Public expenditure in time of crisis: are Italian policymakers choosing the right mix?
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	I'm sending you the third revised version of manuscript 'Public expenditure in time of crisis: are Italian policymakers choosing the right mix?'.
	In this new version of the paper we have taken into account the new comments of the referee.
	The paper is approximately 6800 words in length, below the word limiti of the journal.
	
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	    Sincerely,
	
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Public expenditure in time of crisis: are Italian policymakers choosing the right mix?

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Abstract

In the 'austerity debate' a crucial issue is the composition of fiscal adjustment. This article provides empirical evidence on the relationship between economic crisis episodes and composition of public expenditure by examining the impact of economic crises on the share of different types of public spending in total public expenditure in the Italian regions. Our results suggest that fiscal consolidation strategies have not had growth-friendly expenditure composition. The crisis aggravated budgetary trade-offs by reducing the share of discretionary spending such as public investments.

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Public expenditure in time of crisis: are Italian policymakers choosing the right mix?

Abstract In the 'austerity debate' a crucial issue is the composition of fiscal adjustment. This article provides empirical evidence on the relationship between economic crisis episodes and composition of public expenditure by examining the impact of economic crises on the share of different types of public spending in total public expenditure in the Italian regions. Our results suggest that fiscal consolidation strategies have not had growth-friendly expenditure composition. The crisis aggravated budgetary trade-offs by reducing the share of discretionary spending such as public investments.

Keywords: Economic crisis, composition of government expenditure, panel data

JEL Classification: R50, C23, E62

1 Introduction

The global financial crisis of 2008-2009 and the consequent economic downturn (the most severe downturn of the last eighty years) have had a huge impact on public finances in all European Union Member States over the last few years. This situation has led European countries to introduce sizeable fiscal consolidation measures, as shown in Figure 1. The Euro area's cyclical adjusted primary budget balance (i.e. the balance excluding interest payments and cleaned from the impact of the economic cycle and one-time items) has improved from -1.6 percent of GDP in 2010 to 1.5 percent in 2014. This policy response has been based on the belief that fiscal austerity is the main recipe to put government debt growth under control and restore economic growth.[1]

[Here Figure 1]

The historical experience has proved that this belief is manifestly wrong. Such a consolidation strategy has not been an optimal policy at a time when the cyclical

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[1] The 'expansionary fiscal contractions' is an idea introduced by Giavazzi and Pagano in the early 1990s (Giavazzi and Pagano, 1990). Other papers have further disseminated the case for expansionary contractions (Alesina and Perotti, 1995; 1997; Alesina and Ardagna, 1998; Alesina, Perotti and Tavares, 1998). This set of ideas has been particularly instrumental in framing public policy debates during the Great Recession (Dellepiane-Avellaneda, 2015).

position of the Euro area had deteriorated considerably. Indeed, as clearly demonstrated by Guajardo, Leigh and Pescatori (2014) and Jordà and Taylor (2016) fiscal consolidation has contractionary effects and the negative impact on the economy is more severe during a recession than during expansions: if a 1 percent of GDP fiscal consolidation is imposed in a slump then it results in a real GDP loss of around 3.5 percent over five years, rather than just 1.8 percent in a boom (Jordà and Taylor, 2016). In addition, Fatás and Summers (2016) show that the negative effects on GDP of the large fiscal consolidation that took place during the 2010-2011 period are permanent and large and that, contrary to its goals, the fiscal consolidation led to an increase in the debt-to-GDP ratio via its negative long-term effects on GDP.

According to Gechert, Hughes Hallett and Rannenberg (2016), the impact of the fiscal consolidation actions in the Euro area between 2011 and 2013 reduced GDP by 4.3 percent relative to a no-consolidation baseline in 2011, with the deviation from the baseline increasing to 7.7 percent in 2013. The result of the austerity programs in Europe has been a deep recession. The recession in turn has reduced government revenues even further, forcing these countries to intensify the austerity programs. Fiscal policies have become pro-cyclical pushing countries further into a deflationary spiral that aggravated the fiscal crisis (de Grauwe and Ji, 2013).

Beyond the intensity and the speed, the composition of fiscal adjustment is a crucial issue. The fiscal consolidation has heavily relied on cuts and reductions in public

spending (Kitson, Martin and Tyler, 2011). The result of this choice has been perverse: expenditure cuts have happened mainly at the cost of public investments, the expenditure category expected to be growth-enhancing, exactly the opposite of what the current economic situation of many European countries would have called for (Barbiero and Darvas, 2014). A paradigmatic example is the trend in European public expenditure on research and innovation. Despite the widely accepted idea that the prioritisation of investment in research and innovation is a smart, lasting way out of the economic crisis and a source of renewed growth, in a number of European states public research and innovation budgets decreased or stagnated during the crisis (Veugelers, 2014).

The composition of fiscal adjustment is also an important determinant of its longevity: large contributions from reducing capital expenditures increase the likelihood that consolidation episodes end early. In contrast, the likelihood of a consolidation episode to continue increases with the contribution of current spending (von Hagen, Hughes Hallett and Strauch, 2002).

In addition, a significant part of the burden of adjustment has been assumed by the subnational governments (Ahrend, Curto-Grau and Vammalle, 2013; Vammalle and Hulbert, 2013). Most countries required subnational governments to participate in national fiscal consolidation efforts by introducing budget deficit targets and/or expenditure limits. Given that the share of subnational spending in total expenditures has reached more than 30 percent in all federal states and in some non-federal states

(European Commission 2013a), the reduction of the financial room of subnational governments threaten local growth possibilities and increase inequalities in local public service access and quality.[2]

In the light of these considerations, it is interesting to analyse whether there is a statistical relationship between economic crises and changes in public expenditure composition. Among the few studies that have analysed the relationship between economic crisis episodes and composition of public expenditure is the paper by Breunig and Busemeyer (2012) in which the two authors, using data for 21 OECD countries from 1979 to 2003, argue that the impact of fiscal austerity varies across different types of public spending. Brumby and Verhoeven (2010) find that the growth path of public expenditure on health and education in developing countries has been interrupted by the global economic crisis. Cylus, Mladovsky and McKee (2012), Keegan, Thomas, Normand et al. (2013) and Reeves, McKee, Basu et al. (2014) analyse the impact of economic crises on government health expenditure.

This paper adds to the (scarce) empirical evidence on the relationship between economic crisis episodes and composition of public expenditure by examining the impact of economic crises on the share of different types of public spending in total

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[2] Most European countries have undertaken fiscal decentralization reforms since the mid-1990s, assigning more expenditure functions to lower levels of governments (Rodríguez-Pose and Gill, 2003; Rodríguez-Pose and Sandall, 2008; Blöchliger and Rabesona, 2009; Sacchi and Salotti, 2016).

public expenditure in the Italian regions over the period 1996-2012. The impact on regional public expenditure has not been sufficiently explored in the literature so far despite the relevant role assumed by the subnational governments in the fiscal consolidation efforts.

Within this framework, the analysis of the Italian case is of relevance for a number of reasons. First, during the period under analysis Italy has faced its worst recession in recent history (Accetturo, Bassanetti, Bugamelli et al., 2013). It has been interested by two waves of the crisis: the first wave hit in 2008, causing a sharp fall in GDP in 2009; then, after a small recover in 2010, the Italian GDP collapsed again in 2011-2013 causing an impressive 'double dip' in economic activities. Second, the cumulative effect of financial measures adopted during the crisis has been above 120 euro billions, namely almost 8 percent of the GDP. Necessarily, this massive program had to affect local governments, as in Italy Regions and lower levels of government control large part of public expenditure (Ambrosanio, Balduzzi and Bordignon, 2016). Third, Italy is a country marked by severe structural and economic contrasts across different areas. The divide between the advanced North and the less developed South is a well known feature of the economic development of Italy (Iuzzolino, Pellegrini and

Viesti, 2013; Daniele and Malanima, 2014).[3] Fiscal consolidation policies have been harsher in less developed regions, so increasing internal disparities: tax increases and expenditure cuts were both, simultaneously, stronger in the Italian Mezzogiorno than in the rest of the country, inducing a worse performance of this area in terms of GDP per capita and employment. In addition, the study of local governments in the same country allows to hold constant a series of cultural and institutional characteristics that can potentially threaten the identification of causal effects in a cross-country analysis.

The remainder of the paper is organized as follows. The second section briefly describes the Italian institutional framework. In section 3, we look at the numbers of the crisis and at the distribution of the burden of the fiscal consolidation across levels of government. The fourth section presents the data and the methodology applied, while the fifth section presents the econometric analysis and discusses the main results. The robustness checks are in the sixth section. Finally, the seventh section concludes.

2 The Italian institutional framework

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[3] The disparity between the South and the North in terms of per capita GDP amounts to 46.3 percent in 2014: per capita GDP in the northern regions of Italy was 31,586 euro, while in the South it was only 16,975 euro.

Italy is a unitary country with strong attributes in terms of territorial and functional decentralization. Sub-national governments include 20 Regions (*Regioni*), 110 Provinces (*Province*) and over 8,000 Municipalities (*Comuni*).

Regions, the highest level of local government, are divided in two groups: 15 Ordinary Statute Regions (OSRs) and five Special Statute Regions (SSRs). Geographical, cultural and economic reasons led to the establishment, recognized at the constitutional level, of autonomous regions with special statutes (Valle d'Aosta; Trentino-Alto Adige, which is in turn divided in two autonomous provinces: Provincia di Trento and Provincia di Bolzano; Friuli-Venezia Giulia in the North; and Sicilia and Sardegna in the South). By virtue of their special statutes, these Regions have greater autonomy in terms of legislative and fiscal powers than the Ordinary Statute Regions.

Since the early 1990s, Italy has made significant steps towards federalism, decentralizing political, fiscal and administrative powers, also by means of a major constitutional reform (Ambrosanio, Bordignon and Cerniglia, 2010). As result of this reform process, local governments have exclusive responsibility for essential expenditure items, including healthcare spending and tourism for Regions. In 2014 local governments accounted for a large share of general government primary expenditure, broadly stable at around 30 percent since 1999 (Lorenzani and Reitano, 2015). In terms of composition by economic categories, it is interesting to note that local levels of

government represent a large, but recently declining, share of investment expenditure: from above 60 percent before the crisis to 55 percent in 2014.[4]

In 1999, Italy has introduced an Internal Stability Pact to coordinate and control subnational budget balances and to ensure that the financial situation of local, provincial and regional administrations is consistent with Italy's obligations under the European Union fiscal rules. The rules of the Pact changed over the years, moving from expenditure rules (thresholds on the maximum allowed increase in current expenditure) towards budget balance rules (imposing a surplus on the current budget), first excluding, then including capital expenditure, and with sanctions that became stricter and better enforced. In 2015, the Internal Stability Pact has been discontinued and replaced with a budget balance rule for all local authorities.

3 Crisis and austerity in Italy

Italy has been interested by two waves of the Great Recession: first, during the diffusion of the 2008 global financial crisis and, second, during the sovereign debt crisis started in 2011. At the end of the 2014, the real per capita GDP fell by more than 11 percent since 2007 (Figure 2). The Great Recession in 2008 interrupted a long period of increasing employment rate, too. In particular, the employment rate of young individuals fell

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[4] See Grisorio and Prota (2015a, 2015b) for an analysis of the relationship between fiscal decentralization and public expenditure composition in Italy.

steadily, with a reduction of about 25 percent from 2008 to 2013. Up to 2010, household disposable income declined less severely than per capita GDP, in part because of the cushioning effect of wage supplementation schemes. In addition, individuals also maintained their consumption levels by making use of accumulated private savings and reducing their wealth holdings. However, since 2011, household income has declined more than GDP as a consequence of adverse developments in the labour market, the increase of long-term unemployment not covered by unemployment benefits and the absence of a generalised social safety net for working-age people.

While overall negative, the effect was differentiated across the country: in percentage terms the fall in economic activity was largest in the South than in the rest of the country.[5] Looking at the impact of the crisis on labour market, Italy's aggregate workforce contracted by 4 percent between 2007 and 2014; the South's, by 10.7 percent.

[Here Figure 2]

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[5] Using annual data for 13 European countries over the period 1980-2008, Agnello, Fazio and Sousa (2016) show that regional dispersion increases in the outcome of consolidation episodes, particularly, when packages are more severe and implemented through spending cuts rather than tax rises.

One of the consequences of the fall in GDP was an automatic worsening of all the relevant fiscal indicators. The Italian public debt increased by nearly 30 percent of GDP since 2007, mostly because of the contracting level of national product.

The downturn in GDP was intensified by the reaction of national governments. Since 2010 the Italian central government has embarked on a challenging program of fiscal consolidation. The cumulative effect of financial measures adopted during the crisis has been above 120 euro billions, namely almost 8 percent of the GDP, particularly concentrated in the period between 2011 and 2012.

Italy's capital expenditure considerably contributed to the fiscal consolidation: the country's total capital spending net of one-offs accounted for 3.4 percent of potential GDP in 2014, considerably down from 4.7 percent in 2007. As a comparison, during the crisis the share of capital spending in potential GDP decreased much faster only in Spain among big Member States, from 5.8 percent to 2.4 percent, whereas it only marginally declined in France, the United Kingdom and Germany.

Necessarily, this massive program had to affect local governments too, as in Italy regions and lower levels of government control large part of public expenditure, and as local taxation is also an important component of tax revenues (Ambrosanio,

Balduzzi and Bordignon, 2016).[6] Figure 3 illustrates the fall in investments by regional governments. This was both a consequence of the crisis, that forced local governments to save (and it is easier to save on capital expenditure) and a consequence of the strengthening of the Internal Stability Pact that during the crisis was extended to capital expenditure, too. One of the most relevant changes in the Internal Stability Pact concerned local governments' fiscal targets. In 2008, a new concept of 'mixed accrual basis' balance to define target was introduced. With this definition, the final balance is given by the sum of an accrual current balance and of a cash capital balance, net of some exceptions. This new mixed budget rule introduced a very strong incentive to delay payments and to reduce public investments for municipalities, adding to the usual advantage in cutting capital expenditure during a crisis.

[Here Figure 3]

4   Empirical specification and data

4.1   Model specification

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[6] Based on the Constitution, local governments have 'exclusive responsibility' for essential expenditure items, including healthcare spending and tourism for Regions, as well as local public services, social assistance, and nursery schooling for Municipalities.

The focus of this study is the relationship between economic crisis and changes in public expenditure composition at regional level. Thus, we specify and estimate a set of models where our dependent variable represents the capital expenditure, expressed, respectively, as a share of total public expenditure of the regional administration (*Cap_exp*) and of central government (*CG_Cap_exp*), and selected expenditure functional categories (*Exp_func_cat*) expressed as a share of total public expenditure of the regional administration. We analyse those categories often highlighted as needing prioritisation and strengthening in public budget in order to tackling the legacies of the crisis, which go well beyond the short term.[7]

$$Cap\_exp_{r,t} = \alpha_r + \beta_1 Crisis_{r,t-1} + \beta_2 Election_{r,t} + \beta_3 Pre\text{-}election_{r,t} + \beta_4 X_{r,t-1} + \beta_5 Crisis*SSR_{r,t-1} + \varepsilon_{r,t} \tag{1}$$

$$CG\_Cap\_exp_{r,t} = \alpha_r + \beta_1 Crisis_{r,t-1} + \beta_2 Election_{r,t} + \beta_3 Pre\text{-}election_{r,t} + \beta_4 X_{r,t-1} + \varepsilon_{r,t} \tag{2}$$

$$Exp\_func\_cat_{r,t} = \alpha_r + \beta_1 Crisis_{r,t-1} + \beta_2 Election_{r,t} + \beta_3 Pre\text{-}election_{r,t} + \beta_4 X_{r,t-1} + \beta_5 Crisis*SSR_{r,t-1} + \varepsilon_{r,t} \tag{3}$$

where the subscript *r,t* stands for region *r* at time *t*.

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[7] The functional breakdown of public expenditure is presented in Table A.1 in the appendix.

The dependent variables are expressed as a share of total regional (or central) public expenditure, assuming values in the interval [0,1], in order to maximize the opportunity for finding significant compositional effects of economic crisis episodes.

The regressor of interest is the dummy variable *Crisis* that is equal to one for any year where real GDP growth is negative and zero otherwise. There is no universally agreed measure of an economic crisis (Arberger and Nierhaus, 2008). One popular definition is that proposed by the National Bureau for Economic Research (NBER): "a recession is a significant decline in economic activity spread across the country, lasting more than a few months, normally visible in real GDP growth, real personal income, employment, industrial production, and wholesale-retail sales". As many of the variables required for our analyses are reported annually, we adopt a pragmatic definition of a crisis existing in any year where real GDP contracted. It also reflects the reality of annual budget cycles in government spending.

Since in advanced economies, the electoral cycle can emerge much more in the budget composition than in the overall levels of public expenditure and tax revenue, we introduce two dummy variables, *Election* and *Pre-election*, which assume value 1 in the year of election and pre-election of the regional council and zero otherwise.[8] There is no

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[8] Rogoff (1990) was the first to provide a theoretical foundation for the possibility of electorally timed shifts in the composition rather than the level of public spending. Since then, a large literature has developed, documenting and seeking to explain whether the electoral budget cycles exist. Evidence of

problem of endogenous elections in Italian regions because they are exogenously fixed by law.

Finally, the vector *X* includes control variables, based on standard models of demand for government expenditure, which seek to capture factors affecting public expenditure composition: income; private investments; demographics (population density and age distribution); partisanship of the government (Borcherding, Ferris and Garzoni, 2004).

Moreover, in Equations (1) and (3) an interaction term between the variable *Crisis* and a dummy variable capturing the Special Statute Regions status is included (*Crisis*SSR*).

Table 1 shows the descriptive statistics and sources of the variables used in the econometric analysis.

Considering that the dependent variable is a fraction constrained in the interval [0,1], an appropriate estimation technique is needed. Linear models may have problems of interpretation since the predicted values from an ordinary least squares (OLS) regression can never be guaranteed to lie in the unit interval, mainly when values are observed close to the boundaries, and the use of a logistic transformation, often suggested in the literature, is not a reliable solution as Papke and Wooldridge (1996)

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local political cycles in budget composition is found by Kneebon and McKenzie (2001), Akhmedov and Zhuravska (2004), and Drazen and Eslava (2010).

have demonstrated. In order to deal with the bounded nature of the dependent variable, a fractional response model for panel data was estimated by pooled quasi-maximum likelihood estimation (QMLE), as proposed by Papke and Wooldridge (2008).[9] In order to facilitate the interpretation of the estimates, the average partial effects (APE), which result from averaging the unobserved heterogeneity across regions, are calculated (Wooldridge, 2005). In other words, we compute the average of all individual partial effects across time in our sample.

[Here Table 1]

4.2 The data

The data on public expenditure are taken from the Territorial Public Accounts (*Conti pubblici territoriali*) produced by the Italian Ministry of Economy. These data provide the allocation of revenues and expenditure flows collected/paid by each level of government included in the general government among 20 Italian Regions for the period 1996–2012. The Territorial Public Accounts allow for the analysis of various sub-aggregates covering different macro-areas and administrative regions, sector classifications, economic categories, definitions of government expenditure and final expenditure recipients. For electoral data and political data about the governing

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[9] Papke and Wooldridge (2008) extend to panel data the results of Papke and Wooldridge (1996).

coalitions we relied on the Italian Ministry of Interiors; details of all election results are available from an electronic archive available at http://elezionistorico.interno.it/. Data about population, per capita GDP and private investments are provided by ISTAT, the Italian National Institute of Statistics.

5 Empirical results and discussion

Table 2 reports fractional probit-pooled QMLE estimations of Equation (1). The dummy variable *Crisis* is negative and statistically significant showing that economic recessions influence public investment choice of regional governments towards current expenditure. In order to facilitate the interpretation of our estimates, we calculate the average partial effects: our estimates show that the presence of a recession year reduces the share of capital expenditure by 2.6 percent in the subsequent year. Interestingly, the effect of a crisis is different for the subsample of Special Statute Regions: the sum of the coefficients of the interaction term ($Crisis*SSR_{t-1}$) and the dummy variable *Crisis* is positive meaning that there is an increase in the share of capital expenditure.

As a robustness test, Equation (1) is estimated using other estimation techniques: fractional logit and panel data random effects. The robustness analysis confirms the hypothesis that recessions influence public investment choice of regional governments towards current expenditure (Table 2).

Our results are robust to using an alternative definition of the variable measuring an economic crisis, too. Specifically, we consider the percentage deviation from the average value of regional GDP in the period under analysis (*Crisis_gdp*) and, therefore, we capture not only the presence of a recession episode but also its intensity. Table A.2 in the appendix reports estimates of Equation (1) that include *Crisis_gdp*.

The intuition of this result can be the following. Public policies and spending programs are associated with specific institutional and legal constraints which have an impact on their vulnerability for retrenchment reforms; capital expenditure, the most discretionary component of public spending, faces lower institutional constraints contrary to the current expenditure. Policy-makers can easily decide to postpone or downgrade a particular discretionary investment, whereas in the case of entitlement programs, they are bound by existing legal constraints.

The different behaviour of the five SSRs (the two Islands and three small regions at the northern border of the country) could be explained by the fact that they have broader competencies and spending powers than the OSRs and, therefore, a wider room for maneuver to define a political response to crises. This aspect is particularly important, since the crisis that has hit Italy since 2008 is having relevant effects on the *de facto* balance of power between levels of government: anti-crisis measures could produce structural effects that may weaken Italian local autonomies, suggesting the existence of an ongoing recentralisation (Bolgherini, 2014, 2016).

[Here Table 2]

Regarding the regional electoral cycle, we find that electoral years are associated to an increase of the share of capital expenditure, confirming the theoretical predictions regarding the nature of the electorally induced distortions of expenditures, and indicating capital expenditure as the most visible item of spending (Drazen and Eslava, 2010). This result is in line with previous studies on the political budget cycle in Italy. Petrarca (2014) finds an increase in capital expenditure and a decrease of current expenditure during the electoral year in the Italian Ordinary Statute Regions. Cioffi, Messina and Tommasino (2012) find a clear political cycle in the path of expenditures driven by capital outlay in Italian municipalities.

We also find that left wing governments increase the share of capital expenditure by 2.1 percent. This result supports the view that government ideology influences the allocation of public expenditures (Potrafke, 2011).

Looking at other control variables, first a positive correlation is found between private and public investments; the presence of a positive coefficient indicates that the two types of investment are complementary. Insofar as demographic variables are concerned, population density (Pop_den_{t-1}) seems to confirm the possibility of taking advantage of economies of scale when providing public services. These results are in

line with a previous study on the composition of regional governments spending in Italy (Grisorio and Prota 2015a).

Table 3 reports fractional probit-pooled QMLE estimations of Equation (2). It also reports random effects estimates. We find that a recession year reduces the share of capital expenditure in the subsequent year, even when we examine the expenditure decisions of the central government in the Italian regions. The results are robust to controlling for both regional and national elections and for central government ideology.[10]

Our results, therefore, are in line with the idea that Europe during the recent financial and economic crises saw drastic cuts in public investment in vulnerable Member States. Government gross fixed capital formation has been a major victim of fiscal consolidation in the European Union.

[Here Table 3]

The last step of the analysis concerns specific expenditure categories of the Italian regional administrations: 'Social welfare', 'Investment in human capital', and

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[10] Table A.3 in the appendix reports estimates of Equation (2) that include *Crisis_gdp*. The effect of a recession episode is confirmed even adopting the alternative definition of the variable measuring an economic crisis.

'Production activities'. The results showed in Table 4 indicate that for investment in human capital and for productive activities support there is a reduction of their share on the total expenditure: 0.6 percent and 1.2 percent, respectively (columns (2) and (3) for APE). These findings are interesting since they show that after a recession year regional administrations tend to reduce growth-enhancing categories of public expenditure such as investments in human capital and in productive activities support.[11]

It is worth noting that SSRs continue to show different behaviour from the other Italian regions in terms of public expenditure decisions in the years following a crisis. In particular, we find an increase in the share of investment in productive activities support by 1.2 percent. This means an increase in 'public inputs' which reduce production costs for private firms.

Looking at other control variables, it is interesting to highlight that the share of investment in human capital is higher under left-wing governments. This result is in line with earlier empirical works that analyse the influence of government ideology on total education spending in OECD countries (Busemeyer 2007, 2009).

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[11] As robustness tests, Equation (3) is estimated using a different method of estimation: fractional logit (Table A.4 in the appendix) and a different definition of the variable measuring an economic crisis (*Crisis_gdp*) (Table A.5 in the appendix). The robustness analysis confirms the negative impact of a recession year on the share of these expenditure categories on the total expenditure of the Italian regional administrations.

[Here Table 4]

6 Robustness checks

It is widely recognized that data collected from geographically close entities can be not independent, but spatially correlated. Spatial clustering or geographic-based correlation is often observed for economic variables such as public expenditures (Moscone and Knapp, 2005; Solé-Ollé, 2006; Yu, Zhang, Li et al., 2011). In this section, we, therefore, assess the validity of our results by testing if they are robust to the inclusion of spatial effects.

In order to test for spatial autocorrelation, we apply the Moran's I test on dependent variables (Moran, 1950).[12] The Moran's I statistics indicate the existence of positive spatial dependence for the social expenditure of regional governments and for capital expenditure of central government at regional level over the period analysed (Table A.6 in the appendix).

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[12] Moran's I index ranges from negative one to positive one, where a larger absolute value denotes a greater degree of spatial association. When the value of the index is greater than zero, there is a positive correlation among spatial units. Similarly, when the value of the index is less than zero, there is a negative correlation among spatial units.

In order to capture spatial dependence and to avoid biased and inefficient estimates, we transform Equation (2) and Equation (3) into spatial panel models. A large number of model specifications for spatial processes have been proposed in the spatial econometrics literature (LeSage and Pace, 2009; Elhorst, 2010). In this study, we utilised the spatial Durbin model (SDM) since it contains the most information regarding spatial spillover channels: it takes account of spatial lags of both dependent variable and explanatory variables.[13]

$$Exp\_func\_cat_{r,t} = \alpha_r + \rho \sum_{j=1}^{21} W_{r,j} Exp\_func\_cat_{r,t} + \beta Z_{r,t} + \theta \sum_{j=1}^{21} W_{r,j} S_{r,t} + \varepsilon_{r,t} \tag{4}$$

$$CG\_Cap\_exp_{r,t} = \alpha_r + \rho \sum_{j=1}^{21} W_{r,j} CG\_Cap\_exp_{r,t} + \beta Z_{r,t} + \theta \sum_{j=1}^{21} W_{r,j} S_{r,t} + \varepsilon_{r,t} \tag{5}$$

In Equation (4) and Equation (5), $W_{r,j}$ denotes the spatial weights matrix; ρ is the coefficient of the spatially lagged dependent variable; $Z_{r,t}$ is a vector of exogenous explanatory variables; θ captures the impact of a vector of explanatory variables ($S_{r,t}$) in

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[13] Spatial Durbin model is a generalization of the spatial autoregressive model (SAR) which also includes spatially weighted independent variables as explanatory variables. For estimation purposes, we use the XSMLE Stata command by Belotti, Hughes and Mortari (2013).

the adjacent regions on, respectively, social expenditure of the regional government and capital expenditure of the central government in region *r*.

The estimation results of the spatial panel model confirm that economic recessions influence public investment choice of both regional and central government (Table 5). As in the previous specifications, the SDM appoints the variable *Crisis* a negative and significant coefficient.

The spatial correlation coefficients, ρ, is statistically significant which indicates that the share of social expenditure of the regional government in region *r* depends on the share of social expenditure of the regional governments in the neighbouring regions as well as capital expenditure of central government in region *r* depends on the share of capital expenditure in the neighbouring regions.

[Here Table 5]

7 Conclusions

This paper analyses whether there is a relationship between economic crisis episodes and composition of public expenditure. In developing our argument, we are not concerned with absolute reductions or expansions in the levels of public spending, but with changes in the composition of budgets, i.e., relative changes within a budget.

Our results clearly demonstrate that economic crisis episodes influence public investment choice. First, the presence of a recession year reduces the share of capital expenditure in the subsequent year of both regional and central government. Second, looking at a functional classification of expenditures, the variable *Crisis* is associated to a reduction of the share of the following categories: 'Investment in human capital' and 'Production activities'. These results are robust to different econometric specifications.

The policy implications of our findings may be quite interesting. Austerity programmes should minimise the potentially negative short-term effect on economic activity, while establishing a foundation for long-term growth, with growth-enhancing expenditure safeguarded from cuts, or even increased. Conventional wisdom proposes that capital expenditures will have a positive effect on growth; besides, the areas often highlighted as needing protection in the context of shrinking overall budgets include infrastructure, education and R&D.

In the case of Italy, what has happened is the opposite. Thus, fiscal consolidation strategies did not seem to have growth-friendly composition while likely have exaggerated the output contractions.

A radical change of the economic policies that are currently pursued is needed; with no change, Italy, as well as Europe, could continue to stay in a situation of social and economic depression for years. As suggested by Barry Eichengreen, "[t]he solution is straightforward. It is to fix the problem of deficient demand not by attempting to

further loosen monetary conditions, but by boosting public spending. Governments should borrow to invest in research, education, and infrastructure. […] Productive public investment would also enhance the returns on private investment, encouraging firms to undertake additional projects" (Eichengreen, 2016).

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Table 1. Variable descriptions and summary statistics

Variable	Description	Obs	Mean	Std. Dev.	Min	Max	Source
Cap_exp_{t-1}	Ratio of capital to total public expenditures of the regional government	357	0.15827	0.09884	0.02482	0.58492	Territorial public accounts (*Conti pubblici territoriali*)
$Cg\_Cap\_exp_{t-1}$	Ratio of capital to total public expenditures of the central government	357	0.11581	0.04346	0.04903	0.25049	Territorial public accounts (*Conti pubblici territoriali*)
$Social\_welfare_{t-1}$	Ratio of social welfare to total public expenditures of the regional government	357	0.02833	0.03347	0.00183	0.21310	Territorial public accounts (*Conti pubblici territoriali*)
Inv_hc_{t-1}	Ratio of investment to enhance human capital to total public expenditures of the regional government	357	0.70758	0.14081	0.23656	0.91712	Territorial public accounts (*Conti pubblici territoriali*)
$Prod\_activities_{t-1}$	Ratio of expenditure for productive activities support to total public expenditures of the regional government	357	0.06612	0.05368	0.00802	0.42581	Territorial public accounts

Crisis$_{t-1}$	Dummy variable equal to 1 if the percentage change in the level of real GDP is negative, 0 otherwise	357	0.27171	0.44546	0	1	(*Conti pubblici territoriali*) Italian Institute of Statistics (ISTAT)
Crisis_gdp$_{t-1}$	Deviation from the average value of GDP in the period	357	0.00182	65949.89	-241218.10	62005.88	Italian Institute of Statistics (ISTAT)
SSR	Dummy variable equal to 1 in case of Special Statute Regions, 0 otherwise	357	0.28571	0.45239	0	1	Italian Institute of Statistics (ISTAT)
CG_Social_welfare$_{t-1}$	Ratio of social welfare expenditures of the central government in each region	357	0.58490	0.07250	0.04732	0.72942	Territorial public accounts (*Conti pubblici territoriali*)
CG_Inv_hc$_{t-1}$	Ratio of investment to enhance human capital of the central government in each region	357	0.08394	0.03768	0.00651	0.16298	Territorial public accounts (*Conti pubblici territoriali*)
CG_Prod_activities$_{t-1}$	Ratio of expenditure for productive activities support of the central government in each region	357	0.04172	0.03983	0.00287	0.17641	Territorial public accounts (*Conti*

							pubblici territoriali)
Left_gov$_t$	Dummy variable equal to 1 if the government is left-winged, 0 otherwise	357	0.58824	0.49284	0	1	Ministero dell'Interno
Electoral_year$_t$	Dummy variable equal to 1 if regional government is in election year, 0 otherwise	357	0.18487	0.38874	0	1	Ministero dell'Interno
Pre-electoral_year$_t$	Dummy variable equal to 1 if regional government is in pre-election year, 0 otherwise	357	0.204	0.404	0	1	Ministero dell'Interno
CG_Electoral_year$_t$	Dummy variable equal to 1 if central government is in election year, 0 otherwise	357	0.235	0.425	0	1	Ministero dell'Interno
CG_Pre-electoral_year$_t$	Dummy variable equal to 1 if central government is in pre-election year, 0 otherwise	357	0.235	0.425	0	1	Ministero dell'Interno
GDP_pc$_{t-1}$	GDP per capita (euro)	357	22380.39	6378.56	9946.60	36603.70	Italian Institute of Statistics (ISTAT)
Private_inv$_{t-1}$	Private investment / GDP	357	19.01983	2.76004	12.58000	27.19000	Italian Institute of Statistics (ISTAT)
Pop_den$_{t-1}$	Persons per km^2	357	172.80510	106.08490	35.82077	429.48470	Italian Institute of Statistics (ISTAT)
Pop_15$_{t-1}$	Population below 15 years / totale population	357	0.14055	0.02112	0.10105	0.19978	Italian Institute of

						Statistics (ISTAT)
Pop_65_{t-1}	Population 65 years and over / totale population	357	0.19513	0.02985	0.12400	0.27200	Italian Institute of Statistics (ISTAT)

Table 2. The effect of crisis on the capital expenditure of the regional administrations in the Italian regions.

Dependent variable: ratio of capital expenditure to total public regional expenditure	(1) Fractional probit-pooled QMLE		(2) Fractional logit		(3) Random effects panel data
	Coefficient	APE	Coefficient	Marginal effect	Coefficient
$Crisis_{t-1}$	-0.120**	-0.026**	-0.237***	-0.028***	-0.016***
	(0.054)	(0.011)	(0.064)	(0.007)	(0.006)
$Crisis*SSR_{t-1}$	0.209***	0.051***	0.393***	0.054***	0.040***
	(0.070)	(0.018)	(0.104)	(0.016)	(0.010)
SSR	0.399***	0.098***	0.704***	0.095***	0.088***
	(0.100)	(0.029)	(0.069)	(0.011)	(0.020)
$Private\_inv_{t-1}$	0.027**	0.006**	0.044***	0.005***	0.001
	(0.014)	(0.003)	(0.012)	(0.001)	(0.001)
GDP_pc_{t-1}	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_den_{t-1}	-0.001***	-0.000***	-0.002***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_15_{t-1}	1.510	0.342	3.522*	0.427*	0.467
	(2.805)	(0.598)	(2.003)	(0.243)	(0.295)
Pop_65_{t-1}	0.075	0.017	0.786	0.095	-0.940***

	(2.075)	(0.442)	(1.521)	(0.184)	(0.314)
Left_gov$_t$	0.092**	0.021**	0.170***	0.020***	0.026***
	(0.041)	(0.009)	(0.044)	(0.005)	(0.006)
Pre-electoral_year$_t$	0.048	0.011	0.084	0.010	0.007
	(0.031)	(0.007)	(0.057)	(0.007)	(0.005)
Electoral_year$_t$	0.055**	0.013**	0.093*	0.012*	0.012**
	(0.027)	(0.006)	(0.055)	(0.007)	(0.005)
CG_Cap_exp$_{t-1}$	2.289***	0.518***	4.091***	0.496***	0.451***
	(0.875)	(0.189)	(0.690)	(0.085)	(0.094)
Constant	-2.222***		-3.967***		0.190**
	(0.738)		(0.592)		(0.087)
Observations	336		336		336
Pseudo-log-likelihood	-97.256		-137.525		
R^2					0.640

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

APE, average partial effects; QMLE, quasi-maximum likelihood estimation.

Table 3. The effect of crisis on the capital expenditure of the central government in the Italian regions

Dependent variable: ratio of capital expenditure to total central government expenditure	(1) Fractional probit-pooled QMLE		(2) Fractional probit-pooled QMLE		(3) Random effects panel data	(4) Random effects panel data
	Coefficient	APE	Coefficient	APE	Coefficient	Coefficient
Crisis$_{t-1}$	-0.031*	-0.006*	-0.031*	-0.006*	-0.007***	-0.007**
	(0.017)	(0.003)	(0.017)	(0.003)	(0.003)	(0.003)
Private_inv$_{t-1}$	0.001	0.000	0.001	0.000	0.001	0.001
	(0.018)	(0.004)	(0.019)	(0.004)	(0.001)	(0.001)
GDP_pc$_{t-1}$	-0.000**	-0.000***	-0.000**	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_den$_{t-1}$	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_15$_{t-1}$	1.518	0.293	1.480	0.286	0.750***	0.757***
	(1.746)	(0.334)	(1.740)	(0.333)	(0.170)	(0.170)
Pop_65$_{t-1}$	-0.063	-0.012	-0.095	-0.018	-0.209	-0.214
	(1.720)	(0.333)	(1.719)	(0.332)	(0.213)	(0.212)
CG_Left_gov$_t$	-0.014	-0.003	-0.016	-0.003	-0.006**	-0.006**
	(0.014)	(0.003)	(0.015)	(0.003)	(0.003)	(0.003)
Pre-electoral_year$_t$	-0.008	-0.002			-0.003	

	(0.018)	(0.003)			(0.003)	
Electoral_year$_t$	-0.026*	-0.005*			-0.004	
	(0.014)	(0.003)			(0.003)	
CG_Pre-electoral_year$_t$			0.006	0.001		0.003
			(0.011)	(0.002)		(0.003)
CG_Electoral_year$_t$			0.013	0.002		0.002
			(0.014)	(0.003)		(0.003)
Constant	-0.930		-0.924		0.124**	0.125**
	(0.662)		(0.660)		(0.051)	(0.051)
Observations	357		357		357	357
Pseudo-log-likelihood	-91.365		-91.370			
R^2					0.353	0.353

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

APE, average partial effects; QMLE, quasi-maximum likelihood estimation.

Table 4. The effect of crisis on the functional composition of public expenditure of the regional administrations in the Italian regions.

Method of estimation: fractional probit-pooled quasi-maximum likelihood estimation (QMLE)

Dependent variable: ratio of expenditure for a specific functional category to total public regional expenditure	(1)		(2)		(3)	
	Social welfare		Investment in human capital		Production activities	
	Coefficient	APE	Coefficient	APE	Coefficient	APE
Crisis$_{t-1}$	-0.051	-0.003	-0.063*	-0.006**	-0.106**	-0.012**
	(0.040)	(0.002)	(0.033)	(0.003)	(0.047)	(0.005)
Crisis*SSR$_{t-1}$	-0.017	-0.001	0.014	0.001	0.183*	0.024*
	(0.053)	(0.003)	(0.046)	(0.004)	(0.100)	(0.015)
SSR	0.646***	0.044***	0.340***	0.034***	0.280***	0.036***
	(0.080)	(0.009)	(0.070)	(0.008)	(0.070)	(0.010)
Pop_den$_{t-1}$	-0.001**	-0.000**	-0.001***	-0.000***	-0.002***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP_pc$_{t-1}$	0.000***	0.000***	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_65$_{t-1}$	-0.240	-0.014	-2.304*	-0.220*	-2.284	-0.274
	(2.178)	(0.122)	(1.319)	(0.119)	(1.617)	(0.184)
Pop_15$_{t-1}$	2.290	0.136	6.133***	0.585***	-2.238	-0.268
	(2.779)	(0.155)	(1.812)	(0.166)	(2.023)	(0.230)

Left_gov$_t$	0.052	0.003	0.068*	0.006*	-0.011	-0.001
	(0.060)	(0.004)	(0.038)	(0.004)	(0.039)	(0.004)
Pre-electoral_year$_t$	0.018	0.001	-0.002	-0.000	0.045	0.005
	(0.031)	(0.002)	(0.018)	(0.002)	(0.041)	(0.005)
Electoral_year$_t$	-0.017	-0.001	-0.008	-0.001	0.043	0.005
	(0.018)	(0.001)	(0.021)	(0.002)	(0.038)	(0.005)
CG_Social_welfare$_{t-1}$	-0.691**	-0.041**				
	(0.320)	(0.018)				
CG_Inv_hc$_{t-1}$			-5.240***	-0.500***		
			(0.932)	(0.081)		
CG_Prod_activities$_{t-1}$					1.937***	0.232***
					(0.467)	(0.051)
Constant	-2.375***		-1.748***		-0.631	
	(0.758)		(0.447)		(0.570)	
Observations	336		336		336	
Pseudo-log-likelihood	-30.351		-45.647		-56.628	

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

APE, average partial effects.

Table 5. Regression results of the spatial panel models

Method of estimation: Spatial Durbin Model

Dependent variable:	ratio of social expenditure to total public regional expenditure	ratio of capital expenditure to total central government expenditure
$Crisis_{t-1}$	-0.006***	-0.007**
	(0.002)	(0.003)
W x $Crisis_{t-1}$	0.002***	0.001
	(0.001)	(0.001)
ρ	0.332***	0.327***
	(0.007)	(0.007)
σ	0.000***	0.000***
	(0.000)	(0.000)
Observations	357	357
Log-likelihood	987.070	836.239

Notes: For the sake of clarity and in order to keep the table manageable, we do not report control variables.

* significant at 10%, ** significant at 5% and *** significant at 1%. Standard errors in parentheses.

Table A1. Functional breakdown of public expenditure

Aggregation	Territorial public accounts sectors
Pure public goods	General administration
	Defence
	Public Order
	Justice
Social welfare	Pensions and wage supplementation
	Labour
	Social affairs (assistance and charity)
	Residential building and urban development
Public investment to enhance human capital	Training
	Education
	Culture and recreational services
Infrastructure	Roads
	Other transport
	Telecommunications
	Energy
	Water
	Sewers and water treatment
	Environment

	Waste disposal
	Other public works
Expenditure for productive activities support	Agriculture
	Marine fishing and aquaculture
	Tourism
	Wholesale and retail distribution
	Industry and artisan
	Other economic sectors
Health	Health
Research and development	Research and development

Table A2. The effect of crisis on the capital expenditure of the regional administrations in the Italian regions.

Dependent variable: ratio of capital expenditure to total public regional expenditure	(1) Fractional probit-pooled QMLE		(2) Fractional logit		(3) Random effects panel data
	Coefficient	APE	Coefficient	Marginal effect	Coefficient
Crisis_gdp$_{t-1}$	-0.001	-0.000	-0.002***	-0.000***	-0.000***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Crisis_gdp*SSR$_{t-1}$	0.008***	0.002***	0.016***	0.002***	0.002***
	(0.002)	(0.000)	(0.002)	(0.000)	(0.000)
SSR	0.187**	0.044**	0.333***	0.042***	0.030
	(0.082)	(0.020)	(0.082)	(0.011)	(0.021)
Private_inv$_{t-1}$	0.011	0.002	0.016	0.002	0.001
	(0.011)	(0.002)	(0.011)	(0.001)	(0.001)
GDP_pc$_{t-1}$	-0.000	-0.000	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_den$_{t-1}$	-0.001***	-0.000***	-0.002***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pop_15$_{t-1}$	6.603*	1.490*	13.491***	1.633***	1.093***
	(3.746)	(0.789)	(2.652)	(0.321)	(0.331)
Pop_65$_{t-1}$	5.497	1.240	11.282***	1.365***	0.473

	(1)	(2)	(3)	(4)	(5)
	(3.621)	(0.765)	(2.546)	(0.309)	(0.386)
Left_gov$_t$	0.052	0.012	0.104**	0.013**	0.021***
	(0.041)	(0.009)	(0.045)	(0.005)	(0.006)
Pre-electoral_year$_t$	0.029	0.007	0.050	0.006	0.003
	(0.025)	(0.005)	(0.050)	(0.006)	(0.005)
Electoral_year$_t$	0.055**	0.013**	0.096*	0.012*	0.011**
	(0.023)	(0.005)	(0.051)	(0.006)	(0.005)
CG_Cap_exp$_{t-1}$	1.888**	0.426**	3.386***	0.410***	0.438***
	(0.890)	(0.190)	(0.686)	(0.084)	(0.092)
Constant	-3.188***		-5.973***		-0.074
	(1.092)		(0.761)		(0.096)
Observations	336		336		336
Pseudo-log-likelihood	-96.868		-137.143		
R^2					0.744

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

APE, average partial effects; QMLE, quasi-maximum likelihood estimation.

Table A3. The effect of crisis on the capital expenditure of the central government in the Italian regions

Dependent variable: ratio of capital expenditure to total central government expenditure	(1) Random effects panel data	(2) Random effects panel data
	Coefficient	Coefficient
Crisis_gdp$_{t-1}$	-0.00023**	-0.00025**
	(0.00010)	(0.00011)
Private_inv$_{t-1}$	0.00149*	0.00138
	(0.00084)	(0.00084)
GDP_pc$_{t-1}$	-0.00000***	-0.00000***
	(0.00000)	(0.00000)
Pop_den$_{t-1}$	-0.00023**	-0.00025**
	(0.00010)	(0.00010)
Pop_15$_{t-1}$	0.90128***	0.92354***
	(0.17717)	(0.17846)
Pop_65$_{t-1}$	-0.07608	-0.09683
	(0.22985)	(0.23598)
CG_Left_gov$_t$	-0.00354	-0.00482*
	(0.00242)	(0.00248)
Pre-electoral_year$_t$	-0.00446	
	(0.00282)	

Electoral_year$_t$	-0.00476	
	(0.00292)	
CG_Pre-electoral_year$_t$		0.00472*
		(0.00284)
CG_Electoral_year$_t$		0.00324
		(0.00276)
Constant	0.11561**	0.12247**
	(0.05143)	(0.05241)
Observations	357	357
R^2	0.291	0.280

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Standard errors in parentheses.

Table A4. The effect of crisis on the functional composition of public expenditure of the regional administrations in the Italian regions

Method of estimation: fractional logit

Dependent variable: ratio of expenditure for a specific functional category to total public regional expenditure	(1) Social welfare	(2) Production activities	(3) Investment in human capital
Crisis$_{t-1}$	-0.167*	-0.208**	-0.101
	(0.098)	(0.097)	(0.099)
Crisis*SSR$_{t-1}$	0.015	0.293**	0.067
	(0.193)	(0.145)	(0.152)
SSR	0.970***	-0.042	0.351***
	(0.110)	(0.089)	(0.091)
Pop_den$_{t-1}$	0.001	-0.003***	-0.001**
	(0.001)	(0.000)	(0.001)
GDP_pc$_{t-1}$	0.000***	-0.000	0.000***
	(0.000)	(0.000)	(0.000)
Pop_65$_{t-1}$	-7.564**	-9.984***	-11.592***
	(3.066)	(2.265)	(2.542)
Pop_15$_{t-1}$	-3.330	-9.411***	0.543
	(3.867)	(2.356)	(2.599)
Left_gov$_t$	0.100	-0.063	0.196***

|			
	(0.098)	(0.067)	(0.074)
Pre-electoral_year$_t$	0.002	0.012	-0.089
	(0.130)	(0.078)	(0.091)
Electoral_year$_t$	-0.079	0.081	-0.060
	(0.121)	(0.077)	(0.081)
Constant	-0.413	3.773***	0.386
	(1.064)	(0.686)	(0.786)
Observations	357	357	357
Pseudo-log-likelihood	-370.662		

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

Table A5. The effect of crisis on the functional composition of public expenditure of the regional administrations in the Italian regions

Method of estimation: fractional logit

Dependent variable: ratio of expenditure for a specific functional category to total public regional expenditure	(1) Social welfare	(2) Production activities	(3) Investment in human capital
Crisis_gdp$_{t-1}$	-0.00678***	-0.00376***	-0.00506***
	(0.00129)	(0.00076)	(0.00089)
Crisis_gdp*SSR$_{t-1}$	0.00868*	0.00434	0.00032
	(0.00487)	(0.00282)	(0.00278)
SSR	1.04611***	0.10185	0.60019***
	(0.13946)	(0.11648)	(0.08026)
Pop_den$_{t-1}$	-0.00172**	-0.00439***	-0.00361***
	(0.00071)	(0.00049)	(0.00064)
GDP_pc$_{t-1}$	-0.00002	-0.00003***	0.00003***
	(0.00002)	(0.00001)	(0.00001)
Pop_65$_{t-1}$	8.77274	-0.95969	-3.62664
	(5.72070)	(3.42409)	(3.64811)
Pop_15$_{t-1}$	13.41256**	-0.88780	8.93049**
	(5.63789)	(3.31748)	(3.65132)
Left_gov$_t$	0.18318**	-0.00770	0.29085***

	(0.08716)	(0.05807)	(0.06213)
Pre-electoral_year$_t$	-0.00196	-0.01698	-0.10826
	(0.11843)	(0.07551)	(0.08324)
Electoral_year$_t$	-0.08196	0.07023	-0.08207
	(0.11334)	(0.07585)	(0.07665)
Constant	-4.52498***	1.50868*	-1.50661
	(1.53202)	(0.91495)	(1.03771)
Observations	357	357	357
Pseudo-log-likelihood	-368.616		

Notes: * significant at 10%, ** significant at 5% and *** significant at 1%. Robust standard errors in parentheses.

Table A6. Measuring spatial autocorrelation: Moran's I 1996-2012

	Ratio of expenditure for 'social welfare' to total public regional expenditure	Ratio of expenditure for 'investment in human capital' to total public regional expenditure	Ratio of expenditure for 'production activities' to total public regional expenditure	Ratio of capital to total public expenditures of the central government
1996	0.151**	-0.093	0.001	0.609***
1997	0.223***	-0.044	0.069	0.659***
1998	0.349***	0.072	0.031	0.670***
1999	0.203**	0.144*	-0.116	0.576***
2000	0.327***	0.165*	-0.075	0.545***
2001	0.185**	0.196*	0.008	0.436***
2002	0.236**	0.163*	0.138*	0.466***
2003	0.232**	0.187**	0.182*	0.426***
2004	0.218**	0.183**	0.099	0.245**
2005	0.251***	0.198**	0.039	0.414***
2006	0.183**	0.175**	0.047	0.476***
2007	0.275***	0.167**	0.062	0.375***
2008	0.218**	0.153*	-0.025	0.346***
2009	0.201**	0.191**	0.082	0.133
2010	0.153*	0.207**	0.050	0.346***
2011	0.222**	0.198**	0.051	0.344***
2012	0.194**	0.168*	0.135*	0.353***

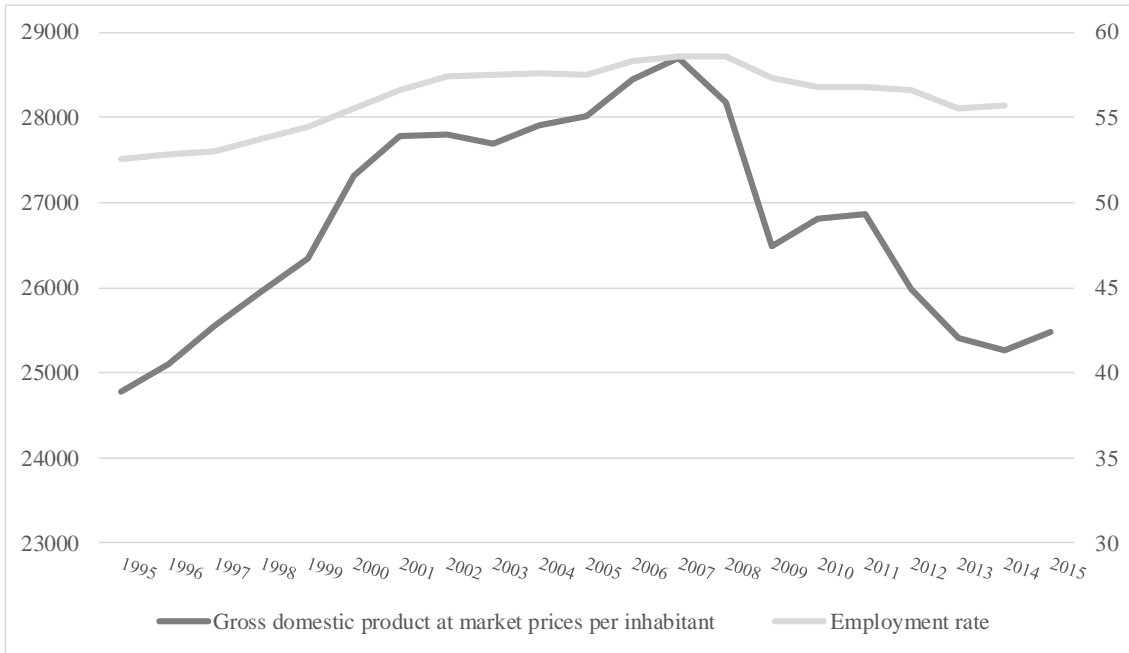*Notes*: * significant at 10%, ** significant at 5% and *** significant at 1%.

Figure 1. Structural balance and structural primary balance in Europe (% of GDP)
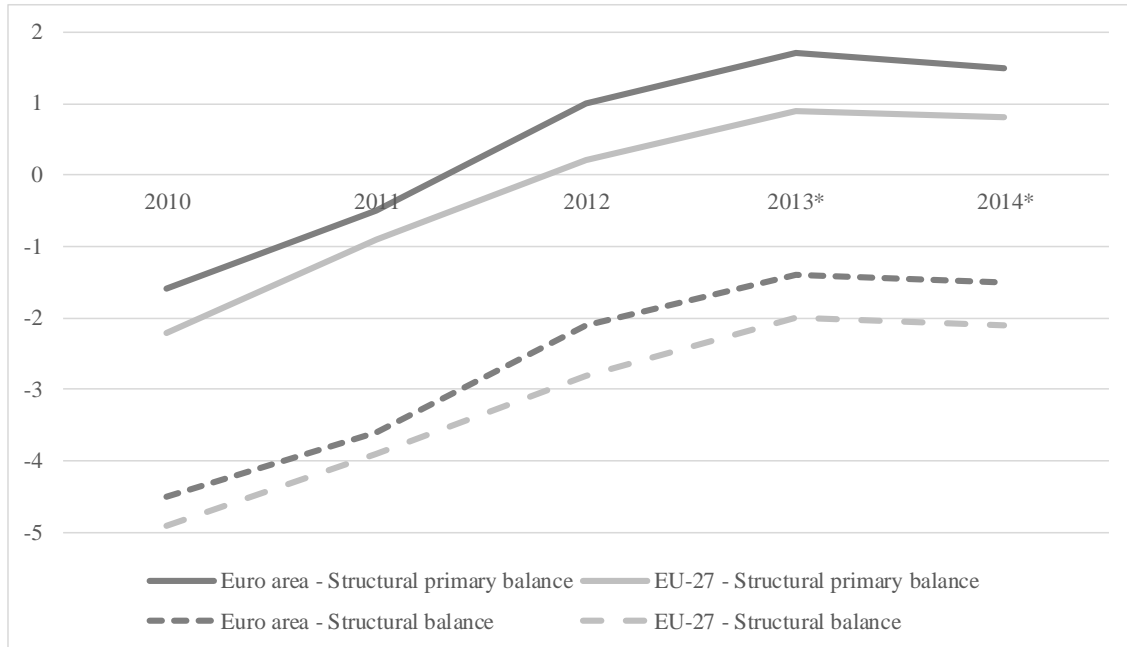
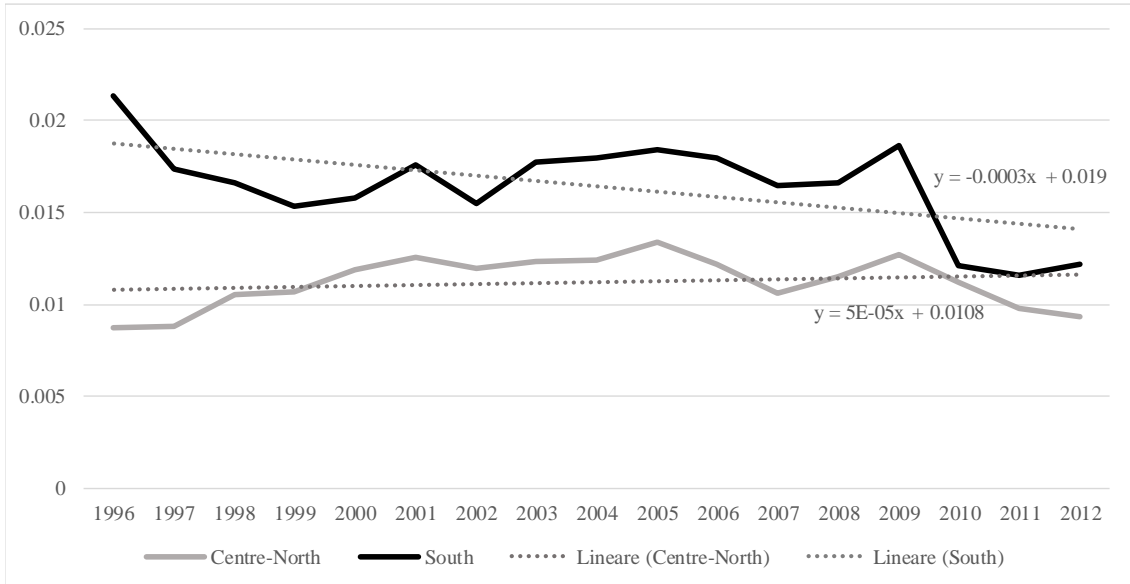[*] Figure from Commission services' Spring 2013 forecast

Source : European Commission (2013b)

Figure 2. Evolution of GDP per inhabitant (chain linked - reference year 2010)
and employment rate (15-64 years, percentage value) in Italy

Figure 3. Capital expenditure of the Regional administrations, % of GDP, 1996-2012

Notes for the Referee

a) In this final version, the length of the paper is approximately 6800 words. It is below the word limit of the journal.

b) We have used "cyclical adjusted primary budget balance" instead of "primary balance".

c) Now we correctly wrote the author's name.

d) We have emphasised the findings about the autonomous regions and the spillover effects.