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To cite this article: Carmelo Petraglia, Eleonora Pierucci & Domenico Scalera (2018) Redistribution and risk sharing in Italy: learning from the past, *Regional Studies*, 52:2, 285-297, DOI: [10.1080/00343404.2017.1296944](https://doi.org/10.1080/00343404.2017.1296944)

To link to this article: <https://doi.org/10.1080/00343404.2017.1296944>



Published online: 31 Mar 2017.



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Redistribution and risk sharing in Italy: learning from the past

Carmelo Petraglia^a, Eleonora Pierucci^b and Domenico Scalerà^c

ABSTRACT

Redistribution and risk sharing in Italy: learning from the past. *Regional Studies*. This paper investigates the role of public policies in Italy by assessing both the redistribution and the risk-sharing functions of interregional net fiscal flows in the long run. Its comparative approach allows one to contrast results obtained for two periods characterized by diverse regional policy and dynamics of regional convergence. Although based on a specific example, the evidence supports more general conclusions: when assessing the regional redistributive and risk-sharing power of national fiscal policies, many different factors related to the existing policy regime should be accounted for, particularly the distribution of government spending between current expenditure and public investment.

KEYWORDS

net fiscal flows; redistribution; risk sharing; regions

摘要

意大利的再分配与风险分担：从过往经验学习。 *Regional Studies*。本文透过评估长远的跨区域淨财政流动的再分配与风险分担功能，探讨意大利公共政策的角色。本文的比较取径，让我们能够对比以不同区域政策和区域聚合动态为特徵的两个时期所取得的结果。尽管本文是根据一个简单的案例，但该证据支持更为普遍的结论：在评估全国财政政策的区域再分配与风险分担能力的时候，应将诸多有关既有政策体制的不同因素纳入考量，特别是在当前支出与公共投资之间的政府支出分佈。

关键词

淨财政流；再分配；风险分担；区域

RÉSUMÉ

Redistribution et partage des risques en Italie : tirer les leçons du passé. *Regional Studies*. La présente communication se penche sur le rôle de politiques publiques en Italie, en évaluant à la fois la redistribution et les fonctions de partage des risques de mécanismes fiscaux nets interrégionaux à long terme. Sa méthode comparée permet de confronter des résultats obtenus pour deux périodes caractérisées par différentes politiques régionales et la dynamique d'une convergence régionale. Bien qu'elles reposent sur un exemple spécifique, les pièces à l'appui soutiennent des conclusions plus générales: lors de l'évaluation du pouvoir de redistribution régionale et de partage des risques des politiques nationales en matière de fiscalité, on doit tenir compte d'un grand nombre de facteurs relatifs au régime de la politique existante, notamment en ce qui concerne la distribution des dépenses du gouvernement entre les dépenses courantes et les investissements publics.

MOTS-CLÉS

mécanismes fiscaux nets; redistribution; partage des risques; régions

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ZUSAMMENFASSUNG

Umverteilung und Risikoteilung in Italien: Lektionen der Vergangenheit. *Regional Studies*. In diesem Beitrag untersuchen wir die Rolle der staatlichen politischen Maßnahmen in Italien durch eine Bewertung der langfristigen Umverteilungs- und Risikoteilungsfunktionen von interregionalen Nettofiskalströmen. Der vergleichende Ansatz ermöglicht die Kontrastierung der Ergebnisse für zwei Perioden, die sich durch eine unterschiedliche Regionalpolitik und Dynamik der regionalen Konvergenz auszeichnen. Obwohl die Evidenz auf einem konkreten Beispiel aufbaut, ermöglicht sie allgemeinere Schlussfolgerungen: Bei der Bewertung des Potenzials von nationalen Fiskalpolitiken zur regionalen Umverteilung und Risikoteilung sollten zahlreiche verschiedene Faktoren des vorhandenen politischen Regimes berücksichtigt werden, insbesondere die Verteilung der staatlichen Ausgaben zwischen laufenden Ausgaben und öffentlichen Investitionen.

SCHLÜSSELWÖRTER

Nettofiskalströme; Umverteilung; Risikoteilung; Regionen

RESUMEN

Redistribución y riesgos compartidos en Italia: lecciones del pasado. *Regional Studies*. En este artículo investigamos el papel de las políticas públicas de Italia evaluando las funciones de la redistribución y de compartir riesgos a largo plazo de los flujos fiscales netos interregionales. Su enfoque comparativo nos permite contrastar los resultados obtenidos para dos periodos caracterizados por diferencias en la política regional y la dinámica de la convergencia regional. Aunque la evidencia se basa en un ejemplo específico, facilita conclusiones más generales: al evaluar el poder regional redistributivo y de riesgos compartidos de las políticas fiscales nacionales en un ámbito regional, deberían tenerse en cuenta muchos factores diferentes relacionados con el régimen actual de políticas, en concreto la distribución del gasto gubernamental entre los gastos corrientes y la inversión pública.

PALABRAS CLAVES

flujos fiscales netos; redistribución; riesgo compartido; regiones

JEL E62, H23, H50, R11

HISTORY Received 25 February 2016; in revised form 2 February 2017

INTRODUCTION

An important aspect in the assessment of fiscal policies concerns their effectiveness in moderating long-run income disparities (i.e., performing a redistribution function) and mitigating the impact of short-run shocks (risk-sharing function) across regions within a country or states belonging to a federation. Income redistribution may aim at reducing inequalities in private consumption and endowment of local public goods or at supplying resources to promote regional development. For this reason it has long been recognized as a distinctive feature of budget policies (Ingram, 1959; Musgrave, 1983; Persson & Tabellini, 1996). The interest in the insurance properties of interregional fiscal transfers is relatively more recent.¹ Motivated by the onset of European monetary union (EMU) and the weak design of EMU common fiscal policy, a fairly large literature on this issue has developed from the mid-1990s, considering mainly (but not only) federal countries.²

The case of Italy represents a peculiarity because of its wide and persistent regional income differences, which call for public intervention for risk sharing or/and redistribution (Decressin, 2002). On the risk-sharing side, regional disparities matter since they may involve a different degree of exposure to either positive or negative aggregate demand shocks. According to the literature (Basile, de Nardis, & Pappalardo, 2014; Mastromarco & Woitek, 2007) the business cycle is closer to the national business

cycle in the north of Italy and more persistent in the south. Furthermore, northern cycle tends to lead the southern cycle, with the consequence that recovery from recessions is often delayed in southern regions. In particular, the 2008–14 crisis hit harder the south and the slow recovery experienced in 2015 has solely interested northern regions (Lagravinese, 2015; Organisation for Economic Co-operation and Development (OECD), 2013).

These facts motivate the interest in analyzing the role played by the public sector in smoothing the cycle to understand whether fiscal policies behave in a pro-cyclical, anti-cyclical or neutral way, that is, whether they amplify or mitigate regional shocks or simply are not relevant to gross domestic product (GDP) dynamics. Concerning the redistributive side, from the end of the Second World War, the Italian regional divide has urged a strong uninterrupted public commitment for territorial rebalancing, generating an ongoing debate on size and time extent of regional unbalances. Thus, while several studies (shortly reviewed below) have focused on the Italian case, the lack of data has limited available evidence to the 1980s onwards.

Measuring interregional risk sharing and redistribution operated by fiscal policy has often implied the use of an indicator of net regional surpluses or deficits. Following a broad literature, in this paper we employ net fiscal flows (NFFs), defined as the difference between what the residents of a region contribute to the general (central, local and social security) government and what they gain from

it in terms of public spending targeted to that region. Our notion of NFF is quite comprehensive and in principle meant to include all public revenues and non-interest expenditures relevant to a given territory.

Giannola, Petraglia, and Scalerà (2016) have recently provided an assessment on the intensity of interregional redistribution operated in Italy through NFFs in the last six decades. In this paper, we extend their analysis in three directions. First, we consider both redistributive and risk-sharing functions. Second, while Giannola et al. supply a historical reconstruction of discontinuous time series of regional NFFs throughout the whole period 1951–2010, we focus on two specific sub-periods (1951–65 and 1983–92), selected because of (1) the availability of regional continuous time series of NFFs; and (2) the strong differences in the macroeconomic and policy context. Continuous time-series allow us to adopt a strictly statistical and econometric approach, unlike Giannola et al. who follow a mainly historical approach. The macroeconomic differences consist in strong diversity in the nationwide economic cycle, the design of regional policy, and the distribution of public spending in terms of current and capital account expenditure. Third, by making use of two alternative measures of NFFs (accounting for total public spending and current spending only), we are able to provide distinct estimates of regional redistribution and risk sharing accomplished by each definition of public expenditure.

We estimate redistribution and risk sharing by employing both simple pooled ordinary least squares (OLS) and more advanced techniques suitable to deal with the presence of fixed effects (FE), possible heteroskedasticity and residuals' autocorrelation. Somewhat unexpectedly, our results show that both redistribution and risk sharing were stronger in 1983–92 than in 1951–65. This outcome, difficult to explain considering that in 1951–65 the commitment of regional policy was much stronger, can be rationalized as a consequence of the reform of the Italian local government financing system occurred in the second half of the 1970s, and the worsening of the 'quality' of public expenditure, increasingly devoted to support consumption at the expense of public investment.

The paper is organized as follows. The next section provides a short review of the relevant literature. The third section reports on empirical strategy and the methods of our investigation. The dataset, sources and results are then described. Afterwards we discuss our results supplying an interpretation hinging on some major distinctive features of policies undertaken in the two periods. The final section concludes.

A SHORT REVIEW OF THE LITERATURE ON THE ITALIAN CASE

The debate on the interregional redistributive effects of fiscal policy in Italy originated from Pantaleoni (1891) and then went on with Nitti (1900), Bernardino (1928) and Zingali (1933). After the Second World War, the availability of more detailed data, allowing for regional sharing

of fiscal revenues, spurred a number of other studies (De Meo, 1955; Forte, Bevolo, Clerico, & Rosso, 1978; Tarquinio, 1969; Geri & Volpe, 1985) dealing with the problem of evaluating the amount of redistribution operated through the public budget.³ However, only in the last two decades has the issue been envisaged in a more general context encompassing both redistribution and risk sharing, and addressed at a more rigorous quantitative level.

Some papers seek to deal with the problem of measuring regional risk sharing by testing the hypothesis of complete consumption risk sharing and then assessing how risk sharing is allocated among different channels, included fiscal policy. With reference respectively to the periods 1971–93 and 1983–94, Scorcu (1997, 1998) finds pretty high correlations in consumption growth rates but less-than-perfect consumption risk sharing, since for several regions consumption comes out to be affected by regional and national GDP growth rates. In a similar vein, Dedola, Usai, and Vannini (1999) make a comparison between the cases of Italy and UK with reference to 1961–94. Concerning the general degree of consumption insurance, they find that, on the whole, it is considerable in both countries, even if some Italian regions (Trentino-Alto Adige, Lazio, Abruzzo, Molise, Basilicata, Sicilia and Sardegna) show a high dependence on aggregate income shocks, presumably due to government transfers. More significant differences between the two countries emerge when Dedola et al. (1999) apply the variance decomposition due to Asdrubali, Sørensen, and Yosha (1996). The latter analysis clarifies that while public budget policies have no role in the UK and are responsible for about 13% of risk sharing in the United States, in Italy risk sharing due to fiscal policy amounts to about 20%, without considering the importance of public debt and interest payments on public debt in the capital markets channel which accounts for two-thirds of risk sharing.

Cellini and Scorcu (2002), focusing on 1960–95 and dealing with both short- and long-run risk sharing, find that for Italian southern regions the hypothesis of complete consumption risk sharing is always clearly rejected. According to these authors, especially for the long run, this result points out the little effectiveness of fiscal redistributive policies. Considering a longer span of time (1960–2001), Cavaliere, Fanelli, and Gardini (2006) reach partly different conclusions, showing that most regions turn out to be insured against both permanent and transitory income shocks. Therefore, the risk-sharing mechanisms operating through financial markets and formal or non-formal institutions (government transfers, first of all) are able to neutralize regional output fluctuations over both short and long horizons.

Another strand of the literature, inspired by the seminal work of Bayoumi and Masson (1995), estimates the weight of redistribution and risk sharing carried out by fiscal policy by directly referring to public expenditures and revenues. Obstfeld and Peri (1998) are the first to adopt this approach for the Italian case. With reference to 1979–93, they estimate at 8% and 3% of income respectively

redistributive and stabilizing effects of transfers provided by the social insurance system in Italy against 19% and 10% of the United States and 53% and 13% of Canada (which, however, takes into account all federal taxes, grants and transfers). Investigating risk sharing and redistribution among Italian regions over 1983–92, Decressin (2002) evaluates the interregional redistribution effect at about 25–35% of GDP, while the amount of risk smoothed via the fiscal system is estimated to range from 10% to 15%, with a significant role played by public consumption. Although Decressin makes use of similar aggregates of taxes, contributions and welfare payments for Italy and other countries (the UK and France), again both redistribution and short-term risk sharing turn out to be lower in Italy than elsewhere. Finally, Decressin also highlights the dramatic changes that occurred throughout the 1980s in the distribution of public spending between current and capital expenditures.

A more recent contribution is due to Arachi, Ferrario, and Zanardi (2010) within a framework similar to Decressin's (2002). The main outcome of this paper, focusing on 1996–2002, is that in Italy fiscal policies have exerted a redistribution effect among regions evaluated at between 26% and 28% of GDP. Remarkably, short-term risk sharing has often resulted in being even pro-cyclical with respect to regional-specific income, thus amplifying the variability of annual GDP across Italian regions up to more than 30%. This evidence seems to be supported by the European Commission (2006), providing evidence of pro-cyclical effects of fiscal policy in Italy and most industrialized countries. Finally, Giannola et al. (2016) estimate the extent of interregional redistribution over 1951–2010. Over the entire period, the redistributive impact of public financial flows is estimated to be rather weak (around 8%). However, results change dramatically when only the last 25 years are taken into consideration: from the mid-1980s onwards the size of estimated redistribution looks more substantial, ranging between 38% and 46% according to different estimation methods.

THE EMPIRICAL INVESTIGATION

The main objective of our empirical investigation is to assess the role played by fiscal policies in the long-term income redistribution and short-term stabilization (risk sharing) among Italian regions. Because our interest mainly focuses on the effects of different regional policy stances, we only deal with the redistribution and risk sharing directly operated by regional NFFs, even if we are aware of the existence of other channels (e.g., the credit and financial markets, as in Asdrubali et al., 1996) through which fiscal policy may influence redistribution and risk sharing. Our study has a peculiar comparative nature, since we consider and contrast two distinct periods, characterized by different features in so far as it concerns fiscal policy stance, distribution of public spending in terms of current and capital account expenditure, and design of regional policy. The two periods also differ for a different pattern of regional convergence/divergence: in the first

period an unprecedented regional convergence process took place, lasting until the mid-1970s; in the second period, regional differences widened. Among the studies shortly reviewed in the previous section, Decressin (2002) is perhaps the one closest to ours; however, we depart from it in several respects. As a first step, we reproduce the analysis carried out by Decressin over the same time horizon (1983–92). Then, we also deal with the period 1951–65. For both periods, we study long-term interregional redistribution and short-term risk sharing, considering the whole set of public expenditures and the current account items only. Estimations are made by employing first standard panel estimation methods and then more complex techniques, suitable to account fully for possible heteroskedasticity or/and autoregressive structures of regressions' residuals. This makes it clear how standard estimations may alter the evaluation of the degree of redistribution and insured risk among regions through the public budget.

Long-term income redistribution

We assess the redistributive impact of fiscal policy by considering, as Decressin (2002), the Bayoumi and Masson (1995) equation:

$$\ln \left(\frac{GDP - X_j}{GDP} \right)_{it} = \alpha_i + \gamma \ln \frac{GDP_{it}}{GDP_{at}} + \varepsilon_{it} \quad j = 1, 2 \quad (1)$$

where i , t and a respectively stand for region, year and national average; GDP is per-capita income; $X_{j=1}$ represents per-capita NFF, defined as the difference between total revenues raised from region i and public non-interest expenditure targeted to that region; and $X_{j=2}$ is per-capita NFFs computed considering current expenditure only (i.e., excluding public investment). This implies regressing regional output after public intervention on the same variable before public intervention. The estimated value for γ is an inverse indicator of the redistributive impact brought about by interregional NFFs, so that the difference $1 - \gamma$ can be interpreted as the size of such redistribution. In fact, if an increase of 1% in the relative regional per-capita GDP involves a corresponding increase of 1% in disposable income $GDP - X_j$, i.e., estimated γ equals unity, it means that the redistributive impact of fiscal flows is zero. Conversely, if an increase of 1% in the relative regional per-capita GDP involves a corresponding increase of only (say) 0.7%, then estimated $\gamma = 0.7$ and the weight of redistribution can be assessed at 30%.

For the sake of robustness, we also estimate the complementary equation of Bosch, Espasa, and Sorribas (2002):

$$\ln \left(1 - \frac{X_j^{it}}{GDP_{it}} \right) = \mu_i + \lambda \ln \frac{GDP_{it}}{GDP_{at}} + \eta_{it} \quad j = 1, 2 \quad (2)$$

where λ is a measure of the intensity of redistribution. In particular, if redistribution operates from the rich to the poor, estimated λ takes negative values: the higher its absolute value, the stronger the impact of public intervention.⁴ Table 1 displays the estimated coefficients obtained

Table 1. Redistribution among Italian regions: subsamples 1951–65 and 1983–92.

	Bayoumi and Masson (1995)			Bosch et al. (2002)			Bayoumi and Masson (1995)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
							Aggregate variable 'leave one out'		
(a)				1951–65					
<i>Explicative variable</i>		$\ln \frac{GDP_{it}}{GDP_{at}}$			$\ln \frac{GDP_{it}}{GDP_{at}}$			$\ln \frac{GDP_{it}}{GDP_{at}}$	
	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$\hat{\lambda}$	$\hat{\lambda}$	$\hat{\lambda}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$
<i>Dependent variable</i>									
$\ln \frac{(GDP - X_1)_{it}}{(GDP - X_1)_{at}}$	0.1825*** (0.013)	0.1563*** (0.032)	0.1036*** (0.022)	$\ln \left(1 - \frac{X_1^i}{GDP_{it}}\right)$ -0.1824*** (0.013)	-0.1453** (0.065)	-0.0897*** (0.030)	$\ln \frac{(GDP - X_1)_{it}}{(GDP - X_1)_{at}}$ 0.1807*** (0.013)	0.1588*** (0.033)	0.1025*** (0.022)
$\ln \frac{(GDP - X_2)_{it}}{(GDP - X_2)_{at}}$	0.1345*** (0.011)	0.0444*** (0.029)	0.0376*** (0.016)	$\ln \left(1 - \frac{X_2^i}{GDP_{it}}\right)$ -0.1343*** (0.011)	-0.0302 (0.033)	-0.0239 (0.020)	$\ln \frac{(GDP - X_2)_{it}}{(GDP - X_2)_{at}}$ 0.1333*** (0.011)	0.0443*** (0.029)	0.0364*** (0.016)
Observations	285	285	285	285	285	285	285	285	285
(b)				1983–92					
<i>Explicative variable</i>		$\ln \frac{GDP_{it}}{GDP_{at}}$			$\ln \frac{GDP_{it}}{GDP_{at}}$			$\ln \frac{GDP_{it}}{GDP_{at}}$	
	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$\hat{\lambda}$	$\hat{\lambda}$	$\hat{\lambda}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$	$1 - \hat{\gamma}$
<i>Dependent variable</i>									
$\ln \frac{(GDP - X_1)_{it}}{(GDP - X_1)_{at}}$	0.3051*** (0.021)	0.2432*** (0.046)	0.1936*** (0.035)	$\ln \left(1 - \frac{X_1^i}{GDP_{it}}\right)$ -0.3051*** (0.021)	-0.2362** (0.109)	-0.2218*** (0.052)	$\ln \frac{(GDP - X_1)_{it}}{(GDP - X_1)_{at}}$ 0.3023*** (0.021)	0.239** (0.073)	0.1932*** (0.035)
$\ln \frac{(GDP - X_2)_{it}}{(GDP - X_2)_{at}}$	0.2712*** (0.012)	0.2303*** (0.062)	0.2292*** (0.023)	$\ln \left(1 - \frac{X_2^i}{GDP_{it}}\right)$ -0.2712*** (0.012)	-0.2233** (0.081)	-0.2080*** (0.036)	$\ln \frac{(GDP - X_2)_{it}}{(GDP - X_2)_{at}}$ 0.2695*** (0.012)	0.2281** (0.061)	0.2277*** (0.023)
Observations	190	190	190	190	190	190	190	190	190

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors are given in parentheses. GDP, gross domestic product per capita; X_1 represents the net fiscal flow (NFF) in per-capita terms (defined as the difference between total revenues and public non-interest expenditure); X_2 represents the NFF per capita computed including current expenditure and excluding public investments. Bosch et al. (2002) demonstrate that $1 - \gamma = \lambda$. When using estimation methods more complex than ordinary least squares (OLS), i.e., panel FE and feasible generalized least squares (FGLS), the estimated parameters may reproduce less accurately the theoretical relation between $1 - \gamma$ and λ . In other words, the estimate of the linear combination of parameters λ might slightly differ from the linear combination of the estimated parameters $1 - \gamma$. Note that also a panel FE model can be represented as an FGLS on the model expressed in first differences (Arellano, 2003). Columns (1) and (4) report pooled OLS estimates. Columns (2), (5) and (8) apply standard panel FE estimations with robust standard errors, as in Decressin (2002). Columns (3), (6) and (9) are panel estimates (including regional dummies) allowing for heteroskedasticity by using two-step FGLS. Therefore, we estimate the panel at the first step by applying OLS and use the estimated residuals to calculate the variance-covariance matrix. We account for heteroskedasticity across panels (the estimated variance is different for each country) and autocorrelation within panels, assuming that the error term in each country follows an AR(1) process. Due to the short sample and the related difficulties in estimating a country-specific autocorrelation coefficient, we restrict the autocorrelation parameter to be identical across regions. For robustness check, columns (7) to (9) report estimates for the same equation as in columns (1) to (3). To account for the different size of regions, ratios $(GDP - X_i)_{it}/(GDP - X_i)_{at}$ and GDP_{it}/GDP_{at} are computed by using country averages that exclude region i ('leave one out' averages).

through a pooled OLS model and through a panel FE estimation (carried out like in previous literature, i.e., Arachi et al., 2010; Giannola et al., 2016). Given the macroeconomic nature of the data and the likely heteroskedasticity problems arising with OLS estimates, we finally resort to a two-step feasible generalized least squares (FGLS) model, estimating the panel at the first step by OLS and then using first-stage residuals to estimate the variance-covariance matrix. We account for heteroskedasticity across panels (i.e., estimated variances are allowed to be different for each country) and autocorrelation within panels, assuming that the error term in each region follows an AR(1) process.⁵ Focusing on the results deriving from this procedure, we are able to observe possible differences with respect to the standard estimation method earlier applied.

Risk sharing: income stabilization

In line with Decressin (2002) and Arachi et al. (2010), we estimate risk sharing through the test equation proposed by Bayoumi and Masson (1995):

$$\Delta(GDP - X_j)_{it} = \theta_i + \beta\Delta(GDP)_{it} + \varepsilon_{it} \quad j = 1, 2 \quad (3)$$

where $\Delta(GDP)_{it}$ and $\Delta(GDP - X_j)_{it}$ are the annual changes respectively in per-capita GDP and per-capita disposable GDP (i.e., net of NFF).

In addition, along the lines of the pioneering contributions by Cochrane (1991) and Mace (1991) on test regression of complete insurance, further developed in several ways by Asdrubali et al. (1996) and others to identify the contribution of each channel to risk sharing, we gauge the extent of risk sharing via fiscal channel by also estimating the equation (Asdrubali et al., 1996; Sørensen & Yosha, 1998):⁶

$$\Delta(GDP - X_j)_{it} = v_t + \beta\Delta(GDP)_{it} + u_{it} \quad j = 1, 2 \quad (4)$$

where v_t is time FE accounting for common shocks (obtained by subtracting to right- and left-hand-side variables their time averages).⁷ In both equations (3) and (4), the interpretation of the coefficient β is simple: if $\text{cov}\{\Delta(GDP), \Delta(GDP - X_j)\}$ were equal to $\text{var}(\Delta(GDP))$, and consequently $\hat{\beta}$ equal to 1, the fiscal channel would play no role in absorbing shocks to income; otherwise if $\text{cov}\{\Delta(GDP), \Delta(GDP - X_j)\} < \text{var}(\Delta(GDP))$ it means that $\Delta(GDP - X_j)$ reacts to income changes $\Delta(GDP)$ from less than 1 to 1, so that the variability of the latter is partially absorbed by the fiscal system. Therefore, $1 - \hat{\beta}$ represents the fraction of income shocks absorbed by the fiscal channel. This simple set-up is the same as the one applied by Bayoumi and Masson (1995), Decressin (2002) and Arachi et al. (2010),⁸ and similar to that earlier employed by Sachs and Sala-i-Martin (1992).⁹

Like in the analysis of redistribution effects of the fiscal policy described in the previous section, in order to obtain results comparable with the reference literature, i.e., Decressin (2002) and Arachi et al. (2010), we first estimate equations (3) and (4) by applying the panel FE model. Then, in line with Asdrubali et al. (1996) and the related international risk-sharing literature, we employ a two-

step FGLS model accounting for heteroskedasticity across panels and first-order autocorrelation within panels.

Robustness checks

Employing aggregate/average magnitudes in equations (1), (2) and (4) might imply a possible drawback in estimation. Indeed, regions may differ significantly in size so that average values can be too heavily influenced by larger regions, and shocks in larger regions can proxy aggregate shocks. To account for such a problem, as a robustness check, we estimate our test equations by both: (1) including all regions in the computation; and (2) excluding the region i , i.e., employing 'leave-one-out' averages (for the latter case results are reported in Table 1, columns (7) to (9), and in Table 2, columns (5) and (6)). The results obtained with procedures (1) and (2) are almost identical (differences in the estimated parameters are small or even negligible).

A second important possible weakness of our empirical methodology is the strong assumption of exogeneity of per-capita income to fiscal policies, usually made in this literature. We attempt to address the issue by conducting some robustness checks to control for endogeneity. Precisely, we perform panel instrumental variables (IV) regressions and endogeneity tests for the standard equations as well as for those involving the 'leave-one-out' computation of aggregates. We use as instruments the 'leave-one-out' average of the ratio $\ln(GDP_{it}/GDP_{at})$ for the redistribution equation and the 'leave-one-out' average of the ratio GDP_{it}/GDP_{at} for risk sharing.¹⁰ We consider these instruments along with their squared values. Once the goodness of the chosen instruments is verified through the Hansen J -test, we perform the endogeneity tests, which never reject the null hypothesis, thus confirming that the regressor can be treated as exogenous and results obtained from FE and FGLS models are reliable.¹¹

DATA AND RESULTS

Data

The data employed in our empirical investigation concern two different periods respectively covering 1951–65 and 1983–92. For the latter span we use the same data as Decressin (2002), i.e., the regional economic accounts for public administrations and regional economic accounts provided by the Istituto Nazionale di Statistica (ISTAT).

The data used for the first period are drawn from the original dataset provided by Giannola et al. (2016), who consistently merge data coming from different sources in order to build up a series comparable with the data available for more recent years. In particular, Giannola et al. (2016) start from Tarquinio (1969), collecting cash-flow data on public revenues and payments recorded by provincial treasuries and reported in the summary statistics of the Ministry of Treasury (Conto Riassuntivo), and complement those data with additional information on Central Treasury (Tesoreria Centrale) revenues and expenditures and capital public expenditure. In fact, the main shortcoming of Tarquinio (1969) is the omission of payments settled by the Central Treasury, which according to Geri and

Table 2. Risk sharing among Italian regions: subsamples 1951–65 and 1983–92.

	(1)	(2)	(3)	(4)	(5)	(6)
	Equation (3)		Equation (4)		Equation (4)	
	Aggregate variable 'leave one out'					
(a)			1951–65			
<i>Explicative variable</i>	$\Delta(GDP)_{it}$					
	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$
<i>Dependent variable</i>						
$\Delta(GDP - X_1)_{it}$	0.0533*** (0.042)	0.0403*** (0.023)	0.0918*** (0.060)	0.0735*** (0.029)	0.0918*** (0.058)	0.0529*** (0.027)
$\Delta(GDP - X_2)_{it}$	0.0262*** (0.038)	0.0423*** (0.016)	0.0601*** (0.055)	0.0548*** (0.020)	0.0601*** (0.054)	0.043*** (0.019)
Observations	266	266	266	266	266	266
(b)			1983–92			
<i>Explicative variable</i>	$\Delta(GDP)_{it}$					
	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$	$1 - \hat{\beta}$
<i>Dependent variable</i>						
$\Delta(GDP - X_1)_{it}$	0.0889*** (0.044)	0.1017*** (0.029)	0.1134*** (0.058)	0.1409*** (0.041)	0.1134*** (0.057)	0.1527*** (0.040)
$\Delta(GDP - X_2)_{it}$	0.1178*** (0.031)	0.1213*** (0.018)	0.1601*** (0.041)	0.1994*** (0.026)	0.1601*** (0.039)	0.2064*** (0.025)
Observations	171	171	171	171	171	171

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors are given in parentheses. GDP, gross domestic product per capita; X_1 represents the net fiscal flow (NFF) in per-capita terms (defined as the difference between total revenues and public non-interest expenditure); X_2 represents the NFF per capita computed including current expenditure and excluding public investments. Columns (1), (3) and (5) apply standard panel fixed effects (FE) estimations with robust standard errors, as in Decressin (2002). Columns (2), (4) and (6) allow for heteroskedasticity by using two-step feasible generalized least squares (FGLS). Therefore, we estimate the panel at the first step by applying ordinary least squares (OLS) and use the estimated residuals to calculate the variance-covariance matrix. We account for heteroskedasticity across panels (the estimated variance is different for each region) and autocorrelation within panels, assuming that the error term in each region follows an AR(1) process. Due to the short sample and the related difficulties in estimating a country-specific autocorrelation coefficient, we restrict the autocorrelation parameter to be identical across regions. Equation (4) accounts for common shocks including time FE according to Asdrubali et al.'s (1996) approach. For robustness check, we estimate the same equation by computing the cross-region time averages. To account for the different size of regions, we use country averages that exclude region i ('leave one out' averages). Results are reported in columns (5) and (6).

Volpe (1985) implies that only 45% of total public expenditure was actually attributed to regions, and the other 55% remained out of the picture. To cope with this problem, Giannola et al. (2016) correct the original data by distributing revenues and expenditures of the Central Treasury to regions in proportion to the residing population. Moreover, as Tarquinio (1969) also omits capital expenditures, data are further adjusted by resorting to additional information from the Ministry of Economy and Finance (2011) and Picci (2002). From the former source, the value of public investment at the national level for 1951–65 is retrieved, and then a share of it is attached to each region, according to the allocation of public investments estimated by Picci (2002).

The over-time evolution of per-capita regional NFFs (evaluated at 2010 euro prices) for 1951–92 is illustrated in Figure 1, where the usual aggregation of Italian regions in four macro-regions is employed.¹² Donor (recipient) macro-regions are above (below) zero. As one can see,

the North-West and Mezzogiorno (i.e., the South) increasingly assume opposite roles as structural donor and recipient. For the North-East and Centre, the variability of NFF indicators is definitely lower. The North-East initially exhibits NFFs close to 0, while later moving on an increasing trend. For the regions of the Centre, the NFF is negative and close to the figures of the South up to the beginning of the 1970s; then it turns to be positive and increasing.

In the following analysis, we will first provide a quantitative assessment of the capability of NFFs to moderate long-run income disparities and mitigate the impact of short-run shocks across regions. We will do so by assessing the redistributive and risk-sharing functions of NFFs in the two periods 1951–65 and 1983–92. Then, we will discuss our results and provide a possible explanation for the weak link between the size of interregional transfers and the evolution of the north-south divide based on the different 'quality' of public policies in the 1950s–60s and 1980s.

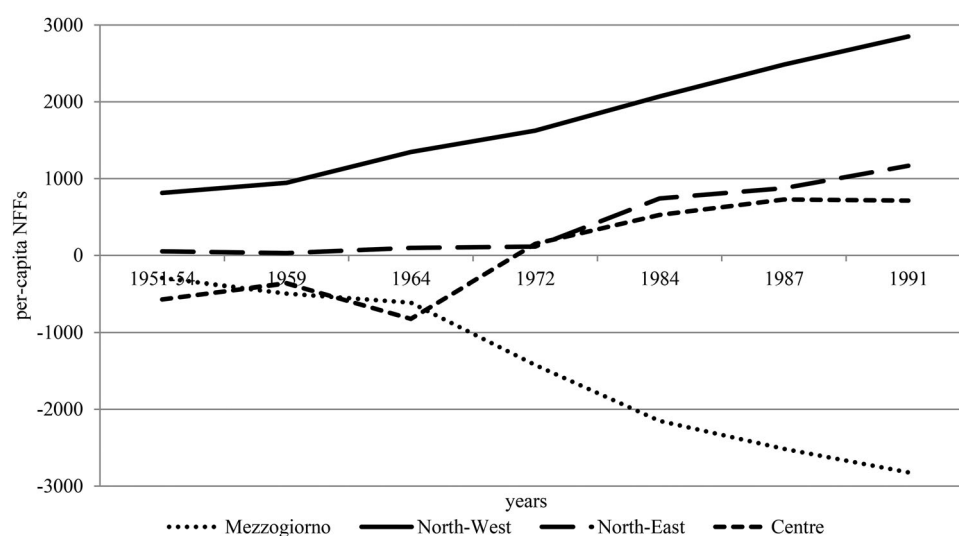


Figure 1. Macro-regions' per-capita net fiscal flows (NFFs) in Italy (2010 euros).

Note: Following most of the empirical literature on regional NFFs, we do not include interest payments on public debt, because of the practical problems involved in their allocation among regions. Moreover, since in our case the purpose of reckoning NFFs is that of representing the intensity of redistribution and risk sharing operated through the public sector, we cleanse regional balances from the amount accounting for the regional share of the overall surplus or deficit (for the Italian case, see, for instance, Ambrosanio, Bordignon, & Cerniglia, 2010; and Arachi, Ferrario, & Zanardi, 2013).

Results

Table 1 reports our estimates of long-run redistribution. It is divided into the two panels each presenting results respectively for 1951–65 and 1983–92.

The first three columns concern estimates obtained by the Bayoumi and Masson (1995) equation, while columns (4) to (6) show the results of estimation of the Bosch et al. (2002) equation. Columns (7) to (9) report, as a robustness check, the Bayoumi and Masson (1995) test equation when average variables are computed on a 'leave-one-out' basis (see the Robustness subsection for details). Pooled OLS, panel FE and two-step FGLS estimates are respectively presented in columns (1) and (4), (2) and (5), and (3) and (6).

Starting from the 1983–92 sample (panel b), the values of estimated coefficients come out to be quite stable, regardless of the estimation technique, almost always significant at 5% level of confidence, and clearly consistent with previous literature. Considering the whole set of public primary expenditures and revenues, the weight of interregional redistribution is assessed to be between 19.32% and 30.51%, i.e., at values very close to those obtained by Decressin (2002), who refers to the same period, and consistent with results of Dedola et al. (1999), Arachi et al. (2010) and Giannola et al. (2016), who deal with different time spans. In particular, it is worthwhile remarking that our assessment substantially coincides with the one by Decressin (2002), even if we apply a technique that allows one to exploit the longitudinal and time dimension of the data on 190 observations (like Arachi et al., 2010) against the simple cross-section analysis on a restricted sample of 20 observations adopted by Decressin (2002). When only current public expenditures are considered, results are almost unaltered and the range of estimated redistribution

is restricted to between 20.80% and 27.12%. As a result, one could argue that in this period interregional redistribution occurred almost exclusively through current expenditure, which implies that it mainly served the purpose of consumption rebalancing, with little room for investment financing. If then one focuses on FGLS estimates, the conclusion is even sharper, as the coefficient relative to current expenditure is higher than the one concerning overall expenditure. In this case, our estimation indicates that the contribution of the capital component was even negative, i.e., that through this channel redistribution was an anti-Robin Hood one: from the poor to the rich.

When moving to 1951–65, the picture considerably changes. For these years, our exercise shows that redistribution was much lower. Again coefficients display some variability across estimation techniques, pointing out that standard procedures tend to over-evaluate redistribution slightly. More importantly, now interregional redistribution can be evaluated from 10.25% to 18.25% for the overall aggregate of primary public expenditure (i.e., 9–12 percentage points less than in 1983–92) and from 3.64% to 13.45% for current expenditure only (14–17 percentage points less than in 1983–92). Therefore, two issues emerge moving from the first (1951–65) to the second (1983–92) period. First, the size of interregional redistribution notably increases. Secondly, the importance of current expenditure seems to rise strongly. In fact, while in 1983–92 the role of capital expenditure is negligible or even counter-productive for redistribution, in 1951–65 capital expenditure is responsible for a high proportion of interregional redistribution.¹³

Concerning risk sharing, results are summarized in Table 2. With respect to long-run redistribution, the values of coefficients are remarkably lower (with one relevant exception) although always statistically significant at 1%

level of confidence. Nevertheless, especially in 1983–92, the role of fiscal policy in smoothing out idiosyncratic risk is not negligible at all, being evaluated between 9% and 15% when considering overall public primary expenditure, and between 12% and 20% when taking into account current expenditure only. Again, our results are similar to the ones presented by Decressin (2002),¹⁴ and again (like in the case of FGLS estimates of redistribution) the capital component of public expenditure seems to play a perverse role by amplifying rather than mitigating the effects of shocks.

Moreover, exactly as observed for redistribution, things significantly change when the focus moves to 1951–65. In particular, three points are remarkable: (1) coefficients are always less than 10% or, when estimated with equation (3), less than 5.33%, indicating that fiscal policy performs its risk-sharing function to a limited extent; (2) current expenditure has an even smaller impact on risk sharing than total primary expenditure, as coefficients in the second line of Table 2 are lower than (in one case almost equal to) coefficients in the first line, which means that not only redistribution but also even risk sharing is carried out mostly through public investments; and (3) unlike what happens in 1983–92, current expenditure has a larger impact on risk sharing than on long-run redistribution, which is mainly operated through capital expenditure, i.e., policies aimed at strengthening social and economic infrastructures and the productive capacity of lagging regions.¹⁵

INTERREGIONAL REDISTRIBUTION AND THE NORTH–SOUTH GAP

At the end of the Second World War, the Italian regional economic and social divide was large and urged public policies for territorial rebalancing. As illustrated by Figure 2, showing the time path of relative southern per-capita GDP (the national average is set equal to 100), at the

beginning of the first of the two periods we consider (i.e., 1951–65), per-capita GDP in the south is still around 64% of the national average. Then in the following years, the Italian per-capita GDP grows at sustained rates (this is the time of the so-called Italian economic miracle), and the Mezzogiorno does even better, so that in 1965 it is at about 68% of the national average. This convergence process is driven by regional and development policies aimed at starting southern industrialization by allotting substantial and increasing resources to this purpose. In those years, the policy stance is characterized by a centralized governance and a top-down supply-based approach, mainly implemented by the Cassa per il Mezzogiorno (Southern National Agency). As a result of this intervention, an intense process of accumulation takes place, largely due to the localization in the area of large (often state-owned) manufacturing plants operating mainly in heavy industry.

After that the southern relative GDP has reached its highest value in 1972–74 (74% of the national average), the beginning of the second period under consideration (1983–92) is characterized by a stage of stability in regional disparities coinciding with a nationwide economic slowdown. Afterwards, in the second half of 1980s a phase of divergence takes place, with the southern gap widening again, and its relative per-capita GDP going back to values close to the ones of the mid-1960s. In these years, while government resources devoted to public investment and subsidies to production in the south reduces from 0.73% (1951–65) to 0.60% (1983–92) of national GDP, its approach switches from supply-side interventions to demand-targeted measures: fiscal subsidies to firms, income support for households and job-creation measures in the public sector. The effects are shown in Table 3, pointing out two major facts. First, the total financial effort of regional policies in terms of share of national GDP, increases until the second half of the 1970s and then sharply decreases (see the last column). Second, from the mid-1970s on the two components of public expenditure ‘Public

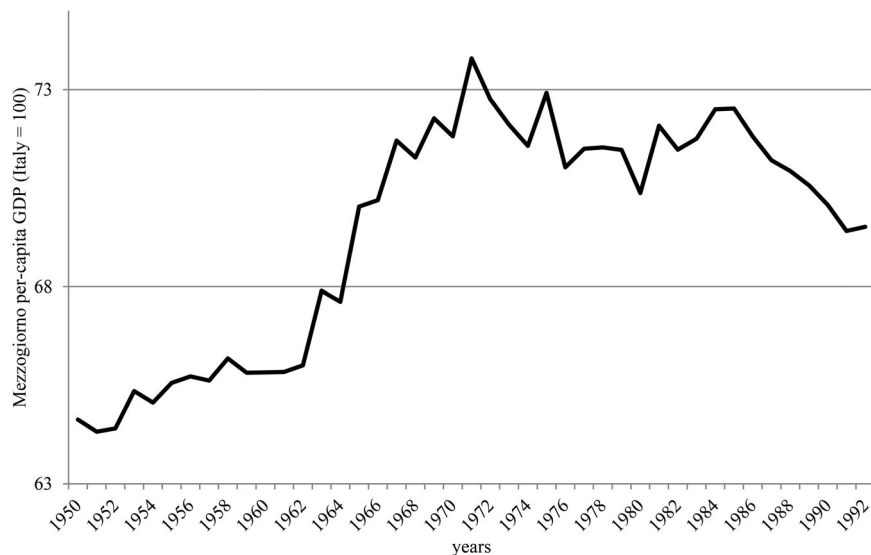


Figure 2. Mezzogiorno per-capita gross domestic product (GDP), 1952–92 (Italy = 100).

Table 3. Financial resources devoted to regional policies in Italy, 1951–93.

Years	Public investment and business incentives		Payroll tax reduction		Total	
	In 2008 millions of euros	As a % of GDP	In 2008 millions of euros	As a % of GDP	In 2008 millions of euros	As a % of GDP
1951–57	1519	0.73	–	–	1519	0.73
1958–65	2321	0.74	–	–	2321	0.74
1966–70	2329	0.70	361	0.13	2690	0.80
1971–75	5808	0.90	1969	0.33	7777	1.27
1976–80	7119	0.90	3643	0.46	10,762	1.32
1981–86	5974	0.65	5089	0.55	11,063	1.19
1987–93	6305	0.57	6215	0.55	12,520	1.10

Note: GDP, gross domestic product.

Source: Bianchi, Miotti, Padovani, Pellegrini, and Provenzano (2012). Total expenditure for the Special Aid Program in the southern regions by the Mezzogiorno National Agency plus total payments by central government for other programmes. Data include expenditure for general infrastructures, sector-specific infrastructures, and support to private investment in the form of both capital and interest subsidies.

investment and business incentives' and 'Payroll tax reductions' show diverging dynamics, with the former declining from 0.90% to 0.57% of Italian GDP and the latter rising from 0.33% to 0.55%. The new policy strategy, based on the idea that endogenous development may be triggered by active participation of local agents in policy programmes, is aimed at supporting local demand to stimulate local supply. However, the high trade integration between north and south of Italy brought about increased imports from the north, crowded out local industrial activities, and contributed to enlarge the gap in the following decades.

In the face of these facts and considering the fiscal and regional policy stance prevailing in the two periods, the result of higher redistribution and risk sharing in 1983–92 than in 1951–65 obtained by our econometric investigation may be somewhat puzzling. Indeed, policies aimed at promoting development of lagging regions should involve higher NFFs because the needed increase in total investment expenditure has to be backed by increases in domestic (i.e., southern) and/or outside saving, the latter including private (mainly, direct investments by northern firms and financial flows by northern banks) and public (NFFs) components. So, to the extent that domestic and private outside saving fall short of total investment, public transfers from outside are needed.

A possible explanation of the apparent puzzle is the possible impact on NFFs exerted by the concurrent reform of the Italian local government financing system occurred in the second half of the 1970s. This implied a deep overhaul, leading to more centralized revenues from municipalities to the national government, and a strong decentralization of expenditure (in particular health and transportation expenditures)¹⁶ due to the establishment of regional governments. According to many observers (Bordignon, 2000; Giarda, 2011), this reform significantly softened the public budget constraint, favouring a sharp increase in the overall primary public expenditure.¹⁷

In fact, the public expenditure to GDP ratio, which was around 25% in 1950, 30% in 1960 and 33% in 1970, jumped to 41% in 1980 and up to 56% in 1993. Furthermore, the weight of local administrations' expenditure remarkably increased: according to Giarda (2011), from 19% of total expenditure (1951) to 29% (1980). Importantly, the institutional break connected to the creation of regional governments triggered in each region a rise of public expenditure approximately proportional to regional population, while revenues were collected by central government in accordance with regional income. In this way, the new setting of local finance significantly favoured the escalation of differences in regional NFFs. In addition, in 1983–92 the new policy stance made interregional redistribution operate mainly through current expenditure, as shown by the evidence summarized in Table 1 (panel b). This is mirrored in the trend of the capital component of public expenditure, which displays a strong decrease as a share of total public expenditure. On this point, the Ministry of Economy and Finance (2011) reports that between 1950 and 1995 the capital public expenditure dramatically decreases from 47% (1950) of total expenditure (net of interests and debt reimbursements) to 39% (1960), 19% (1970) and 11% (1995). Since capital expenditure is the component of public outlays most relevant to development and regional policies, its reduction over time further demonstrates that in 1983–92 interregional redistribution was little functional to the purpose of territorial rebalancing.

Summarizing, redistributive transfers are not necessarily functional to promote growth and territorial rebalancing but may end merely to serve the purpose of financing higher consumption in destination regions. This seems to have happened in our case: public policies at work in the 1980s deployed larger resources but were less effective in reducing the north–south development gap. They operated a kind of redistribution that may be defined as a 'low-quality' one as compared with the one operated in the 1950s and 1960s. In other words, rebalancing development policies were more effective on the

southern gap in 1951–65, but redistribution and risk sharing were higher in 1981–92 because larger resources were moved toward the Mezzogiorno, in correspondence with an overall massive expansion of public expenditure. On the face of it, the growth of southern NFFs (rising from 10% to 13% of local GDP in the 1950s–60s, to 22% in 1990) seems to have been an unavoidable effect, in the light of differences in regional income and the progressivity of taxation system.

CONCLUSIONS

The aim of this paper was to investigate the role of public policies in Italy over a long time horizon by providing an assessment of both the redistribution and the risk-sharing functions of interregional NFFs. Although based on Italian data relative to specific time periods, we believe that the evidence provided here allows one to ‘learn from the past’ and draw more general conclusions. When assessing the regional risk-sharing and redistributive power of national fiscal policies, one should carefully take into account many different factors related to the existing policy regime, the main one being the composition of public spending (public current expenditure versus public investment). In detail, our main contributions can be summarized as follows.

First, we fill a relevant gap in the literature on the Italian case, due to the lack of quantitative evidence for the 1950s and 1960s, when the special aid programme for the development of the Mezzogiorno supported a sustained process of regional convergence. By doing so, we significantly enrich the available evidence, so far limited to the 1980s onwards. Second, we overcome possible statistical bias and inefficiency in estimations of previous evidence available for the 1980s by employing more suitable estimation techniques properly accounting for heteroskedasticity and residuals’ autocorrelation. Third, and more importantly, we adopt a comparative approach contrasting results obtained for two periods (1951–65 and 1983–92) characterized by strong differences in the degree of regional convergence, the distribution of public spending and the design of regional policies.

According to our results, redistribution operated by the public sector in 1983–92 was larger than in 1951–65, but little useful to promote the development of lagging regions. This because in the 1980s interregional redistribution occurred almost exclusively through current expenditure, mainly serving the purpose of consumption rebalancing. Two main issues emerge from the comparison of results relative to the two periods under consideration. First, a clear increase seems to occur in the size of interregional redistribution: from 10% to 18% in the 1950s and 1960s to from 19% to 30% in the 1980s. Second, the importance of current expenditure seems strongly to increase moving to 1983–92, while in 1951–65 capital expenditure is responsible for a higher proportion of interregional redistribution.

As far as risk sharing is concerned, the role of fiscal policy in smoothing out idiosyncratic risks is noteworthy. However, in 1983–92 the capital component of public

expenditure seems to play a perverse role by amplifying rather than mitigating the effects of shocks (i.e., public investments tend to go to regions benefited from positive rather than hit by negative shocks). When the focus moves to 1951–65, three points are remarkable: (1) the fiscal policy performs its risk-sharing function to a limited extent; (2) public current expenditure has an impact on risk sharing smaller than total primary expenditure, i.e., even risk sharing is carried out mainly through public investments; and (3) current expenditure has a larger impact on risk sharing than on long-run redistribution, which is mainly operated through capital expenditure, i.e., policies aimed at strengthening the productive capacity of lagging regions.

ACKNOWLEDGEMENTS

The authors thank the participants in the Regional Studies Association (RSA) Winter Conference 2015, the workshop ‘Risk and Resilience: A Regional Perspective’ (Manlio Rossi-Doria Centre for Economic and Social Research, University of Roma Tre), the XIIIth c.MET05 workshop (University of Naples ‘L’Orientale’), the GeComplexity Conference (University of Crete), the XXVIIIth Siep Conference (University of Salento), and, in particular, Riccardo Crescenzi, Paolo Liberati, Francesco Trivieri and two anonymous referees for their invaluable comments made on a previous version of the paper. All remaining errors are the authors’ own responsibility.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

NOTES

1. For a detailed technical definition of long-term redistribution and short-term stabilization, see, for example, Bayoumi and Masson (1995).
2. For recent surveys, see Cavaliere et al. (2006) and Arachi et al. (2010). For more specifically on the Italian case, see the second section below.
3. For a survey on the main points of this earlier discussion, see Giannola et al. (2016).
4. Equation (1) has been widely used in the literature since it has the desirable property that in the (likely) case of inequality-reducing redistribution, γ ranges from 0 to 1. Bosch et al. (2002) show that there is a precise theoretical relationship between γ of equation (1) and λ of equation (2), i.e., $1 - \gamma = -\lambda$.
5. Due to the short sample and the related difficulties in estimating a region-specific autocorrelation coefficient, we restrict the autocorrelation parameter to be identical across regions.
6. Equations (3) and (4) are consistent with the assumption of constant absolute risk aversion (CARA) preferences.
7. The main difference between the two equations is the inclusion of time FE in equation (4), rather than individual

FE as in equation (3), to isolate the idiosyncratic component of income. Equation (4) allows one to isolate business cycles accounting for common shocks to income, since the first difference of group average (aggregate) income is subtracted from the first difference of income of region i . If in equation (3) a panel FE model has to be applied, equation (4) allows us to apply a more complex two-step FGLS accounting for heteroskedasticity and autocorrelation of residuals.

8. Arachi et al. (2010) rely on a modification of the test equation introduced by Melitz and Zumer (2002): instead of using time averages of the variables (through the inclusion of time FE), they include their trends.

9. The working paper by Sachs and Sala-i-Martin (1992) is the first contribution to explore the role of federal fiscal transfer system in the United States in smoothing regional income shocks. Like Bayoumi and Masson (1995), it uses regional personal income rather than gross state GDP.

10. When we estimate the 'leave one out' version of the estimated equations, the denominators (GDP_{at}) of both instruments are also calculated on a 'leave one out' basis.

11. Results are not reported here but are available from the authors upon request.

12. This aggregation splits the country into four macro-regions: North-West (including the regions Piedmont, Aosta Valley, Lombardy, Liguria), North-East (Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna), Centre (Tuscany, Umbria, Marche, Lazio) and Mezzogiorno (Molise, Abruzzo, Campania, Basilicata, Apulia, Calabria, Sicily, Sardinia).

13. Following the suggestion of an anonymous referee, we also estimate another model where only public investment is considered as an explanatory variable. This allows one to evaluate the size of redistribution due to public investment at about 6–10% in 1951–65 and 0.1–0.2% in 1983–92 according to the FGLS and FE estimations respectively. Looking at risk sharing, public investments account for a negative, pro-cyclical, effect of about 4–5% in 1983–92 against a positive, shock-absorbing role between 1951 and 1965 of about 2–3% (according to equation (4) when applying FGLS and panel FE estimates respectively).

14. In the case of risk sharing, our sample size is comparable with that of Decressin (2002).

15. To test whether the difference between the estimated coefficients for 1951–65 and 1983–92 is statistically significant, we carry out a test of parallelism. This consists of pooling the data in a single model and testing if the estimated slopes for the two subsamples are statistically different. To conduct this robustness check we apply a standard Chow test (Chow, 1960). The null hypothesis of parallelism is always rejected.

16. A wide literature (Persson & Tabellini, 2000; Pisauro, 2001; Rodden, 2006; Rodden, Eskeland, & Litvack, 2003; Velasco, 2000; Weingast, Shepsle, & Johnsen, 1981) has proved that the blend of decentralized expenditure decisions and centralized financing might be highly detrimental for fiscal discipline. In particular, the well-known common-pool argument points out that in this case the budget constraint is softened and regional governments

are induced to overspend (specifically on the Italian case, see Bordignon, 2000; Buiatti, Carmeci, & Mauro, 2014; Giarda, 2011; and Padovano, 2012).

17. Another factor contributing to this evolution was a generous renovation of public pension plans (Giarda, 2011).

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