Government effectiveness and inequality in Italian regions

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Cristian Barra[1] · **Anna Papaccio**[1] · **Nazzareno Ruggiero**[2]

Abstract

Using regional data for Italy over the 2004–2019 period, this paper investigates the relationship between government effectiveness and inequality. For our empirical purposes, ordinary least squares, instrumental variable (IV) and generalized methods of moments regressions have been employed. Our evidence indicates that improved government effectiveness has some role in reducing inequality in the most developed regions of the North, but has no effect in both the Centre and in the peripheral Southern regions.

Keywords Government effectiveness · Inequality · Regional analysis · North–South divide · Empirical design

JEL Classification D02 · D63 · R1

1 Introduction and literature

Recently, there has been a growing concern about the rising of income inequalities, within and across regions, in the European Union and especially in Italy (Ciani and Torrini 2019; Ferrara and Nisticò 2019; Ezcurra 2019, Rodríguez-Pose and Tselios, 2009). The causes of this rising in income inequality in the past decades have also attracted much political and academic consideration. One of the major hypotheses brought forward by scholars links inequality to institutional quality. Inequality has

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been viewed as a product of the changes in the democratic structures, laws, taxes and institutions (Sarkhosh-Sara et al. 2020).

Among the works that address the relation between inequality and institutions, it is necessary to distinguish between the different definitions that scholars use to analyse the institutional quality and to consider the different forms of inequality they focus on.

For instance, Blancheton and Chhorn (2021) focus on income inequality and investigate the relation between public expenditure, institutional quality and inequality in Asia and the Pacific. To explore the role of institutional quality, they employ the average value of the Worldwide Governance Indicators (WGI).[1] They find a negative effect of government intervention (measured by public expenditure) and institutional quality on income inequality.

On the other hand, Ferrara and Nisticò (2019) in their analysis of the evolution of inequality within and between Italian sub-national areas, focus on a different inequality concept. They make use of the synthetic index of well-being, the RWBI, calculated in Ferrara and Nisticò (2015), which synthesizes 10 different dimensions including "culture and free time". They point out that the quality of local institutional frameworks has a role in determining the incidence of inequalities "between" and "within" macro-areas. Their results trail Putnam et al. (1993) finding, according to which the institutional quality is better in highly endowed social capital regions (i.e. Italian Northern regions). Thus, the North–South division in Italy follows the regional institutional quality distribution.

Some other analyses on Italian regional disparities make use of social indicators, including the UN Human Development Index and an "improved" Human Development (Felice 2007), or a combination of income inequality and development indices like in Iuzzolino et al. (2011). According to the latter, government action had a crucial effect on the economic and social imbalance between the Mezzogiorno and the Centre–North of Italy.

Ezcurra (2019), considering different measures of regional inequality (i.e. coefficient of variation, the Gini index and two indices proposed by Theil 1967), finds that countries with better quality of government have lower levels of regional inequality. Chong and Gradstein (2011), explore the possibility of a double relationship between the two variables. They show that a double causality relationship exists between inequality and institutional quality using a simple dynamic model and afterwards testing their findings with a cross-country panel VAR technique that allows measuring the statistical impact of each variable on the other. Specifically, they find that low institutional quality (measured by institutional dimensions such as government stability, corruption, and law and order) and income inequality (using Gini coefficients as a proxy for income inequality for developing and industrial countries) reinforce each other.

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[1] The WGI consists of six dimensions: (i) voice and accountability, (ii) political stability and absence of violence and terrorism, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law and (vi) control of corruption. (For additional details about these variables, please refer to Kaufmann, Kraay and Mastruzzi (2010).)

As Zhuang et al. (2010) pointed out, it is necessary to distinguish between two different approaches in the literature focused on institutional quality (that may affect the link to inequality), namely the analysis of corruption and political institutions.

Regarding the political institution approach, for some authors, a more egalitarian political structure leads to a more equal income distribution (Li et al. 1998, Gradstein et al. 2001). However, this link is not always verified (Bollen and Jackman 1985) or the reverse causality is found (like in Boix 2001, Perotti 1996 and Bénabou 1996) where it is shown that democracy prevails when income differences decline.

Sarkhosh-Sara et al. (2020) focus on economic freedom as an institutional indicator in explaining the relation with inequality. They find that economic freedom has a more significant effect on inequality in both high- and middle-income countries.

The second approach, concentrating on corruption–inequality nexus, has distinct findings. For instance, in Li et al. (2000) the link between corruption and income inequality exhibits an inverted U-shaped relationship. Namely, very low or very high levels of corruption are associated with low-income inequality, while an intermediate level of corruption leads to high income inequality. According to Gupta et al. (2002), corruption increases inequality by means of tax evasion and indemnities that favour the wealthy (and well-connected individuals). You and Khagram (2005) claim that corruption reinforces or widens existing inequalities, but Uslaner (2008) finds a reverse causality arguing that corruption is generated by economic and legal inequality. Dobson and Ramlogan-Dobson (2012), investigating on the informal sector in Latin America, provide evidence of a trade-off between corruption and income inequality. They pointed out that where institutions are weak (and the informal sector is large) it may be beneficial to allow corruption to grow.

On the contrary, some claim that corruption can improve income equality if the social benefit from corrupted activities is greater than the social loss. For example, Andres and Ramlogan-Dobson (2011) find that corruption is associated with lower inequality in less developed countries where the informal sector is present.

High income disparity and a poorly constructed tax and benefit system contribute to Italy's inequality (Ciani and Torrini 2019) and, as Brandolini and Torrini (2010) point out, regional gaps in Italy explain a large share of income dispersion. The literature about Italy's divide, focusing on the analysis of its magnitude and of its possible explanatory factors, stresses out the presence of a lower quality of public services in the South, which applies to all levels of government, and highlights the need to improve the quality of the services supplied by every administrative body or provider of public services (Cannari and Franco 2010, 2011; Felice 2013; Svimez 2017). Moreover, Lasagni et al. (2015) point out that the quality of local institutions, play a central role in explaining firm productivity in Italy and income creation. Starting from this evidence, our paper's aim is to investigate whether institutional quality (expressed by means of government effectiveness) might be considered a key determinant of income inequality and of North–South divide in the country. Our paper contributes to the literature on the Italian divide since it links income inequality (both at the national level and macro-area) to the main factor, pointed out by scholars, that affects the North–South issue, namely the low quality of administrative bodies. Our main hypothesis suggests that an improvement in government effectiveness leads to a decrease in income inequality, the latter measured through the

application of the Gini index, while government effectiveness has been originally defined by Kaufmann et al. (2010) as "the quality of public service and the policies formulated and implemented by the government" and subsequently revised by Nifo and Vecchione (2014, page 1633) as "the endowment of social and economic structures and the administrative capacity in relation to policies by regional and provincial institutions".

For this reason, it is the most suitable indicator to gather the performance of provincial and regional policies and institutions in a country, like Italy, affected the by large and persistent regional divides.

To test our hypothesis, we employ regional data for Italy over the 2004–2019 period[2] and rely on the application of alternative estimation techniques, such as ordinary least squares (OLS), instrumental variable (IV) and generalized methods of moments (GMM) estimations.

Our evidence indicates that improved government effectiveness has some role in reducing inequality in the most developed regions of the North, but has no effect neither in the Centre, nor in the peripheral Southern regions, a result which is robust to the application of alternative estimators.

The remainder of the paper is organized as follows. Dataset and methods are presented in Sect. 2, while Sect. 3 focuses on the summary statistics and results. Section 4 concludes, focusing on policy implications and future research.

2 Dataset and methods

2.1 Data description

To assess the relationship between government effectiveness and inequality, four different data sources have been combined. Information concerning the regional Gini index has been drawn from the Italian Statistical Office (ISTAT). More specifically, the Gini index is calculated by the ISTAT, on a regional basis, exploiting information on households' levels of income, drawn from the Statistics and Income Living Conditions dataset (EU-SILC).[3] Data concerning government effectiveness have instead been taken from Nifo and Vecchione (2014). The index, which ranges in the [0,1] interval, with higher scores indicating higher levels of government effectiveness, aims at measuring *"the endowment of social and economic structures in Italian provinces and the administrative capacity of provincial and regional governments in relation to policies concerning health, waste management and the environment"* (Nifo and Vecchione, 2014 page 1633). In particular, the final measure of government effectiveness is a function of five different variables, respectively,

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[2] The choice of the sample period is driven by data availability reasons.

[3] The ISTAT provides two different measures of the Gini index. The first one, employed in this paper, incorporates rents. The second, on the other hand, net of rents. Preliminary estimates performed with the latter measure provide results which are very similar to the ones reported in this paper. For the sake of the convenience, the estimates performed through this second Gini index have not been reported in the paper, but are available upon request.

represented by the endowment of social facilities, the endowment of economic facilities, regional health deficit, separate waste collection and a urban environment index.[4] Information on the unemployment rate has been taken from the ISTAT Labor Force Survey dataset and the variable is measured as the percentage of job seekers over the labour force. Financial development is instead measured as the ratio of domestic credits provided to the private sector over the GDP. To obtain an index of regional financial development, we relied on information on the amount of credits granted to the private sector provided by the Statistical Bulletin of Bank of Italy and ISTAT information on regional GDP. Export, defined as the ratio of exports in sectors with dynamic world demand over GDP, has again been drawn from the ISTAT. Statistics on both the ratio of individuals aged 14–18 enrolled in high schools and the ratio of youth aged 20–24 with a high school diploma have been taken from the ISTAT. The same data source has been employed to control for demographic variations, summarized by the population density, defined as the amount of inhabitants per squared kilometre.

We finally control for the level of disposable regional income, drawn from the ISTAT Households' Disposable Income dataset, and measured in current Euros.

2.2 Methods

To assess the impact of government effectiveness on inequality in Italy, in our benchmark specification, we rely on the application of a simple ordinary least squares (OLS) estimator. More specifically, we estimate the following model:

$$\ln{(INEQ)}_{i,t} = \beta_0 + \beta_1 \ln{(INEQ)}_{i,t-1} + \beta_2 (GOV\_EFF)_{i,t-1} + \theta_k \sum_{k=1}^{K} (CONTROLS)_{i,t} + \eta_i + \tau_t + \varepsilon_{i,t}$$

(1)

where ln is the natural logarithm, INEQ is the Gini index and GOV_EFF denotes the government effectiveness indicator proposed by Nifo and Vecchione (2014). A dynamic structure for the government effectiveness index has been chosen, as the variable enters our specification with its first lag. This choice is essentially driven by the fact that institutional changes take time before affecting structural economic variables, such as inequality. At the same time, the choice of a dynamic, rather than static relationship, between inequality and government effectiveness is also determined by the fact that both these variables exhibit slow time variations. CONTROLS, on the other hand, is a vector of control variables intended to capture the impact of several environmental factors on inequality and which includes variables like the unemployment rate (UN_R), the ratio of domestic credits provided to the private sector over GDP (CRGDP, taken in log), the share of individuals aged 14–18 attending high school (HS_14_18), the shares of individuals in the age range 20–24 holding a high school diploma (HSD_20_24), export (EXP, taken in log), population density (PD, taken in log) and disposable income (INC, taken

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[4] For more information about the computation procedure of the government effectiveness index and the variables employed to compute it, please refer to Nifo and Vecchione (2014).

in log). The choice of the control variables closely mirrors the one employed by Dobson and Ramlogan-Dobson (2012). More specifically, the unemployment rate is intended to capture the impact of structural factors and socio-economic regional conditions on inequality, while the ratio of domestic credits over GDP aims at controlling for the degree of financial development and to assess whether the growth of the local financial market increases inequality. Both HS_14_18 and HSD_20_24 are instead intended to control for the general level of schooling and to test whether higher education is associated with lower inequality. Export, on the other hand, is included to control for the degree of regional openness to international trade, while population density aims at controlling for urbanization. The disposable income aims at controlling for the general economic conditions of regional households and to assess whether improved economic conditions are accompanied by lower levels of inequality. Our specification further includes the first lag of the Gini index to capture some possible persistence in the levels of inequality. Finally, η is an unobserved area-specific effect, τ represents a set of time dummies, to control for time-specific effects or exogenous shocks (such as the recent advent of financial crisis), while ε is the disturbance terms. Subscripts i and t refer to regions and time periods (years), respectively.

A major concern related to the application of the OLS estimator is represented by the likely endogeneity of our measure of government effectiveness, driven by reverse causality issues, which might make the estimator inconsistent. More specifically, while on the one hand it can be argued that increased government effectiveness reduces inequality as it favours the access education, health and other public services, on the other increased inequality might generate a lower incentive to invest in these public services, hence implying that more unequal societies might exhibit systematically lower levels of government effectiveness. To deal with the likely endogeneity of government effectiveness, we therefore propose the application of an instrumental variable approach and follow an instrumentation strategy close to the one employed by Dobson and Ramlogan-Dobson (2012). In their cross-country analysis aimed at assessing the impact of corruption on inequality, they propose two alternative sets of instruments. More specifically, the first set of instruments is represented by democracy, latitude and ethnolinguistic fractionalization, while the second consists of democracy, latitude, military expenditures and ethnolinguistic fractionalization. Given the regional nature of our data, and the facts that the levels of democracy are the same throughout the country and that regional authorities have no power in managing military expenditures, we therefore instrument government effectiveness through regional latitude (LAT) and ethnolinguistic fractionalization (EFR). We follow Dobson and Ramlogan-Dobson (2012) approach because even if Latin America and Italy show a different historical path, they share some factors related to the persistence of inequality. A common element between Italian regions and Latin American countries is represented by the historical land concentration, which has placed power in the hands of an elite, perpetuating inequality.

The literature also points to ethnolinguistic fractionalization as a potential instrument for a measure of governance quality in a country (Gyimah-Brempong, 2002; Gyimah-Brempong & Munoz de Camacho, 2006). Although many authors

concentrate on corruption, it has been shown that the effectiveness of government mostly reflects corruption and societal forces (Ionescu 2021, Uslaner 2008, Kapoor and Ravi 2012, Banerjee 1994, Bardhan 1997, Guriev 2004, and Bardhan and Mookherjee 2005).

With respect to the choice of the instruments, they are assumed to be valid, as they influence government effectiveness, but not the level of inequality. More specifically, while higher latitude is assumed to be positively correlated with governance and, hence, with higher government effectiveness, ethnolinguistic fractionalization is instead assumed to be inversely correlated with the index of government effectiveness. Indeed, as various contributions in the literature have proved, ethnolinguistic fractionalization reduces taxation, the provision of public goods and the shares of spending on public goods (Alesina et al. 1999, Alesina et al. 2003; Alesina and La Ferrara 2005). Alesina et al. (2003) differentiating between ethnic fractionalization, linguistic fractionalization and religious fractionalization confirm the negative diversity effects on quality of government and growth only concerning ethnic and linguistic diversity. On the other hand, other authors (Mocetti and Porello 2010, Cattaneo 2014; Bettin et al 2019; Mariani et al 2021), investigating the determinants of ethnic heterogeneity in Italian provinces by means of the ethnolinguistic fractionalization index, found that Italy, due to migration flows, has become increasingly diversified in terms of ethnicities.

With respect to ethnolinguistic fractionalization, the computation of this indicator and its interpretation require some considerations. This index measures the probability that two individuals randomly selected will not belong to the same ethnic group. To obtain a measure of regional ethnolinguistic fractionalization (EFR), we apply the approach proposed by Mauro (1995) to information provided by the Italian Statistical Office (ISTAT), which collects information on the regional amount of both nationals and immigrants, the latter partitioned by nationality of origin. More specifically, the regional ethnolinguistic fractionalization index is computed according to the following condition:

$$\text{EFR}_{i,t} = 1 - \sum_{g=1}^{G_{i,t}} \left(\frac{P_{g,i,t}}{P_{i,t}} \right)^2$$

where g represents the group of origin, G_{it} is the overall amount of ethnic groups, which includes Italians as well, P_{git} is the population of ethnic group g which resides in the region and P_{it} is the total regional population. The subscripts i and t refer to regions and time, respectively. The higher the value of the index, the higher is the degree of regional ethnolinguistic fractionalization. As noted by Bratti and Conti (2013), the value of the index, which measures the probability that two randomly selected individuals belong to the same ethnic group, is influenced by both the number of ethnic groups and by the distribution of individuals across different groups.

To control for the likely endogeneity of government effectiveness, we therefore rely on an instrumental variable approach and estimate the following set of equations:

$$\ln(\text{INEQ})_{i,t} = \gamma_0 + \gamma_1 \ln(\text{INEQ})_{i,t-1} + \gamma_2(\text{GOV\_EFF})_{i,t-1} + \lambda_k \sum_{k=1}^{K}(\text{CONTROLS})_{i,t} + \eta_i + \tau_t + \varepsilon_{1,i,t}$$

(2)

$$\begin{aligned} \text{GOV\_EFF}_{i,t-1} = &\ \delta_0 + \delta_1(\text{EFR})_{i,t-1} \\ &+ \delta_2(\text{LAT})_{i,t-1} + \delta_3 \ln(\text{INEQ})_{i,t-1} \\ &+ \iota_k \sum_{k=1}^{K}(\text{CONTROLS})_{i,t} + \eta_i + \tau_t + \varepsilon_{2,i,t} \end{aligned}$$

(3)

Nevertheless, according to Angrist and Krueger (2001), the IV approach has two major pitfalls. The first drawback of this estimator relates to the fact that the instruments employed might be correlated with the omitted variables, which, in turn, might determine bias estimates of the parameter of interest. The second, on the other hand, is driven by the fact that the instruments employed might be only weakly correlated with the endogenous regressors. These potential pitfalls can be solved through the application of the two-step system generalized method of moments (Sys-GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). Designed for panels with few time periods and a large amount of cross-sectional units (*"small T, large N"*), the application of the Sys-GMM approach allows to consistently estimate the first-order autoregressive term and to overcome potential issues related to the application of exogenous instruments, as the estimator employs lagged levels and differences as instruments (see also Roodman, 2009a, b). Indeed, according to Roodman (2009b), lagged levels and differences allow to obtain a set of valid instruments. More specifically, while differences are uncorrelated with the fixed effects, lagged levels are instead uncorrelated with the error term, in the case in which the latter is not serially correlated. If, however, as in the case of the current contribution, the error term exhibits first-order serial correlation, then the application of lags of higher order provides a set of valid instruments. As usual, the validity of the instruments is assessed through the Sargan test of over-identifying restrictions while the Arellano–Bond statistics is used to test for the autocorrelation in the error term.

3 Results and discussion

3.1 Summary statistics

Table 1 reports the descriptive statistics for the main variables employed in our econometric analysis, partitioned at the macro-region level. Accordingly, inequality is higher in the less developed and peripheral regions of the South and Islands, while the North and the Centre exhibit similar levels of income disparity. In particular, the higher levels of inequality registered in the *Mezzogiorno* can be ascribed, following Acciari and Mocetti (2013), to the lower share of income possessed by the individuals in the lower tail of the distribution. Statistics concerning the unemployment

Table 1 Summary statistics

|	North–East and North–West	South and Islands	Centre	Italy
INEQ	27.11	31.16	28.45	29.89
	1.16	1.14	1.01	0.53
GOV_EFF	0.46	0.23	0.44	0.36
	0.14	0.11	0.10	0.16
UN_R	5.81	14.48	7.96	9.71
	2.20	4.21	2.31	5.09
CRGDP	52.64	33.34	55.98	45.41
	13.90	6.93	8.36	14.52
HS_14_18	78.43	75.70	81.19	77.89
	5.56	9.09	10.00	8.32
HSD_20_24	89.26	97.30	97.94	94.22
	7.83	14.29	11.38	12.15
EXP	24.85	13.97	19.95	19.52
	8.93	14.08	$4.92e+14$	12.18
PD	194.40	159.74	8.41	178.79
	117.53	114.03	83.01	110.86
INC	68,058.11	32,768.51	52,937.70	50,918.19
	61,218.15	23,890.85	35,028.85	47,036.72
Observations	128	128	64	320

Authors' elaboration; standard deviation in parentheses

rate indicate that the regions in the South and in the Islands significantly lag the remainder of the country in terms of their labour market performance, as the average unemployment rate is 2.49 times larger compared to the North and almost 1.82 times larger compared to the Centre. Similar dualism emerges with respect to the degree of financial development, as the average ratio of credits to GDP is significantly lower in the South and in Islands compared to the other macro-regions. Though Southern regions are also less educated and with lower disposable incomes, these regions exhibit a higher share of exports to GDP relatively to the other main macro-areas. Nevertheless, the core regions in the Centre and in the North exhibit a higher population density compared to the peripheral regions in the South and in the Islands. Finally, a significant dualism emerges with respect to the government effectiveness index of Nifo and Vecchione (2014). The averages reported in Table 1 indicate that the endowment of regional socio-economic structures and the general quality of public services is larger in the North and in the Centre, which outperform the South and the Islands, as the latter significantly lag the core regions of the country.

Table 2 Pairwise correlation between variables

	ln(INEQ)	GOV_EFF	UN_R	ln(CRGDP)	HS_14_18	HSD_20_24	ln(EXP)	ln(PD)	ln(INC)
ln(INEQ)	1.00								
GOV_EFF	−0.39***	1.00							
UN_R	0.64***	−0.42***	1.00						
ln(CRGDP)	−0.45***	0.64***	−0.65***	1.00					
HS_14_18	−0.28***	0.17***	−0.17***	0.13**	1.00				
HSD_20_24	−0.02	−0.20***	0.15***	−0.25***	0.07	1.00			
ln(EXP)	−0.42***	0.47***	−0.47***	0.59***	0.07	−0.21***	1.00		
ln(PD)	0.33***	0.45***	0.03	0.21***	−0.15***	−0.13**	0.05	1.00	
ln(INC)	0.22***	0.53***	−0.07	0.38***	−0.15***	−0.20***	0.20***	0.82***	1.00

$* p < 0.10$, $** p < 0.05$, $*** p < 0.01$
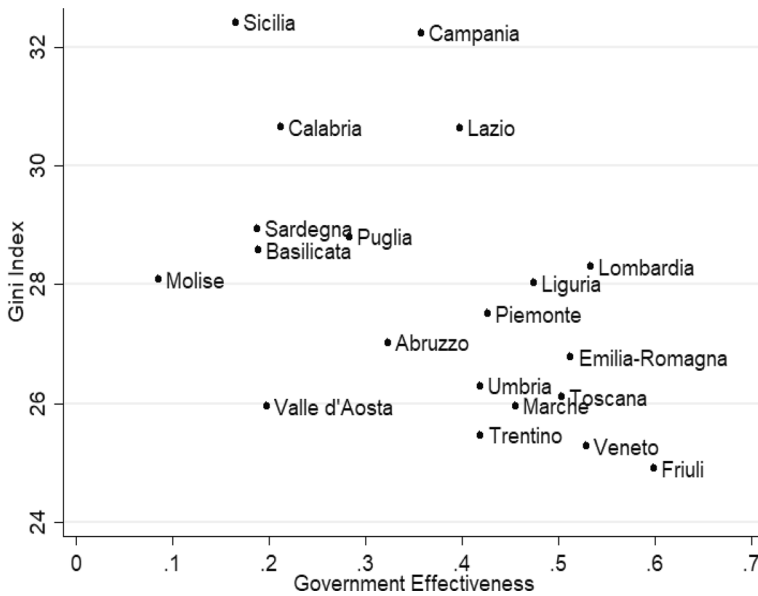
Fig. 1 Inequality and Government Effectiveness (By Region) *Source* authors' elaborations

Indeed, over the sample period, the government effectiveness score of the peripheral regions in the South and in the Islands is 2 times lower compared to the North and 1.91 times lower than Central regions.

3.2 Pairwise correlation between variables

Table 2 reports the pairwise correlations between the main variables employed in the econometric analysis proposed in this paper.[5] Accordingly, the pairwise correlations indicate that the government effectiveness index of Nifo and Vecchione (2014), in line with the expectations, is found to be inversely and significantly correlated with the Gini index.

The unemployment rate (UN_R) is positively and significantly correlated with the Gini index, suggesting that regions with poor labour market performances and with depressed socio-economic conditions also exhibit higher levels of inequality. On the other hand, there exists an inverse and highly significant correlation between local financial development (CRGDP) and inequality. Moreover, while the share of individuals aged 14–18 attending high school (HS_14_18) is inversely and significant correlated with the income inequality, no significant correlation exists between the share in the age range 20–24 holding a high school diploma (HSD_20_24) and the variable of interest. While exports (EXP) are inversely correlated with inequality,

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[5] The pairwise correlations reported in Table 2 must be intended as pooled-data correlations. Hence, the reported correlations have not been computed on a regional nor macro-area basis.

Centre

North

South and Islands

━ Gini Index ╍ ╍ Government Effectiveness
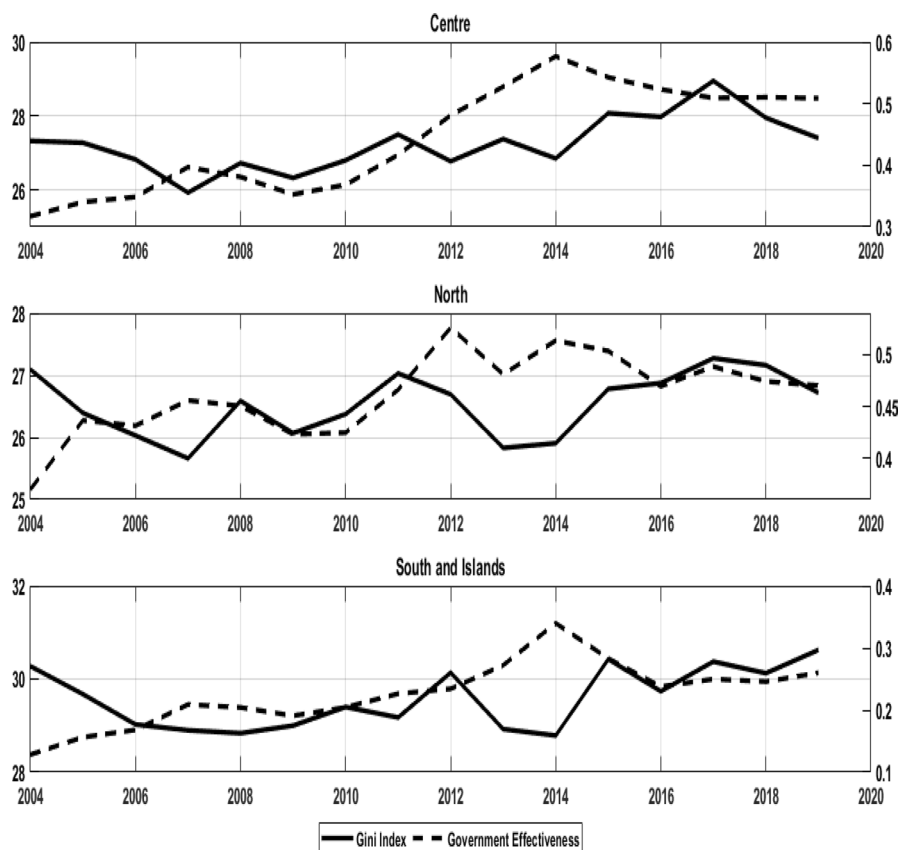
Fig. 2 Inequality and Government Effectiveness (macro-area level) Source: authors' elaborations. *Notes* Gini Index on the left axis; Government Effectiveness on the right axis

evidence of a positive and highly significant relationship is found between population density (PD), disposable income (INC) and the variable of interest.

3.3 Stylized facts

Figure 1 plots, at the regional level, the government effectiveness index of Nifo and Vecchione (2014) against the Gini index. According to Fig. 1, there exists a clear inverse relationship between these two variables, as regions with higher government effectiveness also exhibit lower levels of inequality. Figure 1 further points out a marked dualism between the peripheral Southern and Islanders regions and the core regions of the Centre and the North. More specifically, regions in the latter areas display significantly higher government effectiveness scores and lower levels of inequality compared to the regions in the South which, on the other hand, are characterized by a lower endowment of their socio-economic structures, a lower quality of public services and a more unequal income distribution.

Table 3 Inequality and government effectiveness (OLS regression)

Regressors	North−East and North−West	South and Islands	Centre	Italy
ln(INEQ)$_{t-1}$	0.327***	0.295***	0.404***	0.530***
	[0.0906]	[0.0937]	[0.111]	[0.0514]
GOV_EFF$_{t-1}$	− 0.0851**	0.00334	− 0.171	− 0.109***
	[0.0455]	[0.0668]	[0.125]	[0.0320]
UN_R$_t$	− 0.000157	0.00679**	0.00241	0.00389**
	[0.00461]	[0.00301]	[0.0107]	[0.00158]
ln(CRGDP)$_t$	− 0.0110	− 0.159***	− 0.103	0.00286
	[0.0232]	[0.0577]	[0.0921]	[0.0154]
HS_14_18$_t$	− 0.00436***	− 0.000405	0.000411**	− 0.000329
	[0.00136]	[0.000525]	[0.000196]	[0.000347]
HSD_20_24$_t$	− 0.00150**	0.000119	0.0000557	− 0.000231
	[0.000576]	[0.000364]	[0.000171]	[0.000189]
ln(EXP)$_t$	0.0139***	0.0190**	− 0.0196	− 0.000677
	[0.00494]	[0.00936]	[0.0328]	[0.00244]
ln(PD)$_t$	0.00429	0.0284*	0.0289	0.0201***
	[0.0111]	[0.0149]	[0.0336]	[0.00694]
ln(INC)$_t$	0.00647	− 0.0185	0.0356	0.00634
	[0.00593]	[0.0163]	[0.0314]	[0.00483]
Const	2.346***	2.505***	2.275***	1.487***
	[0.343]	[0.357]	[0.606]	[0.185]
Macro-dummies	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes
Period	2004–2019	2004–2019	2004–2019	2004–2019
Observations	120	120	60	300

Standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 2 assesses the time series behaviour, at the macro-area level, of both the Gini index and government effectiveness over the period considered. According to Fig. 2, up to the onset of the financial crisis, the two variables moved in opposite directions, with a general decrease in the levels of inequality and a rise in the government effectiveness scores. From 2009 onwards, however, all the macro-areas have instead experienced a joint increase of the Gini index and of the government effectiveness indicator. This result seems to suggest that the financial crisis exacerbated inequality throughout the country, but did not reduce the socio-economic regional endowment and the administrative capacity in relation to public services. Further, the evidence reported in Fig. 2 indicates that from 2014 onwards all the macro-areas have experienced an increase in their levels of inequality coupled with a contraction in the scores of government effectiveness. On the other hand, the increase in the levels of inequality

registered by the regions in the Centre has been somewhat weaker compared to the other macro-areas.

3.4 Baseline results: OLS regression

Table 3 reports the results of our benchmark OLS specifications for the country as a whole and by macro-area. Accordingly, inequality has some degree of persistence, both at the national level and at the macro-area level. Relatively to the main parameter of interest, namely government effectiveness, we find evidence of an inverse, albeit weakly significant, relationship for Northern regions only, while in the other macro-areas increased government effectiveness is found to exert no significant effect on inequality. The inverse and significant relationship between government effectiveness and inequality documented for the country as a whole seems therefore to be driven by Northern regions.

A higher unemployment rate is instead shown to increase inequality only in the less developed regions of the South and Islands, hence suggesting that these regions drive the positive and significant effect detected at the aggregate level.

With respect to the other controls included in our specifications, a more developed financial system, summarized here by the ratio of credits to GDP, is instead found to be mostly insignificant, though there is evidence of an inverse and highly significant relationship in the case of the South and Islands. A higher share of youth attending high school is found to be inversely correlated with the Gini index in Northern regions, but positively with the variable of interest in the Centre. On the other hand, a higher share of individuals in the age range 20–24 who hold a high school diploma is associated with lower inequality in the North, but has no significant effect in all other macro-regions. Higher intensity of export exacerbates inequality in both the North and in the South and Islands. Finally, while higher population density increases inequality only at the aggregate level and, to a lower extent, in the South and Islands, variations in the levels of disposable income have no significant effect on the variable of interest regardless the macro-area.

3.5 Dealing with endogeneity

3.5.1 IV regression

The evidence reported in Table 4 suggests that inequality has some degree of persistence both at the aggregate and at the macro-area level. Relatively to the estimated coefficients of government effectiveness, our results indicate that increased government effectiveness has an inverse, though weakly significant, impact on inequality only in Northern regions, while no significant effect is found for the other macro-areas. Increased unemployment rate is found to increase unemployment in the South and at the aggregate level. An increase in the development of the financial system is instead found to have a limited impact on the levels of

Table 4 Inequality and government effectiveness (IV regression)

Regressors	North−East and North−West	South and Islands	Centre	Italy
ln(INEQ)$_{t-1}$	0.266**	0.331***	0.306**	0.564***
	[0.118]	[0.0849]	[0.134]	[0.0873]
GOV_EFF$_{t-1}$	−0.172**	−0.0874	−0.664	−0.0489**
	[0.102]	[0.220]	[0.463]	[0.114]
UN_R$_t$	0.000552	0.00557**	0.0153	0.00381**
	[0.00409]	[0.00274]	[0.0134]	[0.00154]
ln(CRGDP)$_t$	−0.00452	−0.139	−0.242*	−0.000896
	[0.0210]	[0.0857]	[0.136]	[0.0164]
HS_14_18$_t$	−0.00396***	−0.0000540	0.000690***	−0.000430
	[0.00127]	[0.000435]	[0.000223]	[0.000325]
HSD_20_24$_t$	−0.00155***	0.000329	−0.000199	−0.000228
	[0.000525]	[0.000324]	[0.000328]	[0.000185]
ln(EXP)$_t$	0.0136***	0.0179*	0.0412	−0.000712
	[0.00451]	[0.0108]	[0.0541]	[0.00243]
ln(PD)$_t$	0.0118	0.0320*	−0.0407	0.0164
	[0.0136]	[0.0192]	[0.0695]	[0.0109]
ln(INC)$_t$	0.00891*	−0.0105	0.0111	0.00398
	[0.00515]	[0.0189]	[0.0275]	[0.00494]
Const	2.494***	2.206***	2.494***	1.390***
	[0.383]	[0.335]	[0.546]	[0.238]
Hansen J test (p)	0.6659	0.1357	0.1029	0.1681
Endogeneity test (p)	0.2787	0.7191	0.4228	0.5850
Macro-dummies	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes
Period	2004–2019	2004–2019	2004–2019	2004–2019
Observations	120	120	60	300

Standard errors in brackets; * $p<0.10$, ** $p<0.05$, *** $p<0.01$; Hansen test on over-identifying restrictions

inequality in the Centre and has no significant impact on the variable of interest for all the other macro-areas. A higher share of individuals attending high school is again found to reduce inequality in the North, but to increase it in the Centre. A higher share of individuals holding a high school diploma reduce inequality in Northern regions, but has no effect in the other macro-areas. Increased openness to international trade, in line with the estimates reported in Table 3, is found to enhance income inequality both in the North and in the South and Islands. Finally, variations in the disposable income have a weak positive effect on inequality in Northern regions only. Relatively instead to the diagnostic statistics reported in Table 4, they suggest that the instruments employed are valid, as the

Table 5 Inequality and government effectiveness (GMM regression)

Regressors	North−East and North−West	South and Islands	Centre	Italy
ln(INEQ)$_{t-1}$	0.352***	0.218**	0.396***	0.373***
	[0.103]	[0.1000]	[0.0423]	[0.0732]
GOV_EFF$_{t-1}$	−0.0731***	0.00593	−0.141	−0.0601**
	[0.0224]	[0.0592]	[0.120]	[0.0315]
UN_R$_t$	0.00648**	0.00609**	0.00102	0.00438***
	[0.00300]	[0.00286]	[0.00605]	[0.00128]
ln(CRGDP)$_t$	0.000268	−0.00310***	−0.00132***	−0.000324
	[0.000583]	[0.000612]	[0.000231]	[0.000612]
HS_14_18$_t$	−0.00173*	−0.000166	0.000393***	−0.000276
	[0.00102]	[0.000339]	[0.000115]	[0.000329]
HSD_20_24$_t$	−0.00279**	0.000107	0.0000741	−0.000187
	[0.00132]	[0.000244]	[0.0000958]	[0.000200]
ln(EXP)$_t$	0.000781	0.000364	−0.00121	0.000163
	[0.000719]	[0.000284]	[0.000785]	[0.000298]
ln(PD)$_t$	0.0172**	0.0191	0.0444*	0.00773
	[0.00795]	[0.0118]	[0.0258]	[0.0143]
ln(INC)$_t$	−0.000891	0.00911	0.0107	0.0135
	[0.00693]	[0.0138]	[0.0112]	[0.0115]
Const	2.402***	2.482***	1.753***	1.953***
	[0.440]	[0.360]	[0.115]	[0.255]
AB(1) test (p)	0.021	0.016	0.083	0.000
AB(2) test (p)	0.128	0.177	0.394	0.730
Sargan test (p)	0.120	0.157	0.146	0.108
Macro-dummies	No	No	No	Yes
Year dummies	Yes	Yes	Yes	Yes
Period	2004–2019	2004–2019	2004–2019	2004–2019
Observations	120	120	60	300

Standard errors in brackets; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

p-values of the Hansen test are significantly above the conventional 10% threshold. At the same time, the endogeneity tests performed reject the strict exogeneity hypothesis, with the implication that government effectiveness must be treated as endogenous, hence providing favourable evidence for the application of the IV approach.

3.5.2 GMM regression

Though the estimates performed through the application of the IV approach suggest that government effectiveness is endogenous, and the Hansen tests indicate that the instruments employed are valid, this procedure is not immune from limitations.

Table 5 reports the results of our GMM estimation for the country as a whole and at macro-area level. In line with the estimates reported so far, all the macro-areas under scrutiny exhibit some degree of persistence in their levels of income inequality. Relatively to the main parameter of interest, i.e. government effectiveness, the evidence reported in Table 5 points out to an inverse, as expected, and significant relationship between this variable and inequality, which holds only limitedly to Northern regions and the country as a whole. Variations in the unemployment rate, in this environment, are shown to be positive, as expected, and significant, for both the North and South and the Islands. On the other hand, the development of the financial system, in line with the estimates reported in Table 4, is found to ameliorate inequality only in the Centre. With respect to the other controls included in the econometric analysis, a higher proportion of people aged 14–18 attending high school is found to reduce inequality in Northern regions, but to increase it in the Centre. A higher share of the population aged 20–24 with a high school diploma is found to reduce inequality only in Northern regions. Finally, both trade openness and disposable income have no significant effect on the variable of interest regardless the macro-area. The diagnostic statistics reported in Table 5 indicate that for all the specifications the error term exhibits, as expected, first-order serial correlation, as suggested by the p-values of the AB(1) statistics. On the other hand, and in line with the expectations, the p-values of the AB(2) statistics provide evidence against the second-order autocorrelation hypothesis in the error term. Finally, evidence in favour of the instruments employed is found, as implied by the p-values of the Sargan test, which are above the conventional 10% threshold. All in all, the evidence reported in this paper indicates that government effectiveness has some role in reducing inequality, but this effect only holds for the core regions of the North of the country. Indeed, increased government effectiveness is found to reduce inequality only in the North, being instead insignificant once both the Centre and the less developed regions in the South and in the Islands are examined. This result seems to suggest that if institutions have a role in reducing inequality, this role, in the case of the *Mezzogiorno*, must be found in dimensions of institutional quality other than government effectiveness. A possible explanation of our findings, along the lines of Andres and Ramlogan-Dobson (2011), is that in countries (or areas) in which the informal sector is present (such as the South of Italy for instance), a lower level of governance effectiveness can be matched with less inequality if the social benefit derived from the informal economy is greater than the social damage. In the *Mezzogiorno* then, a social damage greater than social benefits would explain not only the higher inequality, but also the lack of a statistically significant result for government effectiveness. We suggest two possible explanations for this result: (i) if the quality of institutions plays a key role in reducing inequality, this significant role must be found, at least in the case of the Mezzogiorno, in dimensions of institutional quality other than government effectiveness; (ii) as Ramlogan-Dobson (2011) stress out, the presence of an informal economy may lead to ineffectiveness of the improvement of governance effectiveness on the level of inequality in a macro-area. In fact, as Ionescu (2021) pointed out, corruption rests upon a foundation of inequality and leads to poorer policies and worse social outcomes. As a consequence, the effectiveness of government mostly reflects corruption and societal forces, but also bad policies can lead to higher levels

of corruption (Uslaner 2008). Moreover, even though corruption and government effectiveness are two different concepts they might be very correlated. Kapoor and Ravi (2012) argue that the corruption index is perception based, so regions where the quality of policies are higher, are given a better ranking in terms of corruption. Furthermore, the amount of red tape and corruption are highly linked (Banerjee 1994, Bardhan 1997, Guriev 2004, and Bardhan and Mookherjee 2005).

4 Conclusion

The existence of regional differences in terms of development across Italian regions has been always a matter of concern that attracted considerable attention from both scholars and politicians. Although previous studies link the levels of income inequality observed in Italian regions to factors like trade, inequality in terms of both opportunity and employment, and human capital accumulation, little is known on the potential impact of regional government effectiveness in affecting the distribution of income.

We focused on the link between income inequality and government effectiveness to address this puzzle and employ regional data for Italy over the 2004–2019 period. For the purposes of this paper, different estimation methodologies, such as OLS, IV and GMM regression have been used.

Our contribution confirms the existence of a sharp dualism between Italian regional economies, with regions in the North and in the Centre which exhibit both lower levels of inequality and higher quality of government effectiveness.

In particular, the latter has been found to have some role in reducing inequality, though limitedly to Northern regions. Indeed, our evidence, which is robust to the application of alternative estimation methodologies, indicates that improved government effectiveness reduces inequality in the core regions in the North, but it has no significant effect in the Centre, nor in the peripheral and less developed regions of the South and Islands.

In the Italian context, the findings of the current study suggest that improving government effectiveness and, hence, both the endowment of socio-economic regional structures and the quality of the public services, holds a potential to better distribute income inequality and to allow for a more homogeneous distribution of regional wealth. However, what is of particular interest from our perspective, is the non-significant role of government effectiveness in explaining inequality in the peripheral regions of the South and Islands. This result, in our opinion, provides room for future research and suggests that other dimensions of institutional quality and informal economy might represent the causes behind the large levels of inequality registered by these regions. Measures other than government effectiveness, such as the control of corruption, rule of law, voice and accountability and regulatory quality might indeed play a relatively more important role in identifying the institutional determinants behind the higher levels of inequality observed in the *Mezzogiorno*. It turns out that future research should therefore embed all these dimensions of the quality of institutions and take into consideration the role of informal economy to have a detailed picture of the factors related to the quality of institutions

that affect inequality in the different macro-areas and in the South. Future research should also consider the channels through which institutions affect inequality, as our analysis only deals with the effect of government effectiveness on inequality, but does not consider how this effect is mediated. This kind of econometric analysis would, in our opinion, allow not only to identify the institutional factors that affect inequality, but would also provide more accurate implications in terms of policy. Our results highlight the limits of regional policies and the crucial role of general policies that have objectives referring to the whole country, but which produce different effects depending on the quality of the administrations and the territorial context. The main goal is to improve the quality of services and performances in the South to have the same level throughout the country. In fact, in education and health, with the same resources assigned to the regions of the North and the South, a decisive negative impact derived from the South different use: concentrated—for example, in the health sector, on hospital components and pharmaceutical. Moreover, some real distortions, dysfunctions or practices by regional and local administrations, deep the divide. In fact, uniform public policies produce different effects depending on the quality of the administrations and the territorial context. In defining the legislation and the resources these aspects must be considered and corrective mechanisms must also be implemented, which operate when the quality of the service provided to the community is inadequate.

Data availability The authors elect to not share data.

Declarations

Conflict of interest The authors declare no conflict of interest.

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