find larger investment multipliers.

Regarding geographical heterogeneity, we are consistent with the literature pointing to fiscal multipliers being higher in the Centre-North compared to the South. This contrasts with Piacentini et al. (2016), who document larger multipliers in the South.

Considering the macro-areas (NUTS-1 level), our significant impact consumption multipliers for the South (0.81) and Islands (1.31) are smaller than those obtained in the North, ranging from 1.75 to 3.22. In the Centre, we obtain 1.19. We find investment impact multipliers for the South (0.77) and Islands (0.78) comparable to those in the Centre-North, but with lower peaks and long-run effects in the Southern regions.

Overall, our estimates are close to those in Lucidi (2022) for consumption multipliers, which peak at 1.7 on-impact in the Centre-North and at 1.3 in the aggregated South and Islands. For investment, we document lower impact multipliers than Lucidi (2022). These findings are confirmed at the NUTS-2 regional level.

Our estimates are also particularly close to Deleidi et al. (2021), who find that investment multipliers are larger than consumption's and that, in general, numbers are higher in the Centre-North than in the South and Islands. Specifically, they report peaks in the Centre-Northern regions of 4.1 (investment) and 1.8 (consumption), compared to Southern regions' peaks of 2.3 (investment) and 1.4 (consumption). Similarly, we find that total spending multipliers are lower than those for both investment and consumption. Frangiamore (2024) and Matarrese and Frangiamore (2023) also have similar directional results, even though our estimates are larger in magnitude.

Finally, we find relatively more persistent effects associated with investment shocks, aligning with studies such as Auerbach and Gorodnichenko (2012), Deleidi et al. (2021), Destefanis et al. (2022) and Lucidi (2022). In contrast with Lucidi (2022), the effects of investment shocks are relatively more persistent in the Centre-North as compared to the Southern regions.

5.2 Uncertainty

An important dimension of our analysis concerns the degree of uncertainty surrounding the estimated fiscal multipliers. As shown in Table 2, significance levels are denoted by one asterisk (*) for nominal significance at 32% and two asterisks (**) for 10%. As explained above, these significance levels are derived from confidence bands computed via a MBB procedure.

Overall, statistical significance tends to decay over time. Across regions and instruments, we rarely detect robustly significant effects beyond a five-year horizon, even for otherwise large point estimates.

At the regional (NUTS-2) level, the estimates exhibit substantial heterogeneity not only in size but also in statistical precision. Several regions in the North-West and Centre—such as Lombardia, Piemonte, Lazio, Marche and Umbria—feature highly significant multipliers across all expenditure categories (consumption, investment, and total expenditure), with many of them reaching significance at the 10% nominal level. In contrast, estimates for many Southern regions—particularly Basilicata, Molise, Puglia, and Calabria—are statistically weak or insignificant, especially in the case of investment spending. In some instances, point estimates are negative, and the confidence bands are wide, reflecting high uncertainty and low signal-to-noise ratios in the local fiscal transmission mechanism. This contrasts the findings in Lucidi (2022) that reveals comparatively more persistent multipliers in the South. Sardegna and Sicilia reports persistently high multipliers across all types of spending.

At the macro-area (NUTS-1) level, the aggregation of regional estimates reveals a similar pattern. The North-West displays the highest and most robust multipliers, while the Centre also features consistently significant effects. The North-East shows comparatively large point estimates but with greater uncertainty, especially over longer horizons. The South and the Islands continue to lag behind: while short-run effects are sometimes significant, long-run responses are generally weaker and often not statistically different from zero. Notably, the Islands (Sicilia and Sardegna) present a delayed but statistically significant response to investment shocks over medium-to-long horizons, suggesting a differentiated temporal profile of fiscal policy effectiveness.

At the national level (NUTS-0), multipliers for all expenditure types are positive and statistically significant in the short run, with peak effects typically occurring within one or two years. However, the long-run multiplier for public investment loses statistical significance, even at the 32%nominal significance level. This is a crucial finding: while the aggregate effect of fiscal expansions appears beneficial on average, the long-term impact remains surrounded by considerable uncertainty. The persistence of government spending effects—particularly for capital investment—is thus less robust than implied by the point estimates alone. Although similar in the magnitude, our multipliers are characterized by higher uncertainty with respect to Deleidi et al. (2021) and Matarrese and Frangiamore (2023).

6 Conclusions

We develop a novel econometric methodology designed to estimate local fiscal reaction functions and, subsequently, fiscal spending multipliers. This methodology emphasizes the importance of regional heterogeneity, moving well beyond the limited role that "fixed effects" can play in standard panel data methods. Applying this methodology to Italian data from 1995 to 2021 observed at the NUTS-2 and NUTS-1 levels, we provide novel empirical evidence on Italian fiscal multipliers. To tackle the common challenge of data scarcity in local fiscal policy analysis, and as a robust alternative to traditional Bartik-type instruments—whose relevance and exogeneity are often empirically difficult to defend—we use factor analysis to construct a single instrument for output shocks common to all regions. This instrument, which is orthogonal to regional government spending by design, is intended to capture the common, non-fiscal forces driving Italian regional output dynamics.

Our findings confirm that, in general, expansionary government spending shocks have a positive effect on output. However, this effect is not as persistent as some previous literature suggests. A key takeaway of our analysis is the high uncertainty surrounding estimated fiscal multipliers, which we quantify by bootstrap confidence intervals robust to VAR disturbances and proxies being driven by uncorrelated but nonlinearly dependent processes. This phenomenon, which is common in the empirical fiscal literature, is exacerbated by the regional disparities.

Our analysis raises doubts about the long-term efficacy of fiscal spending in Italian regions. With a few exceptions, the positive effects of government spending on Italian regions and macro-areas tend to dissipate within a few years after the initial shock. This pattern holds for all types of public spending considered, consumption, investment, and total expenditure at both NUTS-1 and NUTS-2 levels. This evidence could potentially explain why regional fiscal spending has a limited, if not negligible, impact on the debt-to-GDP ratio.

We detect geographical heterogeneity, uncovering significant disparities in the efficacy of fiscal policies across regions. Specifically, we document lower multipliers in Southern regions compared to the Centre-North, which reflects the ancient and persistent North-South divide in Italy. These findings suggest that strategically targeted government spending has the potential to reduce territorial inequalities within Italy.

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A Data

Data	**Description**
GDP	Gross Domestic Product
GC	Government Final Consumption Expenditures
GI	Government Gross Fixed Capital formation
G	Total Government Expenditure, obtained as $GI + GC$
gdp_{def}	GDP Deflator
pop	Annual average population
Variable	**Description**
gdp	Real per-capita regional GDP, $gdp = log(GDP/gdp_{def}/pop)$
gc	Real per-capita regional Government Consumption, $gc = log(GC/gdp_{def}/pop)$
gi	Real per-capita regional Government Investment, $gi = log(GI/gdp_{def}/pop)$
g	Real per-capita regional Total Government Expenditure, $g = log(G/gdp_{def}/pop)$

Table 3: *Regional Data, annual frequency, period 1995-2021. Source: GDP deflator from AMECO, the other variables from ISTAT regional accounts*

Regions	GDP	GC	GI	G
Piemonte	30484.26 (1480.41)	5245.04 (445.22)	649.95 (200.82)	5894.99 (536.27)
Valle d Aosta	38965.18 (1997.31)	10858.44 (714.17)	2754.82 (1013.66)	13613.26 (1473.02)
Liguria	30631.39 (1617.95)	5747.13 (293.99)	794.29 (158.60)	6541.42 (383.40)
Lombardia	37916.90 (1336.60)	4881.93 (321.42)	711.25 (133.49)	5593.18 (352.29)
Prov. Aut. Bolzano	42204.20 (1998.47)	8397.54 (438.44)	2290.96 (410.36)	10688.49 (484.31)
Prov. Aut. Trento	37533.61 (1209.99)	7790.55 (593.13)	1901.00 (486.14)	9691.55 (825.51)
Veneto	31987.07 (1259.53)	4879.87 (355.76)	773.09 (132.47)	5652.96 (392.58)
Friuli-Venezia Giulia	30312.32 (1323.52)	5954.13 (454.85)	1061.33 (273.12)	7015.46 (634.46)
Emilia-Romagna	34508.02 (1378.41)	5235.88 (268.63)	733.70 (198.40)	5969.58 (379.05)
Trentino Alto Adige	39832.06 (1041.59)	8090.00 (469.17)	2093.23 (426.77)	10183.23 (588.51)
Toscana	30251.93 (1325.54)	5394.74 (350.33)	640.14 (133.83)	6034.88 (421.47)
Umbria	26542.83 (1900.99)	5644.70 (324.68)	708.48 (257.27)	6353.18 (477.08)
Marche	27002.76 (1433.25)	5303.53 (329.00)	565.18 (153.22)	5868.71 (395.12)
Lazio	35064.57 (2412.93)	5589.39 (514.97)	982.07 (204.09)	6571.46 (664.26)
Abruzzo	24545.07 (839.95)	5435.34 (308.97)	732.14 (178.72)	6167.48 (400.80)
Molise	21439.86 (1557.07)	6119.10 (545.01)	1130.54 (408.58)	7249.64 (804.95)
Campania	18767.75 (1003.20)	5311.55 (452.55)	561.28 (127.43)	5872.83 (550.81)
Puglia	18178.82 (793.07)	5034.51 (378.38)	526.85 (86.66)	5561.35 (435.18)
Basilicata	20928.49 (1054.84)	5876.27 (452.60)	640.83 (128.06)	6517.11 (518.42)
Calabria	17077.66 (998.60)	6045.65 (526.88)	610.58 (143.80)	6656.23 (535.55)
Sicilia	18122.13 (996.18)	5993.82 (444.82)	645.78 (204.23)	6639.60 (575.89)
Sardegna	20415.13 (1018.77)	6197.92 (386.38)	963.31 (205.19)	7161.23 (497.98)
Macro-areas	GDP	GC	GI	G
North-West	35115.00 (1357.21)	5118.95 (349.49)	719.08 (156.56)	5838.02 (406.13)
North-East	33464.36 (1241.16)	5418.29 (333.17)	907.19 (191.62)	6325.48 (412.76)
Centre	31828.04 (1785.80)	5493.20 (413.61)	797.83 (167.23)	6291.02 (525.51)
South	19042.58 (895.44)	5387.53 (407.51)	590.77 (104.60)	5978.30 (480.43)
Islands	18689.25 (965.35)	6044.31 (424.41)	724.31 (198.82)	6768.62 (549.81)
	GDP	GC	GI	G
Italy	28497.74 (1208.23)	5416.97 (376.31)	739.88 (149.52)	6156.85 (458.56)

Table 4: *Descriptive statistics of data. Average of regional per-capita real variables for the period 1995-2021. In brackets the standard deviations.*

B Confidence Intervals at 68%

	$\mathbb{M}_{g,0}$	$68\% CI$	$\mathbb{M}^{BP}_{g,peak}$	$68\% CI$	$\mathbb{M}^{MU}_{g,peak}$	$68\% CI$	$\mathbb{M}^{MU}_{g,\infty}$	$68\% CI$
Italy	1.548	[1.414, 1.944]	2.043(1)	[1.283, 2.060]	1.951(2)	[1.509, 2.103]	1.754	[1.039, 1.956]
North-West	2.359	[1.927, 2.861]	2.359(0)	[1.927, 2.861]	2.456(1)	[1.730, 2.911]	2.200	[1.330, 2.565]
Piemonte	2.551	[1.307, 3.634]	3.254(1)	[1.590, 4.462]	2.810(1)	[1.722, 3.819]	1.894	[0.938, 2.665]
Valle d Aosta	0.584	[0.212, 2.951]	1.472(1)	[0.860, 1.808]	1.664(8)	[0.649, 2.819]	1.650	[0.517, 2.820]
Liguria	0.724	[0.643, 2.011]	1.963(3)	[0.209, 2.202]	2.801(10)	[1.052, 3.502]	2.801	[1.052, 3.502]
Lombardia	2.532	[2.008, 3.017]	2.532(0)	[2.008, 3.017]	2.532(0)	[2.008, 3.017]	2.238	[1.190, 2.761]
North-East	1.489	[0.936, 2.207]	2.901(1)	[1.460, 3.333]	2.263(2)	[1.375, 2.726]	1.374	[0.394, 1.952]
Prov. Aut. Bolzano	-0.937	[-1.600, 0.045]	-0.034(1)	[-0.854, 0.842]	-0.622(2)	[-1.546, 0.161]	-0.738	[-1.558, 0.227]
Prov. Aut. Trento	0.328	[-1.159, 0.714]	0.328(0)	[-1.159, 0.714]	0.328(0)	[-1.159, 0.714]	0.054	[-2.031, 0.609]
Veneto	1.800	[1.109, 2.642]	2.832(1)	[1.344, 3.814]	2.515(1)	[1.771, 3.533]	1.447	[0.493, 2.458]
Friuli-Venezia Giulia	1.193	[0.597, 2.044]	1.602(1)	[0.345, 2.272]	1.561(2)	[0.600, 2.407]	1.337	[0.017, 2.293]
Emilia-Romagna	1.708	[0.501, 3.074]	4.157(1)	[1.340, 5.121]	2.878(2)	[1.226, 3.612]	1.746	[0.243, 2.555]
Trentino Alto Adige	-0.221	[-0.718, 0.540]	0.004(9)	[-0.014, 0.072]	-0.221(0)	[-0.718, 0.540]	-0.226	[-2.078, 0.828]
Centre	1.130	[1.102, 2.264]	1.971(2)	[0.890, 2.066]	2.279(10)	[1.367, 2.594]	2.279	[1.367, 2.594]
Toscana	0.726	[0.660, 1.972]	1.559(2)	[-0.126, 1.910]	1.879(10)	[0.224, 2.356]	1.879	[0.224, 2.356]
Umbria	1.639	[0.912, 2.049]	1.686(1)	[0.084, 2.153]	2.103(10)	[0.009, 2.625]	2.103	[0.009, 2.625]
Marche	0.958	[0.502, 1.598]	2.406(1)	[1.353, 3.211]	3.035(10)	[2.123, 3.629]	3.035	[2.123, 3.629]
Lazio	1.339	[1.040, 3.091]	2.192(2)	[0.918, 2.731]	2.369(10)	[1.544, 3.090]	2.369	[1.544, 3.090]
South	0.840	[0.460, 1.020]	0.875(1)	[0.328, 0.968]	0.971(2)	[0.347, 1.081]	0.846	[-0.236, 1.448]
Abruzzo	0.891	[0.643, 1.498]	0.891(0)	[0.643, 1.498]	0.891(0)	[0.643, 1.498]	0.694	[0.044, 1.543]
Molise	0.615	[0.041, 1.257]	0.615(0)	[0.041, 1.257]	0.615(0)	[0.041, 1.257]	0.393	[-0.200, 1.672]
Campania	1.098	[0.584, 1.160]	1.098(0)	[0.584, 1.160]	1.196(10)	[0.066, 1.429]	1.196	[0.066, 1.429]
Puglia	0.760	[0.035, 1.507]	1.277(1)	[0.450, 1.869]	1.110(2)	[0.408, 1.619]	0.514	[-0.159, 1.453]
Basilicata	0.204	[-0.467, 0.556]	0.204(0)	[-0.467, 0.556]	0.204(0)	[-0.467, 0.556]	-0.032	[-1.145, 0.409]
Calabria	0.416	[-0.638, 0.964]	0.416(0)	[-0.638, 0.964]	1.004(10)	[-2.243, 2.864]	1.004	[-2.243, 2.864]
Islands	0.912	[0.805, 1.097]	1.466(1)	[0.912, 1.407]	1.361(4)	[1.059, 1.436]	1.346	[0.972, 1.456]
Sicilia	1.022	[0.868, 1.142]	1.402(1)	[0.797, 1.390]	1.373(7)	[1.030, 1.489]	1.372	[1.014, 1.502]
Sardegna	0.613	[0.454, 1.164]	1.639(1)	[0.892, 1.776]	1.341(3)	[0.878, 1.606]	1.277	[0.621, 1.617]

Table 5: ***Total Government Expenditure Multipliers - 68% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. , $\mathbb{M}_{g,0} = \mathbb{M}^{BP}_{g,0} = \mathbb{M}^{MU}_{g,0}$); (ii) peak BP multiplier, $\mathbb{M}^{BP}_{g,peak}$, and (iii) peak MU multiplier, $\mathbb{M}^{MU}_{g,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier $\mathbb{M}^{MU}_{g,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 68% confidence intervals, which are derived using MBB.*

	$\mathbb{M}_{gc,0}$	$68\%CI$	$\mathbb{M}^{BP}_{gc,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gc,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gc,\infty}$	$68\%CI$
Italy	1.925	[1.809, 2.462]	2.498(1)	[1.474, 2.568]	2.526(2)	[1.863, 2.719]	1.921	[1.016, 2.484]
North-West	3.222	[2.771, 3.840]	3.222(0)	[2.771, 3.840]	3.497(1)	[2.470, 4.087]	2.903	[1.635, 3.348]
Piemonte	3.211	[1.488, 4.283]	4.706(1)	[1.910, 5.453]	3.959(1)	[2.155, 4.908]	2.446	[0.677, 3.259]
Valle d Aosta	0.331	[-0.535, 1.980]	2.727(1)	[1.565, 3.202]	2.496(7)	[1.269, 3.473]	2.468	[1.021, 3.484]
Liguria	1.667	[1.886, 3.532]	2.971(2)	[0.260, 3.484]	4.179(10)	[1.997, 5.386]	4.179	[1.997, 5.386]
Lombardia	3.473	[3.050, 4.160]	3.473(0)	[3.050, 4.160]	3.492(1)	[2.191, 4.320]	2.905	[1.455, 3.625]
North-East	1.751	[0.986, 2.667]	3.429(1)	[1.223, 4.253]	2.824(1)	[1.531, 3.796]	0.652	[-0.505, 2.608]
Prov. Aut. Bolzano	-0.856	[-1.350, 0.460]	0.576(1)	[-0.267, 2.269]	0.578(10)	[-1.090, 3.472]	0.578	[-1.090, 3.472]
Prov. Aut. Trento	0.558	[-0.332, 1.088]	0.558(0)	[-0.332, 1.088]	0.558(0)	[-0.332, 1.088]	-0.679	[-3.318, 0.655]
Veneto	1.728	[0.917, 2.681]	3.160(1)	[1.130, 4.611]	2.957(2)	[1.597, 4.052]	1.759	[0.194, 3.075]
Friuli-Venezia Giulia	1.306	[0.233, 2.326]	1.505(1)	[-0.822, 2.000]	1.564(1)	[-0.113, 2.342]	0.902	[-2.760, 2.067]
Emilia-Romagna	2.449	[0.833, 4.374]	5.342(1)	[0.545, 7.214]	4.108(1)	[1.170, 6.013]	2.004	[-0.869, 3.718]
Trentino Alto Adige	-0.300	[-1.042, 0.641]	0.046(10)	[-0.028, 0.090]	-0.300(0)	[-1.042, 0.641]	-8.712	[-3.663, 3.074]
Centre	1.189	[1.207, 2.707]	2.279(1)	[1.543, 2.934]	2.809(10)	[1.545, 3.137]	2.809	[1.545, 3.137]
Toscana	0.344	[0.370, 2.289]	2.070(2)	[-0.481, 2.468]	2.390(10)	[-0.189, 2.928]	2.390	[-0.189, 2.928]
Umbria	2.291	[0.925, 3.227]	2.291(0)	[0.925, 3.227]	2.291(0)	[0.925, 3.227]	1.805	[-1.513, 3.301]
Marche	1.945	[1.369, 2.450]	2.094(1)	[0.839, 3.737]	3.341(10)	[1.355, 4.652]	3.341	[1.355, 4.652]
Lazio	1.384	[1.027, 3.631]	2.602(1)	[1.888, 3.763]	3.057(10)	[2.204, 3.826]	3.057	[2.204, 3.826]
South	0.807	[0.483, 1.079]	0.807(0)	[0.483, 1.079]	0.911(1)	[0.481, 1.227]	0.542	[-0.607, 1.968]
Abruzzo	0.986	[0.620, 1.745]	0.986(0)	[0.620, 1.745]	1.021(4)	[0.237, 1.863]	1.015	[0.055, 1.895]
Molise	0.483	[0.147, 1.383]	0.483(0)	[0.147, 1.383]	0.483(0)	[0.147, 1.383]	0.310	[-0.770, 2.438]
Campania	0.976	[0.556, 1.134]	0.976(0)	[0.556, 1.134]	1.363(10)	[-0.052, 1.859]	1.363	[-0.052, 1.859]
Puglia	0.833	[0.185, 1.642]	1.447(1)	[0.695, 2.166]	1.217(1)	[0.614, 1.873]	0.108	[-0.472, 1.678]
Basilicata	0.204	[-0.578, 0.667]	0.204(0)	[-0.578, 0.667]	0.204(0)	[-0.578, 0.667]	-0.016	[-1.253, 0.612]
Calabria	0.326	[-0.891, 1.196]	0.326(0)	[-0.891, 1.196]	0.326(0)	[-0.891, 1.196]	-1.332	[-3.852, 6.275]
Islands	1.306	[1.168, 1.627]	1.863(1)	[1.174, 1.899]	1.803(4)	[1.365, 1.962]	1.777	[1.221, 1.974]
Sicilia	1.469	[1.300, 1.770]	1.903(1)	[1.155, 1.980]	1.861(5)	[1.486, 2.052]	1.857	[1.428, 2.074]
Sardegna	0.865	[0.488, 1.554]	1.757(1)	[0.760, 2.162]	1.649(4)	[0.645, 2.132]	1.563	[0.317, 2.148]

Table 6: ***Government Consumption Multipliers - 68% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. ,* $\mathbb{M}_{gc,0} = \mathbb{M}^{BP}_{g,0} = \mathbb{M}^{MU}_{gc,0}$*); (ii) peak BP multiplier,* $\mathbb{M}^{BP}_{gc,peak}$*, and (iii) peak MU multiplier,* $\mathbb{M}^{MU}_{gc,peak}$*, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier* $\mathbb{M}^{MU}_{gc,\infty}$*, approximated at the horizon* $h = 10$*. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 68% confidence intervals, which are derived using MBB.*

	$\mathbb{M}_{gi,0}$	$68\%CI$	$\mathbb{M}^{BP}_{gi,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gi,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gi,\infty}$	$68\%CI$
Italy	0.614	[0.540, 1.617]	2.595(1)	[1.136, 2.712]	3.111(5)	[0.143, 3.766]	2.929	[-0.674, 4.356]
North-West	0.849	[0.141, 2.517]	3.792(1)	[1.232, 4.823]	5.389(10)	[2.262, 6.830]	5.389	[2.262, 6.830]
Piemonte	0.204	[0.006, 3.036]	2.925(1)	[1.675, 6.417]	3.110(5)	[1.266, 6.986]	2.821	[0.839, 6.920]
Valle d Aosta	0.423	[-0.080, 14.086]	2.069(1)	[0.180, 4.021]	2.399(4)	[-0.132, 8.362]	1.852	[-2.607, 7.250]
Liguria	-1.422	[-2.032, 0.928]	2.741(4)	[-0.058, 3.882]	3.929(10)	[-1.343, 6.731]	3.929	[-1.343, 6.731]
Lombardia	1.395	[-0.183, 3.053]	4.601(1)	[0.580, 5.687]	6.570(10)	[2.215, 8.081]	6.570	[2.215, 8.081]
North-East	-0.127	[-0.526, 1.435]	3.089(1)	[1.138, 4.093]	2.776(4)	[0.171, 4.298]	1.922	[-0.714, 3.679]
Prov. Aut. Bolzano	-3.469	[-8.248, 0.065]	-0.157(10)	[-0.156, 0.006]	-3.094(2)	[-7.641, -1.505]	-3.192	[-6.598, -1.359]
Prov. Aut. Trento	-0.711	[-2.125, 0.578]	0.628(2)	[-1.108, 1.624]	0.814(10)	[-2.501, 2.572]	0.814	[-2.501, 2.572]
Veneto	0.453	[-0.508, 2.695]	2.886(1)	[-0.472, 5.702]	2.693(2)	[-0.892, 6.536]	0.494	[-3.582, 5.020]
Friuli-Venezia Giulia	0.449	[-0.122, 2.679]	4.033(2)	[1.105, 5.498]	4.894(10)	[2.097, 8.282]	4.894	[2.097, 8.282]
Emilia-Romagna	-0.285	[-1.168, 1.750]	4.735(2)	[0.869, 4.583]	3.743(5)	[0.704, 4.937]	3.163	[0.000, 4.660]
Trentino Alto Adige	-2.273	[-4.242, 0.359]	0.423(3)	[-0.471, 1.031]	0.079(10)	[-3.816, 1.314]	0.079	[-3.816, 1.314]
Centre	0.851	[0.700, 2.403]	1.970(2)	[-1.045, 2.339]	2.956(10)	[-5.439, 6.506]	2.956	[-5.439, 6.506]
Toscana	0.206	[-0.119, 2.407]	1.959(2)	[-0.865, 3.409]	3.366(10)	[-1.174, 6.125]	3.366	[-1.174, 6.125]
Umbria	1.426	[0.793, 2.255]	3.576(1)	[0.226, 4.181]	5.335(10)	[1.353, 6.232]	5.335	[1.353, 6.232]
Marche	-0.780	[-1.781, 0.715]	5.181(3)	[2.121, 5.232]	6.944(10)	[4.459, 8.511]	6.944	[4.459, 8.512]
Lazio	1.502	[0.880, 3.620]	1.502(0)	[0.880, 3.620]	1.643(4)	[-7.194, 6.193]	1.585	[-12.762, 8.637]
South	0.769	[0.182, 1.633]	0.769(0)	[0.182, 1.633]	0.974(2)	[-0.864, 1.944]	-0.922	[-5.577, 3.247]
Abruzzo	1.521	[1.007, 3.443]	1.521(0)	[1.007, 3.443]	2.050(1)	[1.641, 4.559]	0.482	[-0.323, 3.886]
Molise	0.453	[-0.698, 1.831]	0.453(0)	[-0.698, 1.831]	0.453(0)	[-0.698, 1.831]	-4.809	[-5.367, 4.184]
Campania	1.038	[0.265, 2.115]	1.038(0)	[0.265, 2.115]	1.038(0)	[0.265, 2.115]	-5.300	[-11.198, 3.592]
Puglia	0.364	[-1.271, 2.028]	1.971(2)	[-0.301, 2.841]	2.947(5)	[-0.917, 5.112]	2.667	[-1.097, 5.280]
Basilicata	-0.842	[-2.114, 0.191]	0.000(10)	[-0.006, 0.013]	-0.842(0)	[-2.114, 0.191]	-2.303	[-7.337, -0.207]
Calabria	0.733	[-0.337, 1.222]	1.878(2)	[-1.028, 2.074]	5.215(10)	[-4.627, 6.652]	5.215	[-4.627, 6.652]
Islands	0.783	[0.371, 1.417]	2.334(1)	[0.863, 2.385]	3.337(10)	[0.575, 3.815]	3.337	[0.575, 3.815]
Sicilia	0.888	[0.124, 1.442]	1.807(2)	[-0.170, 1.900]	3.110(10)	[-0.353, 3.817]	3.110	[-0.353, 3.817]
Sardegna	0.500	[0.374, 2.058]	3.840(1)	[2.289, 3.937]	4.008(5)	[2.157, 4.901]	3.950	[1.958, 5.039]

Table 7: ***Government Investment Multipliers - 68% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. , $\mathbb{M}_{gi,0} = \mathbb{M}^{BP}_{gi,0} = \mathbb{M}^{MU}_{gi,0}$); (ii) peak BP multiplier, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multiplier, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 68% confidence intervals, which are derived using MBB.*

C Confidence Intervals at 90%

	$\mathbb{M}_{g,0}$	$90\%CI$	$\mathbb{M}^{BP}_{g,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{g,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{g,\infty}$	$90\%CI$
Italy	1.548	[1.210, 2.129]	2.043(1)	[1.013, 2.332]	1.951(2)	[1.230, 2.316]	1.754	[0.260, 2.587]
North-West	2.359	[1.576, 3.239]	2.359(0)	[1.576, 3.239]	2.456(1)	[1.340, 3.336]	2.200	[0.687, 2.968]
Piemonte	2.551	[0.456, 4.455]	3.254(1)	[0.621, 5.574]	2.810(1)	[0.841, 4.580]	1.894	[-0.059, 3.296]
Valle d Aosta	0.584	[-0.567, 4.828]	1.472(1)	[0.348, 2.148]	1.664(8)	[-1.724, 5.310]	1.650	[-2.226, 5.650]
Liguria	0.724	[-0.003, 2.454]	1.963(3)	[-0.452, 2.969]	2.801(10)	[-0.287, 4.324]	2.801	[-0.287, 4.324]
Lombardia	2.532	[1.629, 3.509]	2.532(0)	[1.629, 3.509]	2.532(0)	[1.629, 3.509]	2.238	[0.425, 3.263]
North-East	1.489	[0.389, 2.668]	2.901(1)	[0.810, 3.969]	2.263(2)	[0.697, 3.239]	1.374	[-0.699, 2.692]
Prov. Aut. Bolzano	-0.937	[-2.673, 0.690]	-0.034(1)	[-1.529, 1.453]	-0.622(2)	[-2.467, 0.742]	-0.738	[-2.595, 0.959]
Prov. Aut. Trento	0.328	[-2.303, 1.211]	0.328(0)	[-2.303, 1.211]	0.328(0)	[-2.303, 1.211]	0.054	[-4.296, 1.146]
Veneto	1.800	[0.218, 3.170]	2.832(1)	[0.050, 4.884]	2.515(1)	[0.556, 4.419]	1.447	[-0.595, 3.410]
Friuli-Venezia Giulia	1.193	[0.042, 2.601]	1.602(1)	[-0.437, 2.952]	1.561(2)	[-0.355, 3.065]	1.337	[-1.415, 3.046]
Emilia-Romagna	1.708	[-0.381, 4.097]	4.157(1)	[0.349, 6.397]	2.878(2)	[0.214, 4.373]	1.746	[-0.958, 3.288]
Trentino Alto Adige	-0.221	[-1.138, 1.121]	0.004(9)	[-0.051, 0.174]	-0.221(0)	[-1.138, 1.121]	-0.226	[-5.385, 3.182]
Centre	1.130	[0.658, 2.686]	1.971(2)	[0.461, 2.485]	2.279(10)	[0.521, 2.975]	2.279	[0.521, 2.975]
Toscana	0.726	[0.066, 2.346]	1.559(2)	[-0.731, 2.674]	1.879(10)	[-0.953, 3.003]	1.879	[-0.953, 3.003]
Umbria	1.639	[0.486, 2.385]	1.686(1)	[-0.603, 2.888]	2.103(10)	[-1.749, 3.325]	2.103	[-1.749, 3.325]
Marche	0.958	[0.129, 2.032]	2.406(1)	[0.690, 3.759]	3.035(10)	[1.241, 4.134]	3.035	[1.241, 4.134]
Lazio	1.339	[0.274, 3.868]	2.192(2)	[0.177, 3.381]	2.369(10)	[0.238, 3.609]	2.369	[0.238, 3.609]
South	0.840	[0.259, 1.218]	0.875(1)	[0.111, 1.197]	0.971(2)	[-0.086, 1.284]	0.846	[-2.372, 3.831]
Abruzzo	0.891	[0.407, 1.899]	0.891(0)	[0.407, 1.899]	0.891(0)	[0.407, 1.899]	0.694	[-0.898, 2.473]
Molise	0.615	[-0.406, 1.744]	0.615(0)	[-0.406, 1.744]	0.615(0)	[-0.406, 1.744]	0.393	[-2.548, 2.292]
Campania	1.098	[0.401, 1.369]	1.098(0)	[0.401, 1.369]	1.196(10)	[-1.468, 1.726]	1.196	[-1.468, 1.726]
Puglia	0.760	[-0.608, 2.016]	1.277(1)	[-0.205, 2.463]	1.110(2)	[-0.423, 2.045]	0.514	[-1.786, 1.945]
Basilicata	0.204	[-0.891, 0.853]	0.204(0)	[-0.891, 0.853]	0.204(0)	[-0.891, 0.853]	-0.032	[-2.135, 0.808]
Calabria	0.416	[-1.181, 1.570]	0.416(0)	[-1.181, 1.570]	1.004(10)	[-11.947, 15.399]	1.004	[-11.947, 15.399]
Islands	0.912	[0.691, 1.206]	1.466(1)	[0.744, 1.600]	1.361(4)	[0.882, 1.550]	1.346	[0.688, 1.594]
Sicilia	1.022	[0.747, 1.253]	1.402(1)	[0.599, 1.641]	1.373(7)	[0.788, 1.612]	1.372	[0.761, 1.632]
Sardegna	0.613	[0.177, 1.433]	1.639(1)	[0.603, 2.116]	1.341(3)	[0.523, 1.862]	1.277	[-0.008, 1.946]

Table 8: ***Total Government Expenditure Multipliers - 90% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. , $\mathbb{M}_{g,0} = \mathbb{M}^{BP}_{g,0} = \mathbb{M}^{MU}_{g,0}$); (ii) peak BP multiplier, $\mathbb{M}^{BP}_{g,peak}$, and (iii) peak MU multiplier, $\mathbb{M}^{MU}_{g,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier $\mathbb{M}^{MU}_{g,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 90% confidence intervals, which are derived using MBB.*

	$\mathbb{M}_{gc,0}$	$90\% CI$	$\mathbb{M}^{BP}_{gc,peak}$	$90\% CI$	$\mathbb{M}^{MU}_{gc,peak}$	$90\% CI$	$\mathbb{M}^{MU}_{gc,\infty}$	$90\% CI$
Italy	1.925	[1.545, 2.684]	2.498(1)	[1.109, 2.969]	2.526(2)	[1.445, 3.024]	1.921	[-0.377, 3.557]
North-West	3.222	[2.368, 4.209]	3.222(0)	[2.368, 4.209]	3.497(1)	[1.975, 4.669]	2.903	[0.701, 3.830]
Piemonte	3.211	[0.401, 5.208]	4.706(1)	[0.563, 6.607]	3.959(1)	[0.910, 5.823]	2.446	[-0.847, 4.051]
Valle d Aosta	0.331	[-2.301, 3.018]	2.727(1)	[0.875, 3.862]	2.496(7)	[-0.219, 4.490]	2.468	[-0.804, 4.528]
Liguria	1.667	[1.134, 4.115]	2.971(2)	[-0.683, 4.593]	4.179(10)	[0.410, 6.565]	4.179	[0.410, 6.565]
Lombardia	3.473	[2.538, 4.612]	3.473(0)	[2.538, 4.612]	3.492(1)	[1.578, 5.116]	2.905	[0.229, 4.208]
North-East	1.751	[0.180, 3.214]	3.429(1)	[0.250, 5.348]	2.824(1)	[0.458, 4.561]	0.652	[-3.352, 4.236]
Prov. Aut. Bolzano	-0.856	[-1.934, 1.337]	0.576(1)	[-1.132, 3.411]	0.578(10)	[-4.295, 7.807]	0.578	[-4.295, 7.807]
Prov. Aut. Trento	0.558	[-1.198, 1.712]	0.558(0)	[-1.198, 1.712]	0.558(0)	[-1.198, 1.712]	-0.679	[-6.590, 1.617]
Veneto	1.728	[-0.001, 3.248]	3.160(1)	[-0.151, 5.893]	2.957(2)	[-0.015, 5.123]	1.759	[-1.652, 4.251]
Friuli-Venezia Giulia	1.306	[-0.790, 2.958]	1.505(1)	[-1.997, 2.882]	1.564(1)	[-1.395, 3.067]	0.902	[-7.551, 3.324]
Emilia-Romagna	2.449	[-0.881, 5.508]	5.342(1)	[-1.196, 9.717]	4.108(1)	[-0.942, 7.702]	2.004	[-4.011, 5.352]
Trentino Alto Adige	-0.300	[-2.003, 1.429]	0.046(10)	[-0.091, 0.231]	-0.300(0)	[-2.003, 1.429]	-8.712	[-12.215, 11.334]
Centre	1.189	[0.679, 3.225]	2.279(1)	[1.095, 3.461]	2.809(10)	[0.409, 3.591]	2.809	[0.409, 3.591]
Toscana	0.344	[-0.321, 2.850]	2.070(2)	[-1.280, 3.479]	2.390(10)	[-2.371, 3.628]	2.390	[-2.371, 3.628]
Umbria	2.291	[-0.060, 3.951]	2.291(0)	[-0.060, 3.951]	2.291(0)	[-0.060, 3.951]	1.805	[-5.456, 4.689]
Marche	1.945	[0.841, 2.864]	2.094(1)	[-0.061, 4.726]	3.341(10)	[-1.189, 5.412]	3.341	[-1.189, 5.412]
Lazio	1.384	[0.117, 4.486]	2.602(1)	[1.177, 4.542]	3.057(10)	[1.204, 4.295]	3.057	[1.204, 4.294]
South	0.807	[0.248, 1.294]	0.807(0)	[0.248, 1.294]	0.911(1)	[0.107, 1.455]	0.542	[-4.007, 4.974]
Abruzzo	0.986	[0.141, 2.214]	0.986(0)	[0.141, 2.214]	1.021(4)	[-0.406, 3.119]	1.015	[-1.124, 3.517]
Molise	0.483	[-0.245, 1.858]	0.483(0)	[-0.245, 1.858]	0.483(0)	[-0.245, 1.858]	0.310	[-3.984, 3.184]
Campania	0.976	[0.354, 1.429]	0.976(0)	[0.354, 1.429]	1.363(10)	[-2.498, 2.323]	1.363	[-2.498, 2.323]
Puglia	0.833	[-0.570, 2.086]	1.447(1)	[-0.049, 2.796]	1.217(1)	[-0.259, 2.301]	0.108	[-2.847, 2.237]
Basilicata	0.204	[-1.176, 1.112]	0.204(0)	[-1.176, 1.112]	0.204(0)	[-1.176, 1.112]	-0.016	[-2.313, 1.111]
Calabria	0.326	[-1.668, 1.987]	0.326(0)	[-1.668, 1.987]	0.326(0)	[-1.668, 1.987]	-1.332	[-17.070, 19.913]
Islands	1.306	[0.993, 1.785]	1.863(1)	[0.927, 2.169]	1.803(4)	[1.079, 2.141]	1.777	[0.767, 2.186]
Sicilia	1.469	[1.115, 1.939]	1.903(1)	[0.863, 2.296]	1.861(5)	[1.192, 2.217]	1.857	[1.067, 2.266]
Sardegna	0.865	[0.096, 1.963]	1.757(1)	[0.368, 2.741]	1.649(4)	[-0.198, 2.637]	1.563	[-1.072, 2.723]

Table 9: ***Government Consumption Multipliers - 90% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. , $\mathbb{M}_{gc,0} = \mathbb{M}^{BP}_{gc,0} = \mathbb{M}^{MU}_{gc,0}$); (ii) peak BP multiplier, $\mathbb{M}^{BP}_{gc,peak}$, and (iii) peak MU multiplier, $\mathbb{M}^{MU}_{gc,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier $\mathbb{M}^{MU}_{gc,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 90% confidence intervals, which are derived using MBB.*

	$\mathbb{M}_{gi,0}$	$90\%CI$	$\mathbb{M}^{BP}_{gi,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{gi,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{gi,\infty}$	$90\%CI$
Italy	0.614	[0.100, 2.017]	2.595(1)	[0.609, 3.288]	3.111(5)	[-3.254, 5.175]	2.929	[-6.259, 9.257]
North-West	0.849	[-0.837, 3.327]	3.792(1)	[0.159, 6.088]	5.389(10)	[0.001, 8.436]	5.389	[0.001, 8.436]
Piemonte	0.204	[-1.129, 4.002]	2.925(1)	[-0.280, 8.066]	3.110(5)	[-2.152, 9.052]	2.821	[-2.829, 9.081]
Valle d Aosta	0.423	[-1.885, 29.777]	2.069(1)	[-1.822, 7.416]	2.399(4)	[-7.962, 21.220]	1.852	[-15.188, 21.444]
Liguria	-1.422	[-2.962, 1.803]	2.741(4)	[-1.104, 5.555]	3.929(10)	[-4.908, 9.780]	3.929	[-4.908, 9.780]
Lombardia	1.395	[-1.524, 4.117]	4.601(1)	[-0.877, 7.499]	6.570(10)	[-0.561, 9.902]	6.570	[-0.561, 9.902]
North-East	-0.127	[-1.268, 2.167]	3.089(1)	[0.049, 5.134]	2.776(4)	[-2.320, 5.641]	1.922	[-3.624, 5.084]
Prov. Aut. Bolzano	-3.469	[-16.299, 2.157]	-0.157(10)	[-0.350, 0.078]	-3.094(2)	[-14.467, -0.219]	-3.192	[-11.350, -0.215]
Prov. Aut. Trento	-0.711	[-3.242, 1.905]	0.628(2)	[-2.051, 2.698]	0.814(10)	[-6.092, 4.243]	0.814	[-6.092, 4.243]
Veneto	0.453	[-2.208, 4.029]	2.886(1)	[-2.795, 7.796]	2.693(2)	[-4.945, 9.241]	0.494	[-10.429, 7.755]
Friuli-Venezia Giulia	0.449	[-1.228, 3.550]	4.033(2)	[-0.312, 7.124]	4.894(10)	[-0.551, 10.818]	4.894	[-0.551, 10.818]
Emilia-Romagna	-0.285	[-2.176, 2.916]	4.735(2)	[-0.314, 5.745]	3.743(5)	[-1.286, 6.361]	3.163	[-2.228, 6.275]
Trentino Alto Adige	-2.273	[-5.891, 2.153]	0.423(3)	[-0.991, 1.782]	0.079(10)	[-6.805, 2.566]	0.079	[-6.805, 2.566]
Centre	0.851	[-0.122, 2.895]	1.970(2)	[-2.452, 3.358]	2.956(10)	[-18.273, 11.303]	2.956	[-18.273, 11.303]
Toscana	0.206	[-1.292, 3.235]	1.959(2)	[-2.139, 5.328]	3.366(10)	[-4.793, 9.221]	3.366	[-4.793, 9.221]
Umbria	1.426	[0.257, 2.737]	3.576(1)	[-0.988, 5.444]	5.335(10)	[-1.069, 7.506]	5.335	[-1.069, 7.506]
Marche	-0.780	[-3.073, 1.591]	5.181(3)	[1.269, 6.322]	6.944(10)	[3.076, 10.440]	6.944	[3.076, 10.440]
Lazio	1.502	[-0.545, 4.392]	1.502(0)	[-0.545, 4.392]	1.643(4)	[-18.485, 9.909]	1.585	[-35.762, 16.625]
South	0.769	[-0.460, 2.452]	0.769(0)	[-0.460, 2.452]	0.974(2)	[-2.485, 3.014]	-0.922	[-18.751, 16.837]
Abruzzo	1.521	[-0.082, 5.350]	1.521(0)	[-0.082, 5.350]	2.050(1)	[0.729, 6.644]	0.482	[-1.766, 6.395]
Molise	0.453	[-1.760, 2.670]	0.453(0)	[-1.760, 2.670]	0.453(0)	[-1.760, 2.670]	-4.809	[-20.816, 16.940]
Campania	1.038	[-0.256, 3.096]	1.038(0)	[-0.256, 3.096]	1.038(0)	[-0.256, 3.096]	-5.300	[-36.956, 25.523]
Puglia	0.364	[-3.307, 4.352]	1.971(2)	[-1.760, 4.423]	2.947(5)	[-5.055, 7.711]	2.667	[-5.319, 7.920]
Basilicata	-0.842	[-3.377, 0.922]	0.000(10)	[-0.031, 0.067]	-0.842(0)	[-3.377, 0.922]	-2.303	[-11.776, 1.308]
Calabria	0.733	[-1.028, 1.719]	1.878(2)	[-2.348, 2.865]	5.215(10)	[-22.267, 9.929]	5.215	[-22.267, 9.929]
Islands	0.783	[-0.051, 1.717]	2.334(1)	[0.330, 2.859]	3.337(10)	[-2.218, 4.664]	3.337	[-2.218, 4.664]
Sicilia	0.888	[-0.413, 1.771]	1.807(2)	[-0.893, 2.654]	3.110(10)	[-4.253, 4.815]	3.110	[-4.253, 4.815]
Sardegna	0.500	[-0.151, 2.591]	3.840(1)	[1.754, 4.524]	4.008(5)	[1.066, 5.676]	3.950	[0.743, 5.973]

Table 10: ***Government Investment Multipliers - 90% CI***. *The table displays four metrics: (i) impact multiplier, equal across methods (i.e. , $\mathbb{M}_{gi,0} = \mathbb{M}^{BP}_{gi,0} = \mathbb{M}^{MU}_{gi,0}$); (ii) peak BP multiplier, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multiplier, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multiplier $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area and national multipliers are computed as weighted average of regional ones. Each point estimate is accompanied by the 90% confidence intervals, which are derived using MBB.*

D Robustness

	Total Expenditure				Consumption				Investment			
	$\mathbb{M}_{g,0}$	$\mathbb{M}^{BP}_{g,peak}$	$\mathbb{M}^{MU}_{g,peak}$	$\mathbb{M}^{MU}_{g,\infty}$	$\mathbb{M}_{gc,0}$	$\mathbb{M}^{BP}_{gc,peak}$	$\mathbb{M}^{MU}_{gc,peak}$	$\mathbb{M}^{MU}_{gc,\infty}$	$\mathbb{M}_{gi,0}$	$\mathbb{M}^{BP}_{gi,peak}$	$\mathbb{M}^{MU}_{gi,peak}$	$\mathbb{M}^{MU}_{gi,\infty}$
Italy	1.826**	2.639* (1)	2.237* (2)	1.853**	2.236**	3.101* (1)	2.926* (2)	2.314**	0.786**	4.369* (2)	4.263* (7)	4.187*
North-West	2.599**	2.951**(1)	2.754**(1)	2.236**	3.445**	3.685* (1)	3.875**(1)	2.884**	0.996*	5.902* (2)	6.481* (10)	6.481*
North-East	1.901**	3.777**(1)	2.697**(1)	1.377*	2.140*	4.252* (1)	3.350**(1)	1.557	−0.326	5.548* (2)	4.380* (4)	2.624
Centre	1.238**	2.498* (2)	2.413**(10)	2.413**	1.403**	2.986**(1)	3.109**(10)	3.109**	1.312*	6.367 (7)	5.259* (10)	5.259*
South	1.323**	1.323**(0)	1.349**(1)	1.192*	1.440**	1.440**(0)	1.440**(0)	1.334*	1.084*	1.084* (0)	1.084* (0)	0.450
Islands	1.005**	1.624**(1)	1.413**(3)	1.380**	1.363**	2.128**(1)	1.915**(3)	1.871**	1.025**	3.330**(2)	3.687* (10)	3.687*

Table 11: ***Italian Fiscal Multipliers***. *For each fiscal policy $p \in \{g, gc, gi\}$, the table displays four metrics: (i) impact multipliers, equal across methods (i.e. , $\mathbb{M}_{p,0} = \mathbb{M}^{BP}_{p,0} = \mathbb{M}^{MU}_{p,0}$); (ii) peak BP multipliers, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multipliers, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multipliers $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area multipliers are estimated directly on macro-area data. National multipliers are computed as weighted average of the macro-area ones. ** indicates 10% nominal significance level, * indicates 32% nominal significance level, otherwise the nominal significance is below 32%. Confidence intervals are derived using MBB.*

	$\mathbb{M}_{g,0}$	$68\%CI$	$\mathbb{M}^{BP}_{g,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{g,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{g,\infty}$	$68\%CI$
Italy	1.826	[1.703, 2.402]	2.639(1)	[1.572, 2.727]	2.237(2)	[1.741, 2.449]	1.853	[1.147, 2.045]
North-West	2.599	[2.286, 3.242]	2.951(1)	[0.857, 3.404]	2.754(1)	[1.879, 3.317]	2.236	[1.236, 2.674]
North-East	1.901	[1.129, 3.250]	3.777(1)	[2.003, 4.801]	2.697(1)	[1.967, 3.684]	1.377	[0.433, 2.180]
Centre	1.238	[1.056, 2.731]	2.498(2)	[0.753, 2.834]	2.413(10)	[1.413, 2.936]	2.413	[1.413, 2.936]
South	1.323	[0.665, 1.590]	1.323(0)	[0.665, 1.590]	1.349(1)	[0.586, 1.502]	1.192	[0.184, 1.509]
Islands	1.005	[0.859, 1.196]	1.624(1)	[0.948, 1.640]	1.413(3)	[1.120, 1.510]	1.380	[0.994, 1.542]
	$\mathbb{M}_{gc,0}$	$68\%CI$	$\mathbb{M}^{BP}_{gc,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gc,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gc,\infty}$	$68\%CI$
Italy	2.236	[2.054, 2.925]	3.101(1)	[1.555, 3.344]	2.926(2)	[2.069, 3.183]	2.314	[1.222, 2.613]
North-West	3.445	[2.927, 4.253]	3.685(1)	[0.562, 4.396]	3.875(1)	[2.344, 4.723]	2.884	[1.289, 3.477]
North-East	2.140	[1.027, 3.522]	4.252(1)	[1.222, 6.017]	3.350(1)	[1.840, 4.712]	1.557	[-0.347, 2.849]
Centre	1.403	[1.287, 3.366]	2.986(1)	[1.553, 4.067]	3.109(10)	[1.694, 3.780]	3.109	[1.694, 3.780]
South	1.440	[0.856, 1.738]	1.440(0)	[0.856, 1.738]	1.440(0)	[0.856, 1.738]	1.334	[0.334, 1.963]
Islands	1.363	[1.143, 1.668]	2.128(1)	[1.188, 2.193]	1.915(3)	[1.458, 2.078]	1.871	[1.276, 2.101]
	$\mathbb{M}_{gi,0}$	$68\%CI$	$\mathbb{M}^{BP}_{gi,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gi,peak}$	$68\%CI$	$\mathbb{M}^{MU}_{gi,\infty}$	$68\%CI$
Italy	0.786	[0.896, 2.488]	4.369(2)	[1.574, 3.829]	4.263(7)	[1.571, 5.419]	4.187	[1.328, 5.557]
North-West	0.996	[0.193, 3.541]	5.902(2)	[1.281, 5.775]	6.481(10)	[2.838, 8.169]	6.481	[2.838, 8.169]
North-East	-0.326	[-0.734, 2.918]	5.548(2)	[1.427, 6.333]	4.380(4)	[1.754, 6.583]	2.624	[-0.137, 5.395]
Centre	1.312	[0.857, 3.916]	6.367(7)	[-0.249, 3.123]	5.259(10)	[0.142, 9.210]	5.259	[0.142, 9.210]
South	1.084	[0.333, 2.462]	1.084(0)	[0.333, 2.462]	1.084(0)	[0.333, 2.462]	0.450	[-4.913, 4.375]
Islands	1.025	[0.603, 1.917]	3.330(2)	[0.842, 3.368]	3.687(10)	[1.524, 4.433]	3.687	[1.524, 4.433]

Table 12: ***Italian Fiscal Multipliers - 68% CI***. *For each fiscal policy $p \in \{g, gc, gi\}$, the table displays four metrics: (i) impact multipliers, equal across methods (i.e. , $\mathbb{M}_{p,0} = \mathbb{M}^{BP}_{p,0} = \mathbb{M}^{MU}_{p,0}$); (ii) peak BP multipliers, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multipliers, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multipliers $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area multipliers are estimated directly on macro-area data. National multipliers are computed as weighted average of the macro-area ones. Each point estimate is accompanied by the 68% confidence intervals, which are derived using MBB.*

	$\mathbb{M}_{g,0}$	$90\%CI$	$\mathbb{M}^{BP}_{g,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{g,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{g,\infty}$	$90\%CI$
Italy	1.826	[1.432, 2.648]	2.639(1)	[1.181, 3.132]	2.237(2)	[1.431, 2.681]	1.853	[0.571, 2.363]
North-West	2.599	[1.904, 3.693]	2.951(1)	[0.098, 4.452]	2.754(1)	[1.400, 3.815]	2.236	[0.526, 3.151]
North-East	1.901	[0.202, 3.939]	3.777(1)	[0.785, 5.750]	2.697(1)	[0.960, 4.282]	1.377	[-0.495, 2.924]
Centre	1.238	[0.532, 3.231]	2.498(2)	[-0.017, 3.672]	2.413(10)	[0.187, 3.447]	2.413	[0.187, 3.447]
South	1.323	[0.368, 1.889]	1.323(0)	[0.368, 1.889]	1.349(1)	[0.237, 1.763]	1.192	[-1.301, 1.820]
Islands	1.005	[0.731, 1.337]	1.624(1)	[0.730, 1.922]	1.413(3)	[0.926, 1.624]	1.380	[0.649, 1.699]
	$\mathbb{M}_{gi,0}$	$90\%CI$	$\mathbb{M}^{BP}_{gi,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{gipeak}$	$90\%CI$	$\mathbb{M}^{MU}_{gi,\infty}$	$90\%CI$
Italy	2.236	[1.723, 3.200]	3.101(1)	[0.982, 4.018]	2.926(2)	[1.571, 3.545]	2.314	[0.271, 3.074]
North-West	3.445	[2.447, 4.758]	3.685(1)	[-0.581, 5.942]	3.875(1)	[1.627, 5.558]	2.884	[0.087, 4.162]
North-East	2.140	[-0.101, 4.275]	4.252(1)	[-0.422, 7.724]	3.350(1)	[0.222, 5.713]	1.557	[-2.460, 4.092]
Centre	1.403	[0.763, 4.001]	2.986(1)	[0.818, 5.095]	3.109(10)	[0.039, 4.397]	3.109	[0.039, 4.397]
South	1.440	[0.565, 2.067]	1.440(0)	[0.565, 2.067]	1.440(0)	[0.565, 2.067]	1.334	[-1.183, 2.329]
Islands	1.363	[0.940, 1.864]	2.128(1)	[0.865, 2.557]	1.915(3)	[1.140, 2.262]	1.871	[0.763, 2.337]
	$\mathbb{M}_{gi,0}$	$90\%CI$	$\mathbb{M}^{BP}_{gi,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{gi,peak}$	$90\%CI$	$\mathbb{M}^{MU}_{gi,\infty}$	$90\%CI$
Italy	0.786	[0.347, 3.005]	4.369(2)	[0.786, 4.601]	4.263(7)	[-1.039, 6.916]	4.187	[-1.678, 7.613]
North-West	0.996	[-1.004, 4.508]	5.902(2)	[-0.296, 7.367]	6.481(10)	[-0.301, 10.047]	6.481	[-0.301, 10.047]
North-East	-0.326	[-1.989, 4.447]	5.548(2)	[-0.042, 8.045]	4.380(4)	[-0.221, 8.127]	2.624	[-2.594, 7.056]
Centre	1.312	[-0.098, 4.604]	6.367(7)	[-1.196, 5.614]	5.259(10)	[-5.366, 15.293]	5.259	[-5.366, 15.293]
South	1.084	[-0.410, 4.005]	1.084(0)	[-0.410, 4.005]	1.084(0)	[-0.410, 4.005]	0.450	[-15.446, 7.055]
Islands	1.025	[0.123, 2.334]	3.330(2)	[0.066, 4.315]	3.687(10)	[-0.245, 5.273]	3.687	[-0.245, 5.273]

Table 13: ***Italian Fiscal Multipliers - 90%***. *For each fiscal policy $p \in \{g, gc, gi\}$, the table displays four metrics: (i) impact multipliers, equal across methods (i.e. , $\mathbb{M}_{p,0} = \mathbb{M}^{BP}_{p,0} = \mathbb{M}^{MU}_{p,0}$); (ii) peak BP multipliers, $\mathbb{M}^{BP}_{gi,peak}$, and (iii) peak MU multipliers, $\mathbb{M}^{MU}_{gi,peak}$, along with the corresponding peak horizon in brackets; and (iv) the long-run multipliers $\mathbb{M}^{MU}_{gi,\infty}$, approximated at the horizon $h = 10$. Macro-area multipliers are estimated directly on macro-area data. National multipliers are computed as weighted average of the macro-area ones. Each point estimate is accompanied by the 90% confidence intervals, which are derived using MBB.*

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