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Transparency, quality of institutions and performance in the Italian Municipalities

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Transparency, quality of institutions and performance in the Italian Municipalities

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Abstract

In this paper, we aim at evaluating from an economic perspective the recent Italian legislation on transparency to investigate whether the potentialities of transparency as a tool to improve performance and integrity are fully exploited. We first construct a synthetic indicator (CTI) consisting of two sub-indicators, CTI *Integrity* and CTI *Performance*, which are able to describe in numerical terms the overall degree of transparency of Italian public administrations as well as the two different aspects of the public activity's transparency. Then, using as a sample of Italian municipalities, we address the question whether there is a relation between the fulfillment of transparency obligations and both the institutional quality and the performance of the public administration activity. Our preliminary results suggest that our transparency indicators show a satisfactory correlation with widely used measures of the quality of institutions as well as with the official data on municipalities public spending performance.

JEL Classification: K2, K4, H3, H7

Keywords: Transparency, quality of institutions, local governments, accountability, performance.

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Introduction

Recently public administrations have been required to be more transparent in providing information about their activities with the aim of increasing their accountability, improving the use of public resources and enhancing citizens' trust in public institutions. Integrity and performance issues in government are at the forefront of the political and economic debate worldwide. Diffusion of corruption and abuse of power in governments have led to a growing demand of access to public information. In Italy, major reforms have been introduced since the end of the first decade of this century, but scarce integrity and performance in the public sector are still a 'hot' unresolved problem.

In this paper, we aim at evaluating from an economic perspective the recent Italian legislation on transparency to investigate whether the potentialities of transparency as a tool to disclose relevant information about the public activity to the stakeholders, to prevent corruption and waste of public resources and to favour accountability, are fully exploited. In other words, we try to answer the following question: is the degree of transparency of a public administration somehow correlated with the quality of the local institutions and theirperformance? In such a perspective, we first propose a new approach to measure transparency and then develop an empirical analysisto investigate whether there is a relation between the fulfillment of transparency obligations, the quality of the institutional environment and the performance of the public administration activity. By focusing on a sample including all the main Italian Municipalities (so-called Province Capitals), our empirical analysis can be considered a starting point to investigate the complex relationship between transparency, quality of institutions and performance in the public sector, which so far has not received great attention. The analysis develops as follows. Section 2 presents a survey of the literature. Section 3 offers a short overview of the main features of the Italian legislation on the performance and transparency of public administrations. Section 4illustratesthe empirical analysis. The characteristics of the sample and the methodology employed to build the new indicator of transparency are described; then some preliminary statistical evidence is offered about the relation between transparency, quality of

institutions and performance in the Italian municipalities. Section 5 provides some concluding remarks.

Related literature

Transparency and governance

The increasing demand for transparency as a fundamental claim in democratic societies is one of the policies undertaken to monitor the performance in the public activity, favour accountability and reduce corruption of public officials (Holzner and Holzner 2006).

Literature about transparency finds the theoretical underpinning in the agency theory and the legitimacy theory (for an extensive review, see Ferraz Esteves de Araújo and Tejedo-Romero2016). According to the agency theory, in the relation between public officials (the agents) and citizens (the principal) some problems arise when there is asymmetry of information and policy makers do not act in the interests of the citizens. Transparency in public activity is a means to improve policy effectiveness and make policy makers more accountable. According to the legitimacy theory acquired from the literature of the private organizations, the diffusion of information is a way to legitimate actions to their stakeholders.

There are many definitions of transparency but all of them consider the openness in the flow of economic, political, social information to the relevant stakeholders as the core of the phenomenon (Kaufmann and Kraay 2002; Meijer 2009; 2013). Public administrations are requested to engage in a more active disclosure of information (the so-called proactive transparency), while in the past they were passively providing it on request, and at their own discretion (the so-called reactive transparency) (see, among others, Piotrowski 2008; Meijer et al. 2012). There is a rich literature on the conceptual aspects of transparency, and the contributions on its measurement and consequently the empirical analyses are growing[1].

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[1] For a recent and extensive review on transparency see Cucciniello et al. (2016).

There are several ways to address the measurement issue: a "bottom up" approach, which develops measures of transparency based on the stakeholders' opinions through surveys. Along the lines of this approach there are few initiatives by international organizations such as the *OECD Open Government Data* project and the *World Economic Forum Global Competitiveness Report*, and partial/single country indicators provided by *Transparency International,* like for the Spanish Municipalities, as well as worldwide economic and politico-institutional transparency indexes based on several independent sources (Bellver and Kaufmann 2005).Other contributions have developed specific transparency indexes based on a participatory method, like Ferreira da Cruz et al. (2016) for the Portuguese municipalities and Bertelli and Piotrowski (2010) for the New Jersey municipalities.

A "top down" approach, instead, constructs legal/formal indicators moving from the existing transparency regulation. To our knowledge there are no relevant contributions in the literature which have tried to estimate a broad transparency indicator based on norms and regulations; however, some contributions have measured fiscal transparency indicators based on financial and non-financial information published on website of public administrations (for a survey, see Jorge et al. 2011).The "top down" approach is suitable to address the Italian case where there is a complex legislative framework, which disciplines transparency obligations and the monitoring of their fulfilment. Based on these different measures of transparency, a branch of literature tries to address the relation between different dimensions (economic and political) of transparency and accountability (see, among others, Blumkin and Gradstein2002; Meijer 2013); some contributions focus on the relation between transparency and corruption. Within this latter field of research, some contributions are worth mentioning. Islam (2004) empirically investigates the impact of the timely availability of information about economic data as well as of the regulation of the access to information on the quality of governance in 125 developing countries. Reinikka and Svenson (2004) illustrate a field experiment in Uganda where a newspaper campaign was aimed at reducing corruption in the management of a large education grants program by providing schools (parents) with information to monitor local

officials. Olken (2007) presents a field experiment in over 600 Indonesian villages road projects where an increase in government audits from 4 percent of projects to 100 percent reduced missing expenditures by 8 percentage points, while grassroots participation in monitoring had little average impact. Piotrowski and Van Ryzin (2007), using data from a U.S. national online survey of more than 1,800 respondents, built several indices to measure citizens' demand for transparency at the local level. They find that age, political ideology, confidence in government leaders, frequency of contacting government, and the perception that the access to government is insufficient, are positively correlated with the public demand for transparency, although the determinants differ for each dimension.

Kolstad and Wiig (2009) argues that transparency in resource revenues such as the Extractive Industries Transparency Initiative (EITI) has been insufficient and needs to be complemented by other policies. Lindstedt and Naurin (2010), using cross-sectional data, find that making political institutions more transparent turns out to be an effective measure to reduce corruption only if conditions for publicity and accountability as education, media circulation and free and fair elections are strong. Drawing from a field experiment on access to ration cards among New Delhi's slum residents, Peisakhinand Pinto (2010) demonstrate that India's recently adoption of a freedom of information law is almost as effective as bribery in helping the poor to secure access to basic public services.

Another branch of literature has empirically investigated the determinants of transparency in different countries. Alt et al. (2006), using a unique data set on transparent budget practises, which consists of survey responses to a questionnaire sent to the budget officials of the fifty states of the USA from 1972 to 2002, show that political competition and fiscal imbalances are associated with higher fiscal transparency, while political polarization is associated with lower transparency.

Navarro et al. (2014) find that factors such as financial risk, demography and awareness of stakeholders' demands have a significant impact on the sustainability-related transparency of

information (general, environmental, economic and social) of the local governments in Nordic countries. Esteller and Polo-Otero (2008) find that in the Catalan municipalities fiscal transparency is mostly determined by political competition, the number of inhabitants, and the accumulation ofdebt. Caamaño et al. (2011) examine budget transparency for 33 municipalities in Galicia and find that unemployment is negatively correlated with fiscal transparency while the institutional variables are not. Bastida et al. (2011) show that municipalities collecting more taxes and receiving more transfers disclose more financial information. Moving from the analysis of fiscal transparency's website content of the Portuguese and Italian local governments, Jorge et al. (2011) find that the size of the municipalities and the rate of abstentionism in the last local elections are the only significant determinants of transparency. Using a measure of municipal transparency in New Jersey, Bertelli and Piotrowski (2010) find that, among several economic, social and institutional determinants, only the level of education, the percentage of elderly people and the size of the budget are significantly correlated with transparency. Alcaraz-Quiles et al. (2015) provide evidence that socio-economic factors such as education, population density, access to internet as well as e-government factors such as the provision of public information online, the percentage of procedures completed after online start, the level of online services provided and broadband availability, are all relevant to the disclosure of information by the Spanish regional governments. Albalate (2013), drawing on the 2010 transparency indexes constructed by Transparency International for Spanish Municipalities, finds that large municipalities and left-wing local government leaders are associated with better transparency indexes. Ferraz Esteves de Araújo and Tejedo-Romero (2016) analyse the determinants of transparency in Spanish municipalities using the same Transparency International indexes and find that transparency level is associated with unemployment rate, investment, electoral turnout, political ideology, political competition and size of the population, while public debt and gender are not.

Decentralization and accountability

Transparency may play an important role especially at local level. A considerable bulk of literature emphasizes that at this level of government greater efficiency in the provision of public services is likely to occur, depending on the inter-jurisdictional competition which in turn enhances the control process by the citizens and guarantees greater accountability of the public officials (see a recent paper by Hong 2017). A close analysis of such a literature is outside the scope of this paper[2] and only the main conclusions will be briefly recalled here. It is widely claimed that, under given assumptions, the resource allocation is more efficient in a decentralized context, since local governments enjoy better information about citizens' preferences (and services costs). Moreover, at local level, citizens' political participation is likely to be greater as well as local government accountability. In a public choice perspective, it is claimed that fiscal decentralization tends to constrain the tendency of the public sector to expand (Brennan and Buchanan 1980; Ashworth et al. 2012), because of the competition across local governments. As Qian and Weingast (1997, 88) stress, "competition among jurisdictions forces governments to represent citizen interests and to preserve markets". Moreover, the experimentation of innovative policies to improve the efficiency at local level would be favoured by decentralization.

More recently, at decentralized level the crucial role of information and the related incentive structures are also enhanced[3] but a crucial issue is the trade-off between local accountability (sensitivity of outcomes to local preferences) and the central internalization of inter-jurisdictional interdependencies (Besley and Coate 2003).

However, alongside the above-mentioned benefits, the literature points out several shortcomings of decentralization such as those deriving by the existence of economies of scale, by spillovers effects and by a lower quality of local bureaucracy. Moreover, if citizens/taxpayers lack information the

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[2] For a survey, see Oates (2008).

[3] As Oates (2008) outlines, the literature on fiscal federalism has applied industrial organization models, using agency models to analyse accountability, proximity, and yardstick competition (see, on this aspect, Tommasi and Weinschelbaum, 2007).

claimed accountability would be lower and, therefore, the potential benefits of a decentralized approach might be reduced[4].

Finally, it is interesting to point out that local governments might be captured more easily by lobbies and specific interests and more open to corruption. According to Redoano (2010) the link between decentralization and lobbying is rather ambiguous. At the same time, the relationship between decentralization and corruption is not well defined: however, empirical evidence offered by Fisman and Gatti (2002) using cross-section data would suggest that decentralization is associated with lower levels of corruption; Fiorino et al. (2015), using time-series data, suggest that more decentralized fiscal and spending powers are related to lower levels of corruption.

The legislative framework on transparency: rules and actors

Rules of transparency

The issue of proactive transparency of public sector organizations has received attention in Italy since 2005, when the Code of digital administration[5] has been approved; few years after, in 2009, it has evolved toward the concept of 'total accessibility', as a major tool for the reform of public administration[6]. New rules and evaluation criteria as well as new standards for transparency have been established to improve the performance and accountability of central government and an independent specialized Commission (*Commissione per la valutazione, l'integrità e la trasparenza delle pubbliche amministrazioni*– CiVIT) has been instituted to oversee the implementation of such a reform. OECD (2013,31) stresses that the 2009 reform has promoted the advancement of the transparency agenda, so that "Italy is a leader among OECD countries regarding the disclosure of public information." In practice, however, the real impact of the reform on the performance of public

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[4] Among the others, see Boadway et al. (1999); Besfamille (2004); Reinikka and Svensson (2004).

[5] Legislative Decree n. 82/2005, "*Code of digital administration*"

[6] Legislative Decree n. 150/2009 containing provisions on "*optimization of the productivity of public employees and efficiency and transparency of public administrations*".

administrations as well as on the availability of good quality information has been quite limited (CiVIT, 2012).According to Cacciatore et al.(2016) this is the result of a policy design requiring public administrations to fulfill transparency very promptly, without having time for re-organizing their internal processes coherently with their new information tasks.

In any case, notwithstanding implementation problems, the 2009 reform can be considered the starting point of a continuously evolving legislation on transparency, which through time has increasingly adopted a prevailing focus on the promotion of integrity and prevention of corruption. A complete review of Italian regulation on these issues is outside the scope of this paper. Here, it is enough to recall that the pillar of this renewed effort is the Anticorruption Bill[7], which, among the other things[8], has put the basis for a legislative decree issued in 2013 on publication requirements, transparency and disclosure of information by the public administration. The rules introduced in 2013 enlarge the subjective scope of transparency – so that the obligations of publications apply to more than 10,000 subjects, i.e. all public offices at any level of government and public companies – as well as its objective scope – about 270 detailed obligations to be published in a standardised format (*Amministrazione trasparente*). Transparency obligations cover a very wide and diversified scope: information about the organization of the public administration with respect to politico-administrative bodies and top public managers and officials[9], information about the private-public companies providing local public services[10], external consulting and collaborations, public procurement, management of the property and assets, timing of the payments and provision of public services. The legislative decree also regulates the exercise of the right to access information, such as the civic access

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[7] Law no. 190/2012, containing "*Provisions for the prevention and repression of corruption and illegality in Public Administration*".

[8] For details on the provisions of the Anticorruption Bill and on its implementation, see ANAC (2013), ANAC (2014) and ANAC (2015).

[9] Information includes curriculum vitae, competences, salaries, fiscal declarations, statements about the inexistence of conflicts of interest.

[10] Information refer to the degree of public participation in the company, duration of the engagement, financial results of the last three years, statement about the inexistence of conflicts of interest.

to the information, and provides certain limits to transparency, including the protection of sensitive personal information.

Indeed, government attention for transparency has continued through time, with a further reform of transparency in 2016[11], which has also introduced the generalized dissemination of information upon request[12].

The actors of transparency

The implementation of the transparency rules introduced in 2013 relies on several actors. At decentralized level, each public organization is compelled to implement transparency obligations and to identify a Responsible for Transparency; the Independent Evaluation Unit (*Organismo Indipendente di Valutazione* - OIV)[13] assesses the fulfilment of transparency obligations within each public organization and certifies it on the public organization' s web site; public opinion searches for information with the principle of civic access allowing for the indirect monitoring of the degree of transparency of each public organization.

At central level, the National Anticorruption Authority (*Autorità Nazionale Anticorruzione* - ANAC)[14] performs regulatory and monitoring functions. On one hand, ANAC issues guidelines aimed at interpreting legislation, defining in details the transparency obligations for the public administrations and regulating its implementation[15]; on the other hand, the Authority undertakes monitoring activities on the fulfilment of transparency obligations both on single public organizations

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[11] Legislative decree n. 97/2016, containing "Revision and simplification of rules on the prevention of corruption, publicity and transparency". It is part of a wider reform for the reorganization of public administrations.

[12] The reform follows the Freedom of Information (FOI) approach.

[13] OIV is appointed in each administration by the political decision-maker. It has many tasks also implying the evaluation of performance.

[14] The National Anticorruption Authority is identified in the former Commission for Evaluation, Transparency and Integrity (CIVIT). Law 114/2014 has redesigned its mission: it has enlarged its powers to prevent corruption and to foster transparency while it is not uncharged anymore of monitoring the performance of public organizations. Moreover, ANAC also regulates and monitors public procurement.

[15] The legislative decree n. 97/2016 has entitled ANAC to diversify obligations across administrations depending on the type and the size.

(mainly in response to complaints on non-compliance) and on samples of public organizations (*ex officio*). It has also the power to issue sanctions for non-compliance with mandatory publication obligations[16].

As ANAC (2013) outlines in its "Report on the first year of implementation of Law n. 190/12", the sustainability and the effectiveness of the complex and burdensome regulation established in 2013 cannot be taken for granted. In fact, a complex and uniform regulation applies to public administrations and agencies, even if they differ in terms of size and type of activity, disregarding its high 'opportunity cost', especially for small size municipalities and public bodies. The budget stringencies faced by public administrations, makes the fulfilment of transparency obligations hardly sustainable.

Moreover, also the effectiveness of transparency as a means to promote public sector accountability and widespread forms of social control appears questionable. ANAC (2013) also notes that in the first year of implementation, such regulation has mainly enhanced the bureaucratic tendency to formal compliance, embedded in Italian public administration, rather than promoting a real effort toward improving accountability and performance. In short, bureaucrats, being risk averse, tend mainly to 'comply' rather than to actively produce valuable information. The poor quality of transparency seems somehow confirmed by the OECD 2014 "Survey on Open Government Data" (OECD, 2015); in fact, according to the OECD *Our*data Index[17], Italy still ranks low, below the OECD average and far from other European countries, such as France and United Kingdom.

Nor the other actors operating at decentralized level appear to have fully exploited the potentialities offered by the legislation on anti-corruption and transparency. In fact, as far as public opinion is concerned, it seems that the demand of transparency from the bottom is still limited, though increasing

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[16]The legislative decree n. 97/2016 enlarges ANAC's sanction powers, as stated by the legislative decree n. 33/2013 (art. 14 and 22).

[17]*Our*data Index measures the government efforts to implement the G8 Opendata Charter, based on the availability of Open, Useful and Reusable Government data.

through time, as demonstrated by the number of citizens' complaints to ANAC regarding lack or shortcomings in transparency (ANAC 2013; 2015; 2016)[18].

OIV is formally independent but its effectiveness in carrying out evaluation activities as well as transparency certifications may be endangered by its close relationship with the administration, which appoints OIV members, thus eventually weakening its independence[19].Currently the OIV competences have been enlarged by legislation on transparency and integrity and, as OECD (2013 p. 13) suggests, its role would "need to be carefully assessed and clearly delineated throughout implementation".

<div align="center">Monitoring transparency</div>

As it was pointed out before, since 2013 ANAC has undertaken monitoring activities *ex officio.* Being aware of the complexities related to the completion of the transparency requirements, it has adopted a stepwise approach. Monitoring activity has developed in different sessions, aimed at assessing the fulfilment of selected transparency obligations considered relevant to prevent corruption and foster accountability[20]; many resolutions have been issued, each focusing on different sets of obligations. Thus, through time, it is not possible to make a comparison across public administrations and within each of them to understand transparency trends.

ANAC has carried out monitoring mainly indirectly, using OIVs statements, as well as directly, verifying public organizations websites. The comparison between direct and indirect monitoring shows that in some cases OIVs' statements certifies a higher degree of fulfilment than the one

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[18] ANAC reports complaints towards 150 public administrations in 2013, 340 in 2014 and 542 in 2015.

[19] Such a system is under review with a tendency to reduce the strength of such a relationship. A reform is under way, establishing a national list of experts from which each administration has to choose the members of its OIV.

[20] For instance, monitoring refers to the publication of the 'Three-year Program for Prevention of Corruption (PTPC)', of the 'Three-year Program for Transparency and Integrity (PTTI)' and of the Code of Conduct, as well as to the publication of information about public utilities companies, external consulting and collaboration, provision of the public services, timing of the payments, timing of procedures, management of public properties, civic access. For more details, see Resolutions n. 71/2013, n.77/2013, n. 148/2014 and 43/2016 and the empirical analysis carried out in the following section.

assessed by ANAC through direct monitoring, especially as far as the quality, openness and updating of data are concerned (ANAC 2013).

Moreover, it is worth noting that monitoring refers only to small samples, especially if compared with the huge number of public administrations - more than 10,000 public organizations- compelled to fulfill transparency obligations[21]. For such a reason, the evaluation of the results of ANAC monitoring requires caution.

However, having in mind the above limitations it is worth noting that from ANAC monitoring (ANAC 2013; 2015; 2016) compliance appears rather jeopardized across different types of public organizations, with small municipalities exhibiting more difficulties of compliance than larger ones.

Compliance also appears to differ depending on the type of information. From ANAC monitoring it emerges that while the publication of data is overall rather widespread, the level of completeness of the published information differs across various types of information. It is high with respect to the information related to the specific activities of the administration, to procurement and to the allowance of economic benefits[22]; the level of completeness is rather low for information regarding political-administrative bodies, external consulting and collaborations, timing of payments, length of administrative procedures, management of public assets and public utilities companies. Overall, it seems that information, which is more related to management and performance, are less transparent than others. A closer analysis of the degree of fulfilment of transparency obligations is offered below.

A new transparency indicator

Sample and methodology

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[21] ANAC has monitored *ex officio*165 different types public organizations in 2013-14; 98 different types of public organizations in 2015 and 42 different types of public organizations in March 2016. For more details, see ANAC (2013, 2015 and 2016).

[22] By law, the allowance of economic benefits is null if data are not published on the website and the bureaucrat is financially liable.

We built a new measure of transparency using a sample including the main municipalities (Province Capitals) located in Italian Ordinary Statute Regions[23] in different areas of the country (40 in the North, 24 in the Center and 25 in the South). The sample is quite diversified: municipalities are differently populated, ranging from Rome (2,617,175 inhabitants) to Urbino (15,270)[24].About 42% of the municipalities have population between 90.000 to 45.000 inhabitants and are mostly located in the South. The largest municipalities (accounting for more than half of the population of the overall sample) are located in the North, with the exception of Rome, Naples and Bari. Table 1 summarizes the descriptive statistics of the sample distribution by geographical area.

Table 1. Sample distribution by geographical area

Macro Area	Municipalities in the sample by geographical area					
	Number	% Cumulate	Cohorts of Population (*inh. %*).			
			250.000 and above	*249.999-90.000*	*89.999-45.000*	*44.999-15.000*
North	**40**	*45%*	15%	45%	32,5%	7,5%
Centre	**24**	*27%*	8,3%	33,3%	41,7%	16,7%
South	**25**	*28%*	8%	28%	56%	8%
All sample	**89**	**100%**	**11%**	**37%**	**42%**	**10%**

Source: own elaborations on Istat (2013)

We follow a "top down" approach to construct an indicator of transparency moving from the existing regulation, which disciplines transparency obligations and the monitoring of their fulfilment. To this aim, we first build a completely new dataset containing information about several aspects of public administration activity, issued and validated according to ANAC resolution n.77/2013 - by the OIV). By law[25], all the institutions are requested to publish the OIVs certifications and the relative filled-in format on their websites under the section *Amministrazione Trasparente*.

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[23] Italy is politically and administratively divided in twenty Regions. Five enjoy a special statute (*Regioni a Statuto Speciale*, or RSS) because of their multilingual status, borderline position or secessionist movements (Friuli-Venezia-Giulia, Sicilia, Sardegna, Trentino Alto Adige consisting of the two Autonomous Provinces of Trento and Bolzano, Valle d'Aosta). Fifteen Regions (Piemonte, Lombardia, Veneto, Emilia-Romagna, Toscana, Liguria, Marche, Umbria, Abruzzo, Lazio, Molise, Basilicata, Campania, Puglia, Calabria) are characterized by an ordinary statute (*Regioni a Statuto Ordinario*, or RSO).

[24]The mean and median population of all the Italian Municipalities in 2013 were about 7,500 and 2,500 inhabitants, respectively. Therefore, a municipality with more than 15,000 people is considered a medium-large city.

[25] Leg. decree n. 33/2013 (*Code of transparency*).

We organize the selected information in two groups: one labelled *Integrity*, includes items such as income and asset disclosure and conflicts of interest (on both politicians and top and senior public officials); the other, labelled *Performance*, includes information about the management of public property, the timeliness of public services provision, the quality of public services (see Figure 1).

The value of each of the selected items is based on the OIV evaluation (according to the criteria established by ANAC) in terms of level of publication, degree of completeness and qualitative information. The scale goes from 0 to 3, with the exception of 'publication of data' which range from 0 to 2; for the purpose of our computation, we rescale the items from 0 to 3. Finally, we normalize the values and set the average for all indices equal to unity (following the methodology employed by Afonso et al. 2005; Afonso and Scaglioni 2006). The values for each item are recalculated relative to the average and are given equal weight, consistently with the ANAC methodology[26].
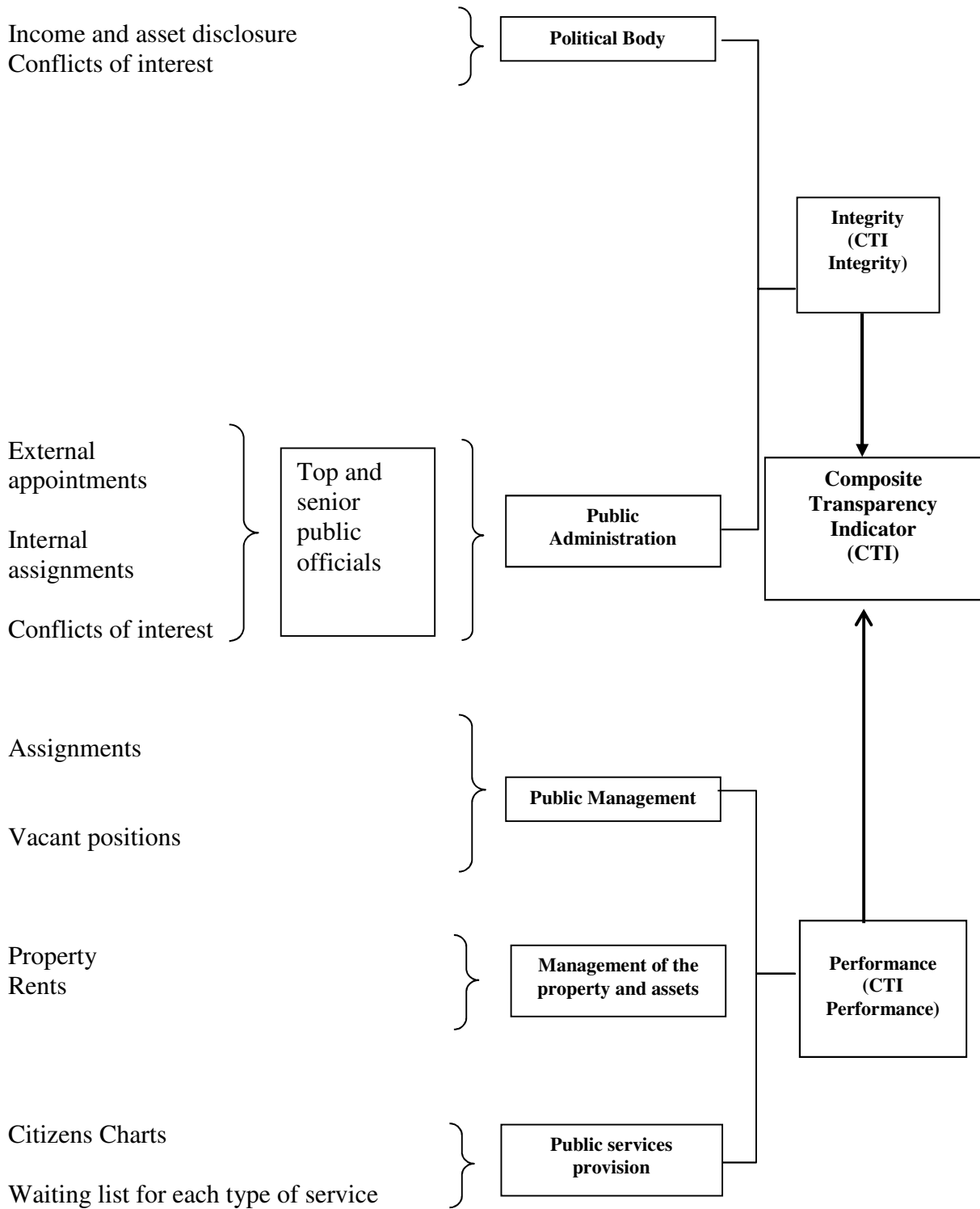
The outcome is a new composite indicator of transparency (CTI), which is constructed as a simple average of the two sub-indicators referring to *Integrity* (CTI *Integrity*) and *Performance* (CTI *Performanc*e). Those indicators are computed for all the municipalities in the sample and then aggregated on regional basis, to facilitate the analysis of the patterns.

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[26] Raw and normalized data are available upon request.

Figure 1 - Items included into the Composite Transparency Indicator (CTI).

Income and asset disclosure
Conflicts of interest

Political Body

Integrity (CTI Integrity)

External appointments

Internal assignments

Conflicts of interest

Top and senior public officials

Public Administration

Composite Transparency Indicator (CTI)

Assignments

Vacant positions

Public Management

Property
Rents

Management of the property and assets

Performance (CTI Performance)

Citizens Charts

Waiting list for each type of service

Public services provision

Transparency across the Italian Regions

As it emerges from Figure 2 the CTI exhibits marked differences across the 89 municipalities of our sample across Regions[27]. The latter perform a *Transparency Average Compliance* of 1,04 (on the scale 0 to 3).The degree of transparency varies from 0.05 (or -95% below the average achieved by the other Regions) for Molise to 3.23 (or +223% above the average) for Emilia Romagna. Marche (1.04; 4%) is the Region mostly aligned with the average. Lombardia and Piemonte are both below it, although with a different degree of fulfilment of the transparency obligations and respectively with 0.98 (-2%) and 0.78 (-22%). On the contrary, Liguria and Veneto are both significantly above the average with their 1.31 (+31%) and 1.22 (+22%). Lazio reaches the second position in the ranking with its 1.51 (+22%). Toscana and Umbria display 1.18 (+18%) and 1.10 (+10%), respectively. Puglia is the only Region among the Southern which exhibits a performance above the average (1.12; +12%). All the others occupy the latest positions with the following figures: Abruzzo 0.76 (-24%), Basilicata0.29 (-71%), Calabria 0.24(-76%) and Campania 0.20(-80%).

Overall, with respect to the macro-areas, Northern and Central Regions show positive values in accomplishing the transparency obligations (50% and 21%, respectively), although they are quite diversified going from 0.77 (-23%) for Piemonte to 2.23 (123%) for Emilia Romagna.Lowest values are shown instead by the Southern Regions, except for Puglia. Specifically, their average is about -56%, ranging from 0.76, performed by Abruzzo, to the aforementioned Molise (-95%).

Figure 2 – Composite Transparency Indicator by Regions (CTI, 2013)

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[27]Our sample includes only municipalities located in the Ordinary Statute Regions for two reasons: 1) Special Statute Regions may implement national transparency obligations with their own manners and procedures; 2) the quantity level of the service provision used as a measure of performance in our empirical analysis are available only for the municipalities located in the Ordinary Statute Regions (SOSE 2016).

CTI

0,05   3,22
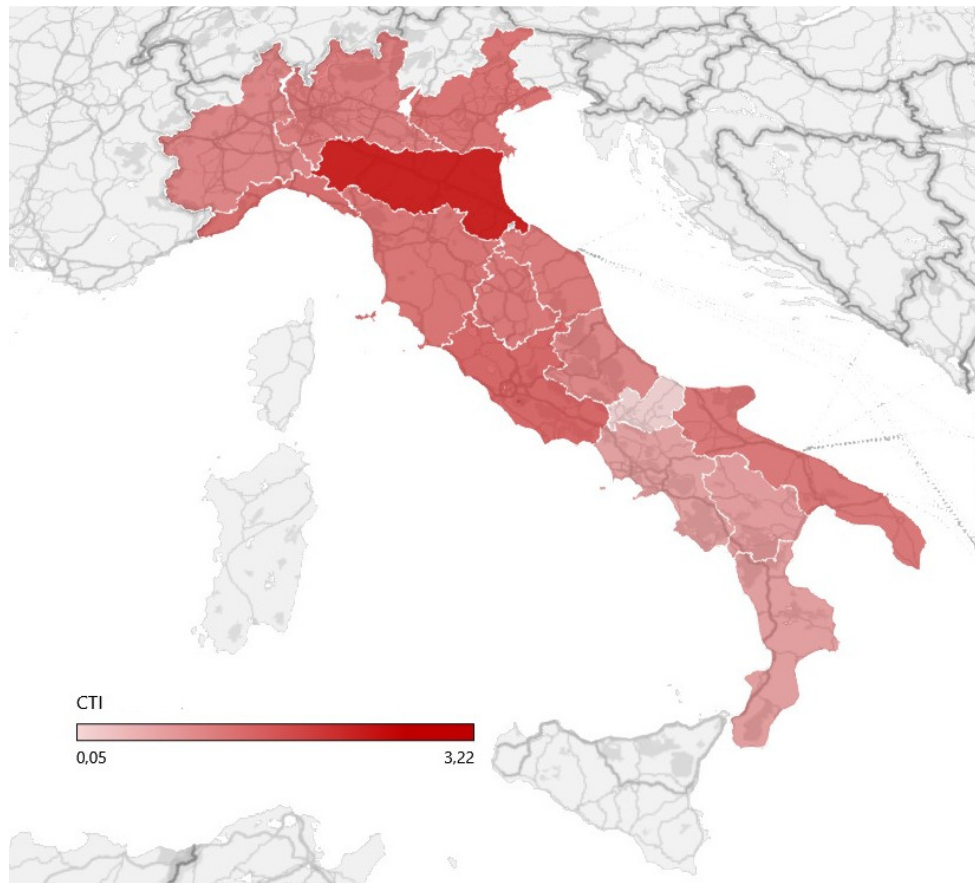
Source: our elaborations.

Regarding to the sub-indicator CTI *Integrity* (see Figure 3.a), on average, Northern-Regions display a positive value significantly above the average (+59%), while the Central and Southern ones show negative values (-11% and -56%).

Looking at the CTI *Performance* (Figure 3b), on average, the picture is slightly different. Northern and Central Regions perform significantly above the average (+41% and 52%, respectively), while Southern show a negative value on average (-69%).

In both cases, the best and the least performers are in line with the results of the CTI. Again, Emilia Romagna exhibits the highest value (+277% for CTI *Integrity* and +167% for CTI *Performance*), while Molise the lowest (-91% for CTI *Integrity* and -100% for CTI *Performance*). Overall, no systematic relation appears to occur between the level of CTI and each sub-indicator at regional level; however, all three indicators show a similar pattern in the least transparent municipalities.

Figure 3 – CTI *Integrity* and CTI *Performance* by Regions

| a.CTI *Integrity* | b.CTI *Performance* |
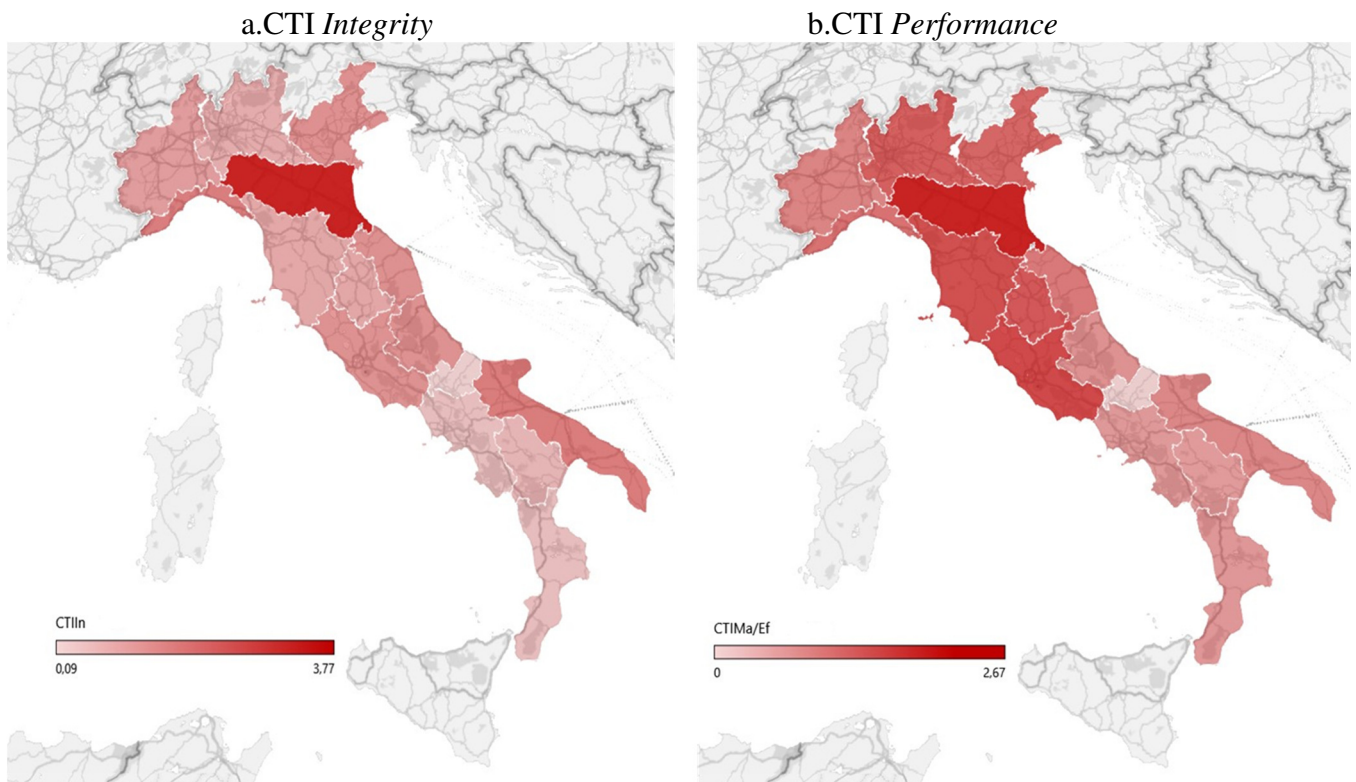
Source: our elaborations.

Then we look at the detailed items of the OIV transparency certifications to further investigate the differences among the sub-indicators. It emerges a wide heterogeneity across municipalities in the access to the information (in many cases information is published in pdf files) as well as in the fulfilment of the obligations, especially for the items about the engagements of both senior public officials and top managers and the quality of the information about the provision of public services. For example, when the so-called Citizens Charts (*Carte dei Servizi*) of the public services exist, they generally do not refer to all the services and do not contain any indicator to evaluate their provision. Overall, the degree of completeness is quite low in most of the municipalities and this is reflected in OIV's scores. On the contrary, all the municipalities publish the list of their properties and assets, although most of them are in pdf files and not self-explaining.

Aforementioned, overall on the ANAC scale (from 0 to 3), the *Transparency Average Compliance* of our sample is 1.04 and thetwo extremes values are represented by 1.74 and 0.08. Focusing on the CTIs by cohorts of population (see Table 2), we can conclude that municipalities size matters. Values above the average of both the CTI and the CTI *Performance* are concentrated in the central cluster (249,999-90,000 inhabitants), while the extremes always show lower values. However, the large municipalities are the most efficient in displaying the information about the provision of public services and the public property and assets. As far as *Integrity* is concerned, again only the relative larger municipalities show values above the average, while the others do not perform well. In this context, one might conclude that, while the smallest municipalities may lack resources and expertise to accomplish all the transparency obligations, the largest may have difficulties in publishing a complete set of information given their complex organization.

Table 2 - CTIs distribution by cohorts of population

Cohorts of Population (*inh.*).	CTI		CTIIn		CTIMa/Ef	
	Value	*% relative to the Average*	*Value*	*% relative to the Average*	*Value*	*% relative to the Average*
250.000 and above	0.89	-11%	0.91	-9%	0.87	-13%
249.999-90.000	1.37	37%	1.40	40%	1.34	34%
89.999-45.000	0.79	-21%	0.73	-27%	0.85	-15%
44.999-15.000	0.62	-38%	0.72	-28%	0.52	-48%

Source: own elaborations.

Transparency, quality of institutions and performance: some statistical evidence

Once we have measured the degree of transparency for the main Italian municipalities, we address the question whether the ones which are characterized by a higher level of transparency compliance are located in an area with higher level of quality of institutions and display a better performance in the provision of public services. To this end, we compare our transparency outcomes with two well-established indicators which measure, respectively, the quality of institutions (Nifo and Vecchione 2014) and the performance in the provision of public services (SOSE 2016).

The first, called *Institutional Quality Index (*IQI), is a synthetic indicator constructed on the hierarchy framework of the World Bank's WGI for the period 2004-2012 and based on 24 elementary indexes clustered into five dimensions: 1) *voice and accountability* (participation in public elections. number of associations and social cooperatives, degree of freedom of press); 2) *government effectiveness* (endowment of social and economic facilities, ability of local governments to manage the provision of public services); 3) *regulatory quality* (capacity of the administrations to encourage and protect business activity, expressed in terms of economic openness, number of public employees, business density, mortality and environment); 4) *rule of law* (crimes against property and reported, tax evasion, judges' productivity, trials length); 5) *control of corruption* (crimes against the public administration, number of administrations run by a commissioner appointed by the central government, the Golden-Picci Corruption Index). The index is normalized and ranges from 0 (lowest institutional quality) to 1 (highest institutional quality)[28].
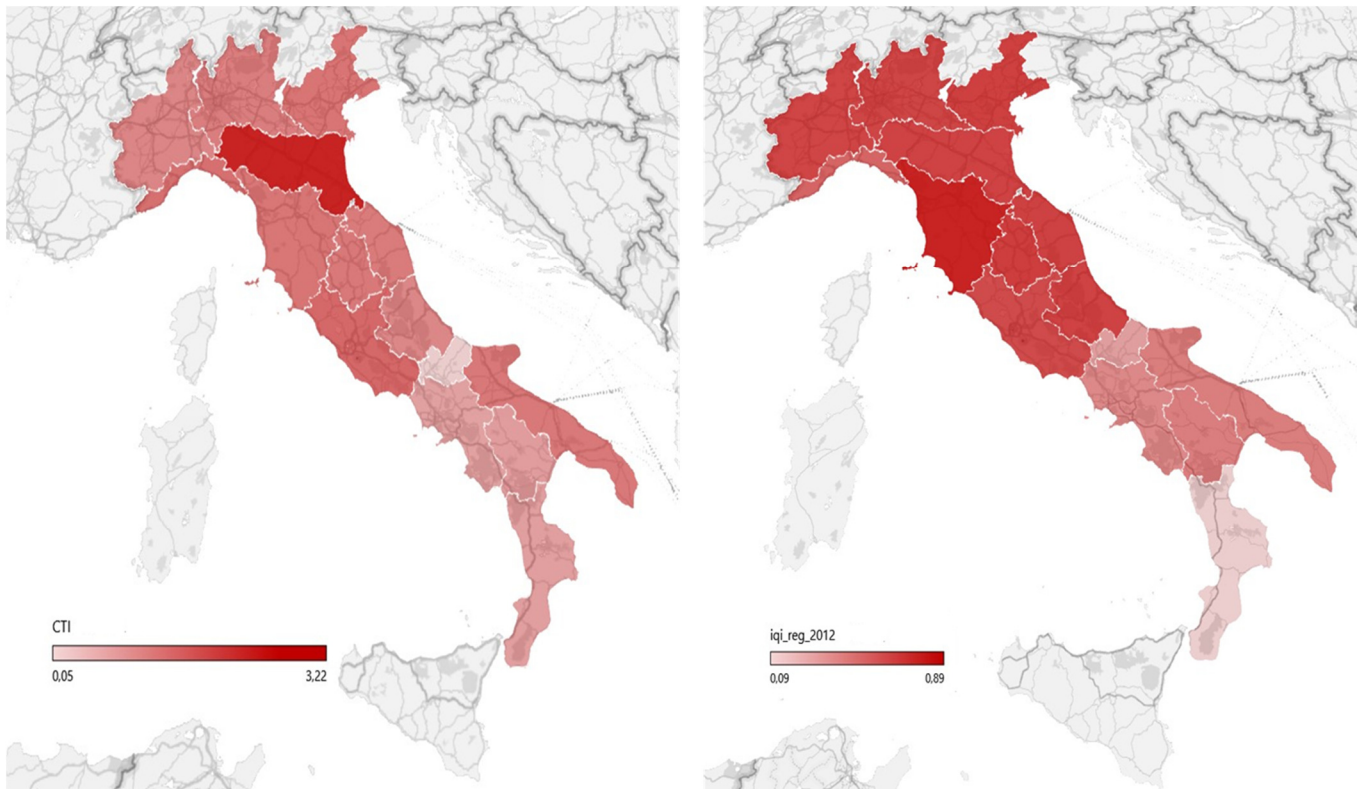
The performance of the local public administrations is measured using the official data on quantitative level of the service provision (QLS) provided by SOSE (2016) on the website OpenCivitas for the municipalities located in the Ordinary Statute Regions[29]. QLS is a synthetic measure of two dimensions. the expenditure gap (*i.e.* the difference between the actual and standard

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[28]For further details on the methodology, see Nifo and Vecchione (2014).

[29]SOSE (Soluzioni per il Sistema Economico S.p.A.) is a public company owned by the Ministry of Economy which provides a data set on the expenditure functions of the municipalities published on the site OpenCivitas for 2010 and 2013.

expenditures) calculated for each public service through the *Regression Cost Base Methodology*[30] and the output gap (*i.e.* the difference between the actual and standard level of services). In other words, the indicator QLS measures the capacity of the municipalities to satisfy the demand for local public services by citizens along a scale which goes from 0 (low performance) to 10 (high performance)[31].

Figure 4exhibits the two indicators CTI and IQI (the latter refers to the value of 2012), both calculated at the regional level. High levels of IQI are more concentrated in the Northern and Central regions, while CTI shows a more fragmented picture. In Southern Regions, lower levels of transparency compliance are associated to a lower level of institutional quality. Overall the two figures fit rather well though discrepancies appear for Piemonte, Umbria and Marche.

Figure 4 – CTI and IQI

a. CTI   b.IQI

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[30]For further details on the methodology, see Porcelli et al. (2016).

[31] Our dataset includes 81 main Municipalities because some Province capitals are not included in Nifo and Vecchione dataset.

Source: own elaborations.

Figure 5shows the pattern of the indicators CTI and QLS (the latter refers to 2013, the last year currently available). Overall the highest levels of QLS are concentrated in the Northern and Central Regions. All the Northern Regions show QLS values above the average (which is 5.43) with the exception of Liguria (4.96). Marche provides the highest quantitative level of public services (6.15).
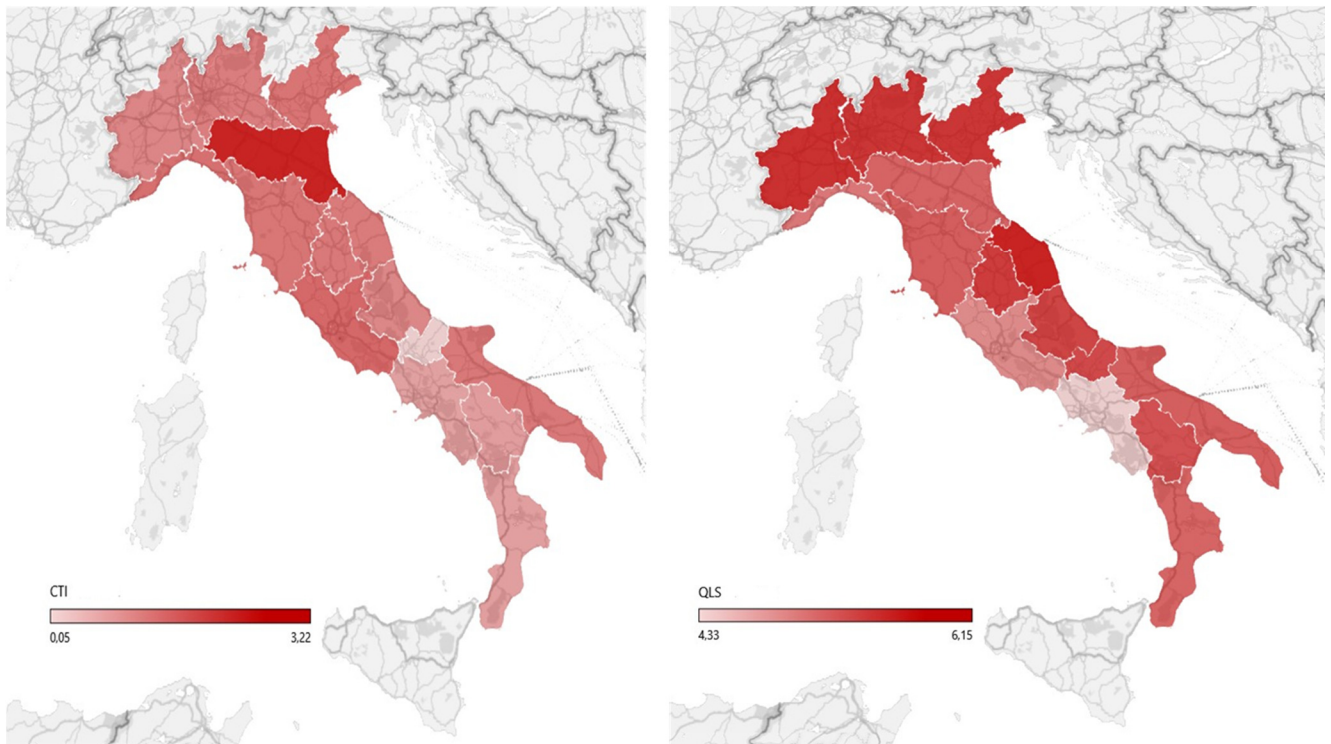
Most of the Southern Regions instead rank in the lowest positions in the sample as values of the QLS are below the average (5.43).

Figure 5 – Degree of transparency (CTI) and performance (QLS)

a. CTI   b. QLS

Source: own elaborations.

<div align="center">

Simple correlations

</div>

We provide a preliminary measure of the relation of transparency with quality of institutions and performance respectively, using simple correlations. Given that the CTIs are ordinal values, we use the Spearman's rank correlation coefficient[32]. For the sake of completeness, we also use the Pearson's product moment correlation coefficient[33]. In most cases, the values are very similar and lead to the same conclusions (see Table 3).

The Spearman's rank correlation coefficient between CTI and IQI is 0.87(the Pearson coefficient is slightly lower, 0.75); it is 0.84 between CTI and QLS (the Pearson coefficient is slightly lower,

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[32]Being a nonparametric (distribution-free) rank statistic, Spearman's coefficient is appropriate when either or both variables are skewed or ordinal (Valzand and Thompson 1994; Xu et al. 2010).

[33]Notice that Pearson's product moment correlation coefficient is generally affected by the extreme values, amplifying or reducing the strength of relationship.

0.78). This high level of correlation is rather encouraging as far as the reliability of our CTI is concerned, suggesting a positive and significant relation between CTI and both IQI and QLS.

Then, we correlate both IQI and QLS with CTI *Integrity* and CTI *Performance*, respectively. The quality of the institutions is highly correlated with both (0.87 and 0.79 with CTI *Integrity;* 0.82 and with CTI *Performance*). The performance in the provision of public services is highly correlated with CTI Integrity (0.84 and 0.74); surprisingly, less correlated with the CTI *Performance* (0.67 and 0.58). A likely explanation is that QLSs closely refer to well identified public services while CTI *Performance* includes items which are broadly related to management. Finally, we select three of the items of IQI (*voice and accountability*, *government effectiveness* and *control of corruption*) which are the dimensions mainly associated with the transparency issue.

The CTI confirms a high correlation with *voice and accountability* (0.86), *government effectiveness* (0.84) and *control of corruption* (0.88). Specifically, both CTI *Integrity* and CTI *Performance* are highly correlated with *government effectiveness* and *control of corruption* (0.88 and 0.84, respectively); slightly less with *voice and accountability* (0.81 for the CTI *Performance* and 0.89 for the CTI *Integrity*).

Based on these preliminary results we may conclude that our measure of transparency, in both its integrity and performance dimension, seems to be quite robust and reliable. Transparency turns out to be significantly and positively correlated with both the well-established indicators of the quality of institutions and the performance of the provision of public services, showing that there is a nexus among all these aspects of the public activity.

Table 3 -Level of correlation among transparency, quality of institutions and performance
(α= 0.05)

INDICATORS	STATISTICS	
	RhoSpearman's	*RPearson's*
TOTAL INDICATORS		
- CTI / IQI	*0.87*	*0.75*
- CTI / QLS	*0.86*	*0.78*
CTI and IQIs SUB-INDICATORS		
- CTI / Corruption	*0.88*	*0.73*
- CTI / Government Effectiveness	*0.84*	*0.70*
- CTI / Voice	*0.86*	*0.70*
CTIs SUB-INDICATORS and IQIs SUB-INDICATORS		
- CTIIn / Corruption	*0.87*	*0.78*
- CTIIn / Government Effectiveness	*0.88*	*0.82*
- CTIIn / Voice	*0.89*	*0.85*
- CTIMa/Ef / Corruption	*0.80*	*0.79*
- CTIMa/Ef / Government Effectiveness	*0.84*	*0.80*
- CTIMa/Ef / Voice	*0.81*	*0.77*

Source: own elaborations.

Conclusion

In this paper, we address a research question which is almost unexplored in the literature, *i.e.* whether there is a relation between transparency, quality of institutions and performance of public administrations, using Italy as a case study.

We make a first step in this direction suggesting a new methodological approach which produces a synthetic indicator of transparency (CTI) consisting of two sub-indicators, CTI *Integrity* and CTI *Performance*, which are able to describe the overall degree of transparency of public administration as well as the two different aspects of the public activity's transparency. It is worth noting that we

construct a new dataset collecting official data from the websites of the main municipalities (Province Capitals) located in all the Italian Ordinary Statute Regions.

Though at a preliminary stage, our analysis confirms that transparency matters. Our indicators show a satisfactory correlation with widely used measures of the quality of institutions as well as with the official data on municipalities performance provided by OpenCivitas.

On this ground we may conclude, on the one hand, that our indicators are reliable and robust in representing transparency as a dimension of a 'good administration'; on the other hand, that Italian main municipalities exhibit a quite diversified picture where the degree of transparency seems to be related to the quality of institutions in the region as well as to their public spending performance.

Some policy implications can be drawn to design cost-effective transparency rules. Fulfilling transparency obligation is costly and therefore it is important to evaluate its impact. In this perspective, the stability of rules and obligations and the consolidation of such tools would be very useful to foster the effectiveness of transparency and reduce the costs of its implementation. Stability would also allow to evaluate through time the impact of regulation on public administration behavior.

Finally, the correlation between transparency and the quality of institutional environment suggests that transparency might be challenged in low quality social and institutional environment; this could be considered a red flag, *e.g.* a kind of risk assessment indicator at territorial level, to orientate *ex-ante* measures to foster transparency and monitoring public administration activities.

References

Afonso, Antonio, Ludger Schuknecht and Vito Tanzi. 2005."Public sector efficiency: an international comparison."*Public choice* 123(3-4): 321-347.

Afonso, Antonio, and Carla Scaglioni. 2006."An Assessment of Telecommunications Regulation Performance in the European Union". *ISEG Economics Working Paper No. 07/2006/DE/UECE*. Available at SSRN: http://ssrn.com/abstract=849027 or http://dx.doi.org/10.2139/ssrn.849027.

Albalate, Daniel. 2012. "The institutional. economic and social determinants of local government transparency."*Working Paper 2012/10*. Research Institute of Applied Economics. University of Barcelona.

Alcaraz-Quile, Francisco J., Andrés Navarro-Galera, and David Ortiz-Rodríguez. 2015. "The Influence of Administrative Culture on Sustainability Transparency in European Local Governments."*Administration & Society* 1 –40.

Alt, James E., David D. Lassen, and Shanna Rose. 2006. "The causes of fiscal transparency: evidence from the US States". *IMF Staff Papers* 30.

ANAC – Autorità Nazionale Anticorruzione. 2013.*Rapportosul primo anno di attuazione della legge n. 190/2012.*Roma.

ANAC – Autorità Nazionale Anticorruzione. 2014. *Relazione annuale sull'attività svolta. Anno 2013.*Roma.

ANAC – Autorità Nazionale Anticorruzione. 2015. *Relazione Annuale 2014*. Roma.

ANAC – Autorità Nazionale Anticorruzione. 2016. *Relazione Annuale 2015*. Roma.

Ashworth, John.,Emma Galli, and Fabio Padovano. 2012."Decentralization as a constraint to Leviathan: a panel cointegration analysis."*Public Choice*11: 1-26.

Bastida, Francisco,Bernardino Benito, andMaría-Dolores Guillamón. 2011. "The determinants of local governments' financial transparency."*Local Government Studies* 37(4): 391-406.

Bellver, Ana, and Daniel Kaufmann. 2005. "Transparenting Transparency: Initial Empirics and Policy Applications." *World Bank Policy Research Working Paper*. The World Bank.

Bertelli, Anthony, and Suzanne J. Pietrowsky. 2010. "Measuring municipal transparency." Unpublished paper prepared and presented at 14th IRSPM conference Bern. Switzerland on 1rst April.

Besfamille, Martin. 2004."Local Public Works and Intergovernmental Transfers Under Asymmetric Information."*Journal of Public Economics*88(1-2):353-375.

Besley, Timothy, and Stephen Coate. 2003."Centralized versus Decentralized Provision ofLocal Public Goods: A Political Economy Approach."*Journal of Public Economics*87(12): 2611-2637.

Boadway, Robin, Isao Horiba, and Jha Raghbendra. 1999."The Provision of Public Services by Government Funded Decentralized Agencies."*Public Choice*100(3-4):157-184.

Blumkin, Tomer, and Mark Gradstein. 2002. "Transparency Gloves for Grabbing Hands? Politics and (Mis)Governance."*CEPR Discussion Papers* No 3668.

Brennan, Geoffrey,and James M. Buchanan. 1980.*The Power to Tax: Analytical Foundations of a Fiscal Constitution.* Cambridge. UK: Cambridge University Press.

Caamaño-Alegre, Jose, SantiagoLago-Peñas, Francisco Reyes-Santias, and Aurora Santiago-Boubeta. 2011. "Budget Transparency in Local Governments: An Empirical Analysis."*International Studies Program Working Paper* 11-02.Andrew Young School of Policy Studies.Georgia State University.

Cacciatore, Federica, Fabrizio Di Mascio, and Alessandro Natalini. 2016. "La politica della trasparenza in Italia: Meccanismi sociali e dinamiche del contesto." mimeo.

CiVIT-Commissione per la valutazione, l'integrità e la trasparenza delle pubbliche amministrazioni. 2012. *Relazione sulla performance delle amministrazioni centrali anno 2011*. Roma

Cucciniello, Maria, Gregory A. Porumbescu and Stephan Grimmelikhuijsen. 2016. "25 Years of Transparency Research: Evidence and Future Directions". *Public Administration Review* 77(1): 32–44.

Curtin, Deirdre, Albert Meijer, and Maarten Hillebrandt. 2012."Open Government: Connecting Vision and Voice." *International Review of Administrative Sciences* 78(1): 10-29.

Esteller, Alejandro, and José Polo-Otero. 2010. "Análisis de los determinantes de la transparencia fiscal: Evidencia empírica para los municipios catalanes."*Documentos de Trabajo FUNCAS*. 560/2010.

Ferraz Esteves de Araujo, Joaquim F., and Francisca Tejedo-Romero. 2016. "Political and Economics Determinant of Information Transparency in Spanish Local Governments". mimeo.

Ferreira da Cruz, Nuno, António F. Tavares,Rui Cunha Marques, Susana Jorge, and Luís de Sousa. 2016. "Measuring Local Government Transparency." *Public Management Review* 18(6): 866-893.

Fiorino, Nadia, Emma Galli, and Fabio Padovano. 2015."How long does it take for government decentralization to affect corruption."*Economics of Governance* 16: 273–305.

Fisman, Raymond, and Roberta Gatti. 2002."Decentralization and Corruption: Evidence across Countries."*Journal of Public Economics*83(3): 325-345.

Heald, David. 2006. "Varieties of Transparency". In *Transparency: The Key to Better Governance?*e dited by Christopher Hood and David Heald: 25-43. Oxford UK: Oxford University Press.

Holzner, Burkart, and Leslie Holzner. 2006. *Transparency in Global Change: the vanguard of the Open Society.* Pittsburgh PA: University of Pittsburgh Press.

Hong, Sounman, 2017. What Are the Areas of Competence for Central and Local Governments? Accountability Mechanisms in Multi-Level Governance. *Journal of Public Administration Research and Theory*, 27 (1): 120-134.

Islam, Roumeen. 2004. "Do more transparent governments govern better?"*Policy Research Working Paper 3077.*World Bank

Istat. 2013."Atlante statistico dei comuni". Last access February 2017.

Jorge, Susana M., Patricia Moura Sa, Anna Francesca Pattaro, and Pedro R. Lourenço. 2011. "Local government financial transparency in Portugal and Italy: A comparative exploratory study on its determinants." Paper presented at the 13th Biennial CIGAR conference held in Ghent (Belgium) on 9-10 June.

Kaufmann, Daniel, and Aart Kraay. 2002."Growth without Governance."*Policy Research WorkingPaper 2928*.World Bank.

Kolstad, Ivar, and Arne Wiig. 2009."Is Transparency the Key to Reducing Corruption in Resource-Rich Countries?"*World Development*37(3): 521-532.

Lindstedt, Catharina and Daniel Naurin. 2010. "Transparency is not Enough: Making transparency effective in Reducing corruption."*International Political Science Review* 31(3): 301-321.

Meijer, Albert. 2009."Understanding Modern Transparency. " International *Review of Administrative Sciences*75(2):255-269.

Meijer, Albert. 2013."Understanding the Complex Dynamics of Transparency."*Public Administration Review*73(3): 429-439.

NavarroGalera, Andrés, Araceli de los Rios Berjillos,Mercedes Ruiz Lozano, and Pilar Tirado Valencia. 2015."Identifying motivation of the local governments to improve the sustainability transparency."*Review of Administrative Sciences* 45: 149-167.

Nifo, Annamaria and Gaetano Vecchione. 2014. "Do Institutions Play a Role in Skilled Migration? The Case of Italy."*Regional Studies* 48(10): 1628-1649.

Oates, Wallace E. 2005. "Toward a Second-generation Theory of Fiscal Federalism." *International Tax and Public Finance* 12(4): 349 - 373.

Oates, Wallace E. 2008. "On the Evolution of Fiscal Federalism: Theory and Institutions."*National Tax Journal* LXI: 313-334.

OECD. 2013. *Reinforcing public sector integrity for sustainable economic growth of Italy*.Paris.

OECD. 2013. 2015. *Government at a glance*. Paris.

Olken, Benjamin A. 2007. "Monitoring Corruption: Evidence from a Field Experiment in Indonesia."*Journal of Political Economy* 115(2):200-249.

Porcelli, Francesco,Francesco Vidoli, and Roberto Dispotico. 2016." Public Sector Economics and the Need for Reforms. A Simple Four Quadrants Model to Monitor the Performance of Local Governments."In *Public Sector Economics and the Need for Reforms.* Edited by Apostolis Philippopoulos: 273-301. Cambridge MA: MIT Press.

Park, Heungsik, and John Blenkinsopp. 2011."The roles of transparency and trust in the relationship between corruption and citizen satisfaction."*International Review of Administrative Sciences* 77(2): 254-274.

Qian,Yingyi, and Barry R. Weingast. 1997."Federalism as a Commitment to Preserving Market Incentives."*Journal of Economic Perspectives*11(4):83-92.

Peisakhin, Leonid, and Paul Pinto. 2010."Is transparency an effective anti-corruption strategy? Evidence from a field experiment in India."*Regulation and Governance* 4: 261-280.

Piotrowski, Suzanne J. 2008. *Governmental Transparency in the Path of Administrative Reform*. Albany. NY State: University of New York Press.

Piotrowski, Suzanne J., and Gregg G. Van Ryzin. 2007. "Citizen Attitudes Toward Transparency in Local Government."*The American Review of Public Administration* 37(3): 306-323.

Redoano, Michela. 2010."Does Centralization Affect the Number and Size of Lobbies?"*Journal of Public Economic Theory*12(3):407 - 435.

Reinikka, Ritva, and Jakob Svensson. 2004."Local Capture: Evidence from a Central Government Transfer Program in Uganda."*The Quarterly Journal of Economics.* 119(2):678-704.

SOSE. 2016. *The Italian way towards Standard Expenditure Needs*. Accessed February 13th. http://www.opencivitas.it/progetto-fabbisogni-standard

Tommasi, Mariano, and Federico Weinschelbaum.2007. "Centralization vs. Decentralization: A Principal-agent Analysis." *Journal of Public Economic Theory*9(2): 369-389.

Valz, Paul D., and Mary E. Thompson. 1994. "Exact inference for Kendall's s and Spearman's ρ with extension to Fisher's exact test in r×c contingency tables."*Journal of Computational and Graphical Statistics* 3(4):459–472.

Xu, Weichao, Yunhe Hou,Y. S. Hung, and Yuexian Zou. 2010. "Comparison of Spearman's rho and Kendall's tau in normal and contaminated normal models." Manuscript submitted to IEEE Transactions on Information Theory. November 9th.Accessed February 13th. https://arxiv.org/pdf/1011.2009.pdf