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Is Transparency a Free Lunch? Evidence from the Italian Local Health Authorities

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Abstract

The healthcare sector is often considered one of the most prone to corruption and transparency policies have been proposed in several countries to fight bribery and corruption. Indeed, the transparency of public bodies potentially play a relevant role in preventing misbehaviours and favouring accountability. The paper contributes to the broader understanding of the transparency role in the healthcare sector using Italy as a case study. For this purpose we first build a composite indicator of transparency, already proposed in the literature in the field, to assess the differences in transparency and integrity between Italian Local Health Authorities (LHAs). Then we use multivariate regression to explore the relationship between the performance for different expenditure functions at LHAs level and transparency index. Our results show a wide difference in transparency and integrity among LHAs that does not always follow the classic north-south divide in the country. In addition, we find results consistent with the idea that transparency is generally associated with better performance of the LHAs in containment total health expenditure while imposing larger administrative burdens.

JEL Classification: C92, H30, H41.

Keywords: Transparency; Accountability; Italian NHS; Local Health Authorities; Administrative burdens.

1. Introduction

Worldwide, the health sector is one of the areas that is extremely susceptible to corruption [1; 2; 29]. Several factors contribute to make health a particularly sensitive ground, where opportunistic behaviors germinate often degenerating into corruption [3; 4]. The magnitude of the expenditure, the ubiquity of information asymmetries, the extent of the relationship with the private sector, the unpredictability and inelasticity of demand, the high specialization of the products purchased, the need for complex regulation systems are just some of these factors. Corruption fundamentally undermines good governance, weakens health systems, and violates human rights [5].

The means and intensity of corruption differ according to the overall level of integrity present in the various countries and to the state of development of countries' health care systems. The European Network against Fraud and Corruption in the Health Sector (EHFCN) estimates that in Europe around 6% of the health budget is absorbed by corruption [6]. The theme also deserves attention because corruption in the health sector has not only economic effects, but also on the health of populations reducing to services and undermines people's trust in the healthcare system [7, 8]. According to these aspects, affirmation of legality and integrity must be a priority commitment for the policymakers, especially in times when institutions are perceived as far away from citizens' everyday concerns. Unfortunately, all these malpractices are not easy to be detected, therefore the healthcare sector needs adequate levels of transparency, specifically to enhance accountability. Answerability, or the obligation of public officials to provide

information on actions taken and to justify these actions to oversight actors, is the essence of accountability [10]; thus, transparency, intended as public availability of usable information, is both one of the principal measures in the fight against corruption [11] and a key precondition for services improvement and productivity. Empirical analysis supports that more information leads to a reduction in corruption [12, pp. 316–322]. Nonetheless, these outcomes are not sufficient to conclude that transparency always means lower corruption [13;14].

Despite the effort of the ongoing research, to the best of our knowledge, the relationship between transparency and public health spending has been poorly understood. In this perspective, the Italian National Health System is a noteworthy case study. In fact, not only Italy exhibits one of the most interesting initiatives in detailing the transparency obligation for the public administrations among the OECD countries [15;17; 9] but, because of the high decentralization, great variation exists across regions both in the regulation and in the delivery of services [16; 48].

To this end, we aim at assessing, first, the level of transparency of Italian LHAs building a new composite indicator of transparency (CTI) and its two sub-indicators, (CTI_*Integrity*) and (CTI_*Performance*), following the methodology proposed by [17]. These indicators have the advantage to quantitatively describe the degree of transparency of public administrations as well as the two different aspects of the public activity's transparency [15; 9]. Then, we investigate whether transparency matters on the performance for different expenditure functions at LHAs level. As valuable as the impact of transparency could be, it is worth noting that it might not be a “free lunch”.

For this purpose, we built on results obtained by [18] to estimate the determinants of the cost incurred by LHAs in four different expenditure functions (i.e. total expenditure, administrative expenditure, the cost for purchasing goods, and the cost for buying non-healthcare-related services). Starting from their data, we take into consideration the determinants of expenditure to verify whether and to what extent transparency affects health expenditure.

Our analysis confirms that transparency matters. However, fulfilling transparency obligation is costly in term of administrative burdens and thus it is important to evaluate its effect on public administration performance. In this respect, the stability of rules and obligations and their consolidation and accountability not only would promote the effectiveness of transparency and reduce the costs of its design and implementation but have also an impact on public spending.

The remain of the paper develops as follows. Section 2 reports the background whereas the Section 3 present our case study. The characteristics of the sample and our empirical strategy are reported in Section 4 whereas our empirical results are provided in Section 5. Finally, Section 6 offers some concluding remarks.

2. Background

A large body of literature analyze efficiency and productivity in the healthcare sector but international empirical evidence on the role played by corruption in the healthcare sector is less investigated [29;19]. Only recently, some evidence comes from some in-depth studies on the characteristics, causes, remedies and effects of

illicit in various healthcare dimensions, which show how the opacity of budgets and control systems and administrative confusion facilitate the emergence of interests illicit and collusion in the healthcare system. Independent research institutes, such as the Afrobarometer and the Eurobarometer, track regional data on informal payments through public surveys conducted over time [5]. In a systematic review of 38 studies on methodology and burden of informal patient payments, [20] found that 2–80% of respondents had made informal payments. Furthermore, in countries with greater corruption, citizens report being less satisfied with the quality of health services [21]. A study conducted in Honduras [47] found that 8.3% of general practitioners on the payroll were ghost workers, persons fraudulently added to the payroll who does not actually work. Another study conducted in 2004 found absenteeism in Bangladesh was 42% among physicians and 35% among other staff [22]; in Rwanda, a 2015 study found one-third of health workers in primary care facilities were absent [23] and a World Bank Service Delivery Indicator Survey using data from Africa in 2012–2016 show absenteeism rates in health sector ranging from 14.3% in Tanzania to 33.1% in Niger. In Italy, [19] demonstrate that, the performance of the public work contracts for healthcare infrastructures is significantly affected by ‘environmental’ corruption.

Furthermore, a key issue between corruption and transparency in healthcare sector is represented by governance. In this perspective, [24] focus on the relationship between the grade of centralization (or decentralization) in public procurement of Italian Local Health Authorities (LHAs) and the auction prices of selected drugs for hospital usage during the period 2009-2012. The analysis let emerge that centralized and mixed procurers are statistically associated with lower prices with

respect to decentralized ones and more importantly that higher corruption and lower institutional quality strengthen the effects of centralization in terms of lower prices. In this latter regard, an interesting analysis was conducted by [25] on the Italian case. The study highlights how the application of reference prices in the health sector led to a reduction by over 114,000,000 euros in the overall expenditure, mainly due to a renegotiation of contracts.

Moreover, within the debate on corruption and health, the quality of drugs also plays a central role (for the so-called substandard and falsified, SF, medical products). This is partly due to regulatory failures connected to corruption causing unnecessary morbidity, increasing mortality, and favoring antimicrobial resistance [27].

Undoubtedly, what has been said so far raises a problem of accountability in the health sector. Even if transparency and accountability are often defined as distinct concepts, they are closely related, and understanding how transparency can increase accountability is crucial for identifying the types of information that should be made publicly available [26]. Transparency and accountability can reduce vulnerability to corruption and unethical practices and improve public trust in government institutions [28].

At a global scale, transparency has been promoted by WHO mainly through two international projects aimed at fighting corruption: the Medicines Transparency Alliance (MeTA - <http://www.medicinestransparency.org>), a multistakeholder initiative implemented in seven countries between 2008 and 2015, and the *Good*

Governance in Medicines (GGM) programme [30; 31], which included a transparency assessment tool for the pharmaceutical sector [31].

Finally, [33] has highlighted the links between transparency, accountability and corruption showing that in the absence of any signal of the public official's behavior (e.g., a performance measure, a verification outcome, announcements, service users' complaints) the public official is in effect not at all accountable for the use of public resources. Therefore, the greater the transparency, the more space for government officials to be held accountable for their actions [34].

3. A snapshot of the case study: transparency and the Italian NHS

3.1 Transparency of public body in Italy

To assess the role played by the degree of transparency on the performance achieved by the LHAs, we consider the case of the Italian National Health System.

The reasons are twofold: firstly, Italy among the OECD countries presents one of the most remarkable legislation regarding the administrative transparency obligations [17; 15; 9] and, secondly, Italy is one of the main European countries where corruption raises concern for its impact on economic activities [35; 36].

In 2015, the Italian National Agency for Regional Health Services (AGE.NA.S) presented its first report on the actions adopted by the National Health System (NHS) in order to promote transparency and integrity [31]. More recently, AGE.NA.S has launched the new website called "Portal of the Transparency of

Health Services” (“*Portale della trasparenza dei servizi per la salute*”) aimed at providing easily accessible health information to citizens in order to facilitate the user's knowledge of the healthcare offer, increase communication's level of transparency and promote the efficiency and quality of the Regional Health Systems (<https://www.portaletrasparenzaservizisanitari.it/>).

More in general, the issue of transparency of public administrations has received attention in Italy since 2009 when the concept of ‘total accessibility’ as a major tool to improve efficiency and transparency of public administrations was introduced with emphasis on central government.

A crucial step in this effort to enhance public sector accountability has been the Anti-Corruption Bill, which, among the other things, has put the basis for the new transparency regulation, the so-called “Code of Transparency - Leg. decree n. 33/2013”, issued in 2013. The latter has considerably improved the scope and the substance of transparency regulation, broadening the number of obligations (about 270). All public offices at any level of government and publicly owned companies (over 10,000 organizations) were required to introduce a standardized format for their publication on the website (*Amministrazione trasparente*). The application of the transparency rules involves the interface of various actors. First, in each public body, a “Responsible for Transparency” is in charge of executing the transparency obligations. An independent assessment unit (Independent Evaluation Unit - OIV) is instead designated by the political decision-maker to evaluate the fulfilment of the transparency obligations and subsequently certify it on the bodies' websites. On a central level, the National Anti-Corruption Authority (*Autorita Nazionale*

Anticorruzione – ANAC) carries out regulatory and monitoring activities, sanctioning in case of non-compliance. In practice, monitoring is usually conducted only on very small samples, especially when compared to the number of public organizations liable to transparency regulations [17; 15; 9].

3.2 The Italian institutional framework

The National Health System (*Servizio Sanitario Nazionale*, SSN) in Italy shows some interesting institutional characteristics. Since 1978, Italy relies on an SSN, which grants universal access to a uniform level of care all over the country. Over time, Italy has undergone a set of reforms inspired by the principles of regionalization, competition, and managerialism. As a result, responsibilities for the financing and delivery of healthcare are now in charge of regional governments, which administer, finance, and organize healthcare according to the populations' needs, though within the national regulatory framework. This organization passes through different structures. At first, we have Local Health Authorities, LHAs (*Aziende Sanitarie Locali*), a network of geographic and population-defined bodies, which are independent public entities with their own budgets and management. They provide services for the patients and directly run small public hospitals. Secondly, we have major public hospitals, which are granted the status of trusts with full managerial autonomy (*Aziende Ospedaliere*), and thirdly, we have accredited private providers [16; 42; 48].

As mentioned above, our analysis is part of that stream of literature that considers the degree of transparency that local governance of the health sector can achieve,

focusing on the LHAs' activities and departing from the copious stream of literature on the transparency of costs, prices, quality, and effectiveness of medical services and products [37].

Moreover, the Italian NHS for its large decentralization to regional level represent and interesting case study for the literature analyzing the effect of health care decentralization on several health outcomes [e.g., 35; 39; 40; 41; 43; 48] along with the one focusing on the relationship between decentralization and health policies' efficiency and effectiveness [42; 16; 48]. This literature supports the idea that fiscal decentralization makes local governments more accountable and efficient. Thus, Italian LHAs seem particularly well-suited to our aims in the broader understanding of the transparency role in the healthcare sector.

4. Data and empirical strategy

In this Section we describe the sample and our empirical strategy to first construct the transparency indices and then to assess the relationship between the transparency indices and performance in the expenditure functions.

Our dataset includes 143 LHAs, covering the entire Italian territory, and it is quite diversified, ranging from Milan (3,442,042 inhabitants) to Aosta (126,899). LHAs are mostly concentrated in the North (representing 52% of the overall sample). Medium-sized LHA - below 500,000 and above 200,000 inhabitants - count for more than the 40% of the population and are located in the North (19%) and in the South (18%). Specifically, 74 out of the 143 LHAs are in the Northern regions (Piemonte, Valle d'Aosta, Liguria, Lombardia, Veneto, Friuli-Venezia Giulia,

Trentino-Alto Adige, Emilia-Romagna), 27 in the Central regions (Lazio, Marche, Toscana, Umbria) and 42 in the Southern ones (Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardegna, Sicilia). Table 1 summarizes the descriptive statistics of the sample distribution by geographical area and population size.

[Table 1 around here]

To investigate whether transparency matters on the computed performance index for different expenditure functions (i.e. total expenditure, administrative expenditure, the cost for purchasing goods, and the cost for buying non-healthcare-related services) we first consider three possible levels of transparency and then we perform several tests often used in related literature (i.e., the Mann-Whitney and Kolmogorov-Smirnov tests and Kernel density estimates).

To calculate our transparency index, we retrieved information from the special section present on the LHAs websites, called “Transparent Administration”, (see Section 3.1).

Then, we carry out an empirical assessment of the role of transparency in the performance of the Italian LHAs using the data on cost provided by the Italian Ministry of Health (New Health Information System - NSIS). In doing so, our paper is related to the literature on the performance of local health department and their determinants [e.g. 44; 45; 46; 18; 49; 50].

In particular, [46] identify the determinants of local health department expenditures, emphasizing how local health department spending varies significantly across the jurisdictions even in case of similar size. The authors stress the need for effective strategies to analyze the efficiency of public health spending. A potential cost savings may be derived from the consolidation of local health authorities. This hypothesis is further investigated by [44] for local health department in the USA. They show how better off municipalities are less likely to consolidate health departments. The consolidation process is impeded by population and income differences among municipalities. A similar approach, with a different outcome, to the determinants of Italian Local Health Authorities expenditure and consolidation was recently proposed by [18]. The authors estimate the potential advantages from consolidation with specific reference to the Italian setting. Their main result is the presence of economies of scale with regard to a particular subset of the production costs of LHAs, i.e. administrative costs together with the purchasing costs of goods (such as drugs and medical devices) as well as non-healthcare-related services.

Thus, following the approach proposed by [18], we explore if transparency, as measure we our index, matter on different expenditure functions at LHAs level.

Accordingly, the general specification of the determinants of different expenditure functions is expressed as follows:

$$\ln C_i = \alpha + \beta_1 \ln POP_i + \beta_2 \ln POP_i^2 + \beta_3 CTI_i^h + \sum_{j=1,k} \delta_j X_j + \varepsilon_i \quad [1]$$

where C_i is the dependent variable and represents the per capita expenditure in different functions incurred by the i -th LHA. POP refers to the population in the i -

th LHA for exploring whether LHA size (in terms of inhabitants) would affect the healthcare per capita expenditure for the examined cost type. To control for potential scale effects in the costs we include in [1] the POP square. CTI captures the degree of transparency, performed by each LHA. For the sake of completeness, we also consider the two different dimensions of the CTI, referring to *Integrity* (CTI $_{In}$) and *Performance* (CTI $_{MaEf}$). X is a set of K explanatory variables, including dummy explanatory variables that catch LHAs' fixed characteristics, reported in Table A1. ε_i reflects the error term.

The employed data, which include numerous information about expenditure and main characteristics of Italian LHAs, and source are reported in Table A_1 in the Appendix A.

5. Empirical results

In this Section, we present our empirical results. The focus will be on two main aspects previous mentioned: the degree of transparency across the Italian LHAs (Section 5.1) and the costs of being transparent for the Italian LHAs (Section 5.2).

5.1. The degree of transparency across the Italian Local Health Authorities

Transparency refers to several attributes that make a specific administration more transparent. Practitioners and academics agree on considering *Integrity* and *Performance/Efficiency* as key features to assess the degree of transparency reached by a public organization. In this perspective, [17] propose to measure them through

two distinct indicators – respectively the CTI *Integrity* (CTI*In*) and the CTI *Performance* (CTI*MaEf*). To this end, they operationalize the two dimensions selecting some of the obligations contained within the Italian “Code of Transparency - Leg. decree n. 33/2013” (see Section 3.1 and the Appendix B).

This “top-down approach” provides a limited set of meaningful and robust indicators that, in our opinion, are suitable also to appraise and measure the degree of transparency of the authorities running the governance of local healthcare systems and to drive policy choices. This belief is supported also by the fact that the Italian Legislator has extended the same obligation to the LHAs.

Therefore, we straightway follow the same methodology as in [17; 15; 9], first building a dataset containing information about several aspects of LHAs’ activity and then derive the three indicators - i.e. the CTI, the CTI*In* and the CTI*MaEf*. A brief overview of the methodology applied to calculate the CTI and its two pillars is provided in the Appendix B.

The degree of transparency of Italian Local Health Authorities using the composite indicators CTI, CTI*In* and CTI*MaEf* are reported in Figures 1 and 2. More specifically, Figure 1 reports the geographical distribution of CTI Integrity and CTI Performance index whereas Figure 2 reports the geographical distribution CTI.

[Figure 1 around here]

[Figure 2 around here]

It depicts partially the usual geographical dichotomy between North and South, with Tuscany and Emilia Romagna aligned with the former macro area, while Lazio, Umbria and Marche with the latter. Basilicata represents an exception, but Potenza is not, as among the ten most transparent LHAs there are Oristano, Brindisi and Caltanissetta. *CTI* and *CTIMaEf* are almost aligned. Basilicata and FVG reach the highest level, while in terms of Integrity the best performer, besides Basilicata, is Liguria. Marche and Molise are located in the lowest positions in the ranking. Nonetheless, we can notice that our results are in line with those presented by AGE.NA.S, despite the different approaches followed in measuring LHAs' transparency (for more details see Appendix B).

5.2. *The costs of being transparent for the Italian Local Health Authorities*

Differently from [18] we estimate the equation [1] for the four different expenditure functions (i.e. total expenditure, administrative expenditure, the cost for purchasing goods, and the cost for buying non-healthcare-related services), including the degree of transparency among the determinants of the cost incurred by LHAs and also those LHAs located in Special Statute regions (SSR). To control for the difference with Ordinary Statute regions we incorporate in each estimate a dummy variable (*d_SSR*). Furthermore, to take into account that in the year 2013 the four LHAs in Umbria are merged in two LHAs we aggregate the data for those LHAs obtaining two virtual LHAs. Finally, we estimated the equation [1] using a slightly different approach of those proposed by [18] that is based on stepwise backward elimination technique (at 5% level of significance). We believe that this approach

although based on statistical significance potentially exclude variables that in principle could be important to explain the expenditure variability at LHA level. Thus, as a first exploratory assessment, we perform a stepwise backward elimination technique with a lower level of significance (i.e. 10% level of significance) and include in each estimate the control for SSR.

Tables 2, 3, 4 and 5 report the estimates obtained for our four expenditure functions using OLS with robust standard errors and stepwise backward elimination at 10% level of significance.

[Table 2 around here]

[Table 3 around here]

[Table 4 around here]

[Table 5 around here]

Our results show that for what concerns the total expenditure (per capita) CTIs indicators present the expected negative sign which means that more transparency implies fewer total costs for the administration. *CTI* and *CTIMaEf* are both significant but *CTIIn* is not. Moreover, we find no significant difference between ORD and SSR

For the Administrative expenditure (per capita) we see ambiguity for the expectation of the sign of transparency on the administrative costs considering that both directions are quite reasonable, meaning that more transparency implies more administrative and bureaucracy costs for the administration. We find a positive and, for the sub-sample of LHAs in ORD, significant impact. In fact, we find a significant difference between ORD and SSR.

The cost of purchasing goods (per capita) is with the expected sign but not significant even if there is a significant difference between ORD and SSR.

For the last cost function, we find that the cost of buying non-healthcare-related services (per capita) have the expected negative sign but not significant. Instead, there is a significant difference between ORD and SSR.

However, for the sake of our analysis, we must take in consideration the wide heterogeneity in displaying the data among the different LHAs, some problems related to the incompleteness of information and, last but not least, the high grade of LHA managers' discretionally. As valuable as the impact of transparency could be, it is worth to note that it might not be a "free lunch".

6. Concluding remarks

This paper aimed at assessing whether and to what extent transparency affects health performance and expenditure.

To do so, we first build a measure of transparency for the Italian Local Health Authorities. Moreover, we put in relation transparency with four cost functions

(total expenditure, administrative expenditure, the cost for purchasing goods, and the cost for buying non-healthcare-related services) for the Italian LHA in 2012 looking at the role played by transparency.

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TABLES AND FIGURES

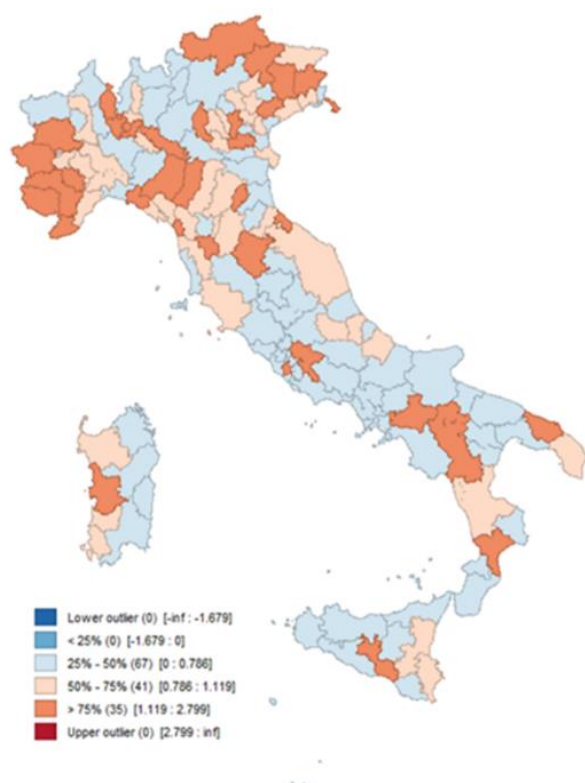
Table 1. Sample distribution of LHAs by geographical area and population size

Macro area	LHAs in the sample by geographical area and population					
	by geographical area		by population size			
	Obs.	% Cumulate	1.000.000 and above	999.999-500.000	499.999-200.000	Below 200.000
North	74	52%	6%	16%	19%	7%
Centre	27	19%	5%	5%	5%	1%
South	42	29%	7%	7%	18%	3%
All sample	143	100%	18,2%	28,3%	42,4%	11,1%

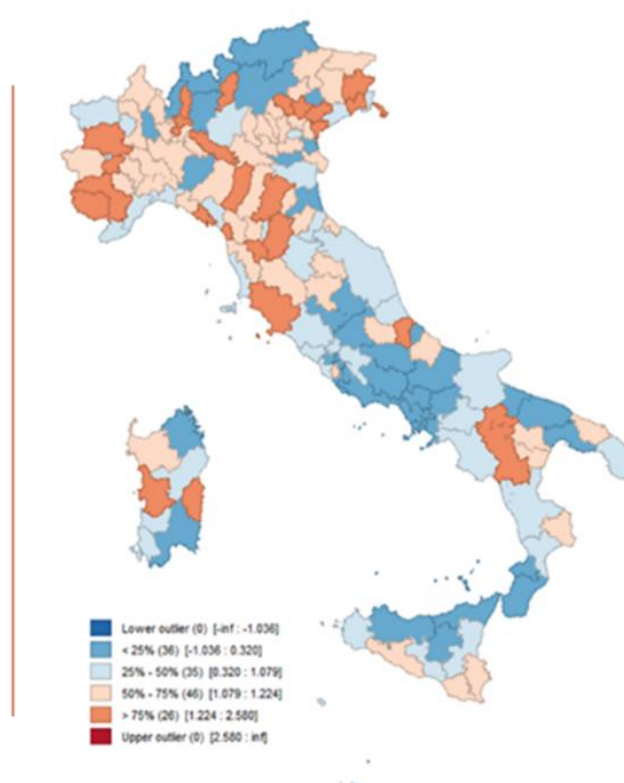
Source: own elaborations on data provided by Italian Ministry of Health and Italian Statistical Office - ISTAT (2013).

Figure 1. Geographical distribution of *CTI_Integrity* and *CTI_Performance* index

1.a CTI_{Int}

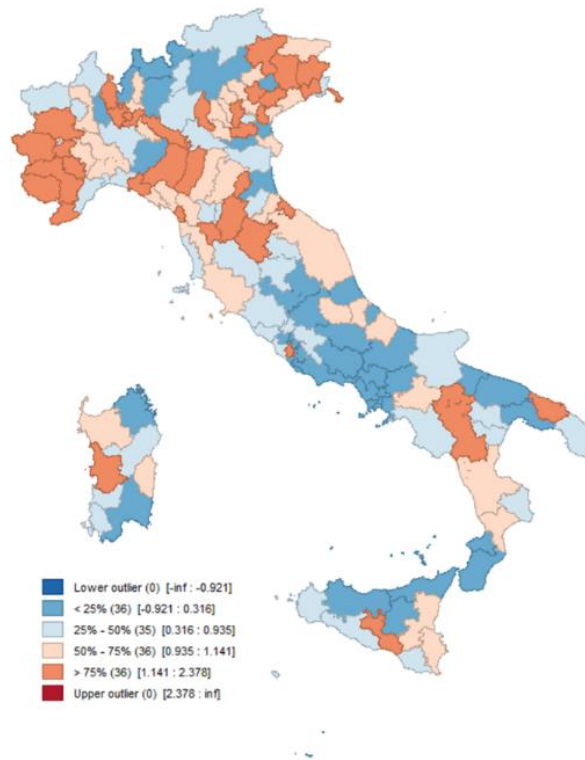


1.b CTI_{MaEf}



Source: own elaborations on ANAC resolution (see Appendix B) and Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013.

Figure 2 – Geographical distribution of *CTI* index



Source: own elaborations on ANAC resolution (see Appendix B) and Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013.

Table 2 – Impact of transparency on total expenditure (per capita)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	TOTAL_COSTS (log)	TOTAL_COSTS (log)	TOTAL_COSTS (log)	TOTAL_COSTS (log)	TOTAL_COSTS (log)	TOTAL_COSTS (log)
POP (log)	-0.0375 (0.1386)	0.1251 (0.1496)	-0.0375 (0.1408)	0.1829 (0.1618)	-0.0419 (0.1370)	0.1326 (0.1453)
POP ² (log)	0.0011 (0.0054)	-0.0049 (0.0058)	0.0011 (0.0054)	-0.0072 (0.0062)	0.0012 (0.0053)	-0.0053 (0.0056)
CTI	-0.0124* (0.0072)	-0.0172* (0.0089)	--	--	--	--
CTI _{ln}	--	--	-0.0093 (0.0061)	-0.0088 (0.0062)	--	--
CTI _{MaEf}	--	--	--	--	-0.0132* (0.0072)	-0.0185** (0.0089)
Other controls	yes	yes	yes	yes	yes	yes
Constant	-0.4358 (0.8870)	-1.7557* (1.0163)	-0.4216 (0.9000)	-1.8652* (1.0887)	-0.4242 (0.8764)	-1.8414* (0.9949)
Sample	All regions	Only ordinary regions	All regions	Only ordinary regions	All regions	Only ordinary regions
Observations	143	117	143	117	143	117
R-squared	0.9447	0.9442	0.9439	0.9405	0.9451	0.9451

Source: own elaborations on ANAC resolution (see Appendix B), Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013 and on data provided by [18]

Notes: The table shows estimates of the impact of transparency as measured respectively by CTI, CTI_{ln} and CTI_{MaEf} indices on Total expenditures (log). All estimates employ the other covariates obtained through an Ordinary Least Square with robust standard errors and stepwise backward elimination as suggested by [18]. Full estimates are available from the authors on request. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3 – Impact of transparency on the administrative expenditure (per capita)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	ADM_COSTS (log)	ADM_COSTS (log)	ADM_COSTS (log)	ADM_COSTS (log)	ADM_COSTS (log)	ADM_COSTS (log)
POP (log)	-0.9460 (0.6804)	-2.4175*** (0.7741)	-0.9712 (0.6824)	-2.4629*** (0.7661)	-0.9192 (0.6721)	-2.4323*** (0.7728)
POP ² (log)	0.0283 (0.0270)	0.0854*** (0.0304)	0.0293 (0.0271)	0.0866*** (0.0300)	0.0272 (0.0267)	0.0861*** (0.0304)
CTI	0.0162 (0.0357)	0.0631** (0.0306)	--	--	--	--
CTI _{ln}	--	--	0.0254 (0.0326)	0.0427 (0.0283)	--	--
CTI _{MaEf}	--	--	--	--	0.0032 (0.0348)	0.0669** (0.0309)
Other controls	yes	yes	yes	yes	yes	yes
Constant	6.5629 (4.5866)	22.4312*** (4.9493)	6.6814 (4.5989)	23.5491*** (4.8590)	6.4452 (4.5330)	22.4469*** (4.9194)
Sample	All regions	Only ordinary regions	All regions	Only ordinary regions	All regions	Only ordinary regions
Obs.	143	117	143	117	143	117
R-squared	0.7992	0.8375	0.7998	0.8322	0.7988	0.8388

Source: own elaborations on ANAC resolution (see Appendix B), Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013 and on data provided by [18]

Notes: The table shows estimates of the impact of transparency as measured respectively by CTI, CTI_{ln} and CTI_{MaEf} indices on administrative expenditures (log). All estimates employ the other covariates obtained through an Ordinary Least Square with robust standard errors and stepwise backward elimination as suggested by [18]. Full estimates are available from the authors on request. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 – Impact of transparency on the expenditure of purchasing goods (per capita)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	COST_GOOD (log)	COST_GOOD (log)	COST_GOOD (log)	COST_GOOD (log)	COST_GOOD (log)	COST_GOOD (log)
POP (log)	1.1551 (0.8366)	-0.2999 (1.1204)	1.1453 (0.8481)	-0.3503 (1.1089)	1.1401 (0.8300)	-0.2618 (1.1329)
POP ² (log)	-0.0480 (0.0330)	0.0070 (0.0436)	-0.0473 (0.0334)	0.0091 (0.0431)	-0.0476 (0.0327)	0.0054 (0.0441)
CTI	-0.0624 (0.0501)	-0.0511 (0.0545)	--	--	--	--
CTI _{ln}	--	--	-0.0463 (0.0443)	-0.0360 (0.0476)	--	--
CTI _{MaEf}	--	--	--	--	-0.0674 (0.0489)	-0.0579 (0.0547)
Other controls	yes	yes	yes	yes	yes	yes
Constant	-12.8470** (5.5255)	-1.7039 (7.7330)	-12.7390** (5.5979)	-1.2680 (7.5817)	-12.8422** (5.4743)	-2.1014 (7.8852)
Sample	All regions	Only ordinary regions	All regions	Only ordinary regions	All regions	Only ordinary regions
Obs.	143	117	143	117	143	117
R-squared	0.8311	0.8526	0.8302	0.8520	0.8317	0.8531

Source: own elaborations on ANAC resolution (see Appendix B), Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013 and on data provided by [18]

Notes: The table shows estimates of the impact of transparency as measured respectively by CTI, CTI_{ln} and CTI_{MaEf} indices on expenditures of purchasing goods (log). All estimates employ the other covariates obtained through an Ordinary Least Square with robust standard errors and stepwise backward elimination as suggested by [18]. Full estimates are available from the authors on request. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5 – Impact of transparency on the expenditure for buying non-healthcare-related services (per capita)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	COST_NOT_HEALTH (log)	COST_NOT_HEALTH (log)	COST_NOT_HEALTH (log)	COST_NOT_HEALTH (log)	COST_NOT_HEALTH (log)	COST_NOT_HEALTH (log)
POP (log)	0.9366 (1.0010)	-0.0663 (1.5109)	0.9768 (0.9847)	-0.0689 (1.4768)	0.8867 (1.0127)	-0.1082 (1.5524)
POP ² (log)	-0.0394 (0.0385)	-0.0023 (0.0580)	-0.0409 (0.0379)	-0.0021 (0.0567)	-0.0373 (0.0390)	-0.0007 (0.0596)
CTI	-0.0346 (0.0429)	-0.0600 (0.0449)	--	--	--	--
CTI _{ln}	--	--	-0.0461 (0.0389)	-0.0638 (0.0407)	--	--
CTIMaEf	--	--	--	--	-0.0674 (0.0489)	-0.0579 (0.0547)
Other controls	yes	yes	yes	yes	yes	yes
Constant	-15.9543*** (5.8541)	-12.8354 (8.8649)	-16.1108*** (5.7813)	-12.6733 (8.6914)	-15.7242*** (5.9252)	-12.6505 (9.1659)
Sample	All regions	Only ordinary regions	All regions	Only ordinary regions	All regions	Only ordinary regions
Obs.	143	117	143	117	143	117
R-squared	0.8997	0.9178	0.9001	0.9181	0.8994	0.9173

Source: own elaborations on ANAC resolution (see Appendix B), Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013 and on data provided by [18]

Notes: The table shows estimates of the impact of transparency as measured respectively by CTI, CTI_{ln} and CTIMaEf indices on expenditures of purchasing non health care services (log). All estimates employ the other covariates obtained through an Ordinary Least Square with robust standard errors and stepwise backward elimination as suggested by [18]. Full estimates are available from the authors on request. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

APPENDIX A

Table A_1 - Descriptive statistics of the employed variables

Variable	Meaning	Obs	Mean	Std. Dev.	Min	Max
CTI	Composite Indicator built upon selected transparency obligations validated by the OIV of each administration. according to ANAC resolution n.77/2013	143	0.755	0.476	0.000	1.482
CTI _{In}	Composite Indicator built upon selected transparency obligations validated by the OIV of each administration. according to ANAC resolution n.77/2013	143	0.684	0.504	0.000	1.745
CTI _{MaEf}	Composite Indicator built upon selected transparency obligations validated by the OIV of each administration. according to ANAC resolution n.77/2013	143	0.827	0.504	0.000	1.277
TOTAL_COSTS	Total production costs (euro per capita)	143	1,659.277	224.898	1,089.718	2,192.018
ADM_COST	Costs for administrative services and personnel (euro per capita)	143	43.151	16.867	13.190	129.340
COST_GOODS	Cost of buying health and non-health goods (euro per capita)	143	182.359	94.425	24.496	683.755
COST_NOT_HEALTH	Cost of buying non-health services (euro per capita)	143	93.098	47.179	5.873	211.322
POP	Resident population in the LHA on 1 January 2012	143	415,344.100	295,115.700	57,349.020	1,540,688.000
DENSITY	Demographic density (pop/surface area)	143	516.410	1,180.619	30.606	7679.612
DEPENDENCY	Dependency ratio of the population (pop over 65 and pop under 14 upon pop between 15–64)	143	0.541	0.041	0.449	0.651
DOCTORS	Number of General Practitioners (for 1000 residents)	143	0.769	0.078	0.557	1.048
PAEDIATRICIANS	Number of pediatricians (for 1000 residents)	143	0.124	0.021	0.081	0.171
PURCH_HEALTH_SERVICE	Reimbursements for health services (as percentage of Total production costs)	143	0.170	0.073	0.046	0.370
LUMP_SUM_FUND	Per-capita lump-sum funding received from Regional Governments	143	1,620.009	192.482	1,085.767	2,151.178
D_SEP	Dummy for LHA in regions with a separated organizational model	142	0.106	0.308	0.000	1.000
D_SEMI_SEP	Dummy for LHA in regions with a semi-separated organizational model	143	0.238	0.427	0.000	1.000
D_INT	Dummy for LHA in regions with an integrated organizational model	143	0.259	0.439	0.000	1.000
D_SEMI_INT	Dummy for LHA in regions with a semi-integrated organizational model	143	0.399	0.491	0.000	1.000
D_CENTRAL_H	Dummy for LHA in regions with Centralized Purchasing System only for Health services	143	0.280	0.450	0.000	1.000
ADDICTION_SERVICE	Number of Addiction Treatment Services (for 1000 residents)	143	1.177	0.661	0.285	4.101
EMERGENCY_SERVICE	Emergency medical service (hours/pop)	143	0.366	0.271	0.000	1.435
PURCH_ADM_SERVICE	Cost of buying administrative services (as percentage of Total production costs)	143	0.002	0.003	0.000	0.024
D_RECOVERY	Dummy for LHA in regions under the Recovery Plan	143	0.399	0.491	0.000	1.000
FOREIGNERS	Percentage share of foreign residents	143	0.068	0.034	0.009	0.139
MUNICIPALITIES	Number of municipalities in the LHA (2012)	143	0.172	0.139	0.001	0.594
INCOME	Tax base of personal income tax (IRPEF), 2011 (euro per capita)	143	12,105.490	3,007.114	6,166.729	21,393.290
D_CENTRAL	Dummy for LHA in regions with Centralized Purchasing System	143	0.490	0.502	0.000	1.000
HOSPITAL_BEDS	Number of beds programmed in hospitals/pop	143	0.086	0.278	0.000	1.000
D_RESERVATION	Unified reservation center—Type 2 (dummy)	143	0.280	0.450	0.000	1.000
D_MATERNAL	Maternal and child department (dummy)	143	0.811	0.393	0.000	1.000
D_TRANSPORT	Transport service to dialysis center (dummy)	143	0.629	0.485	0.000	1.000
D_REANIMATION	Mobile Resuscitation Units (dummy)	143	0.273	0.447	0.000	1.000
D_AMBULANCES	Ambulances for emergency transport of newborn babies (dummy)	143	0.077	0.267	0.000	1.000
FACILITIES	Doctor's offices and laboratories (accredited private hospitals) 100,000/pop	143	15.178	8.877	3.357	53.812
HOME_CARE	Integrated home care assistance 1000/pop	143	11.765	8.459	1.436	48.655

Source: own elaborations on ANAC resolution (see Appendix B for additional information), Section ‘Transparent Administration’ of the LHAs’ websites in the year 2013 and on data provided by [18]

APPENDIX B

In this Appendix we provide more detail on the way the transparency indices employed in the paper are structured and supply additional descriptive statistics. For the purpose of our analysis, following [17] we select information about several aspects of public administration activity, issued and validated according to ANAC resolution n.77/2013 by the Independent Evaluation Unit (OIV).

This set of items are first grouped into two pillars labelled *CTI Integrity (CTIIn)* and *CTI Performance (CTIMaEf)*. The former includes items such as income and asset disclosure and conflicts of interest (on both politicians and top and senior public officials); the latter comprises information about the management of public property, the timeliness of public service provision, the quality of public services. The second step consists of constructing a single synthetic measure, the so-called *Composite Transparency Indicator (CTI)*, by aggregating the syntheses obtained for the two dimensions. Data for each item are retrieved from LHAs websites and represents a completely new dataset. The value of each item is based on the evaluation provided by the OIV along the criteria established by the National Anti-corruption Authority (ANAC), i.e. “publication of information”, “completeness”, “updating” and “openness”. The scale goes from 0 to 3. Table B_1 reports the obligations selected for each dimension, while Table B_2 displays the three different measures of transparency at the regional level.

Table B_1. Transparency obligations (ANAC resolution n.77/2013)

Macrofamilies	Name of the individual obligation	Content of the obligation	CTI ^{Un}	CTI ^{MaEf}
General provisions	Disciplinary code and code of conduct	Disciplinary code and code of conduct	—	—
Organization*	Political-administrative bodies	Competences; appointment; curricula; compensation of any nature*; travel reimbursement; other offices or assignments; asset disclosure*; income disclosure*; expenses for the electoral campaign; changes in income and in financial and real estate assets*; changes in income and in financial and real estate assets occurred after the publication on the websites*	✓	
Consultants and collaborators*	Consultants and collaborators	Details on collaboration or consultancy assignments with indication of the beneficiary, the reason for the assignment and the amount paid*. For each assignee: curriculum vitae*; remuneration and performance indices*; paid positions in other public entities*; absence of situations, even potential, of conflict of interest*	✓	
Activities and procedures	Procedural time monitoring	Results of the monitoring activity	—	—
Grants, contributions, subsidies, economic benefits	Criteria and methods	Acts which determine the criteria and procedures that administrations must follow	—	—
	Concession documents	Detailed information about grants, contributions, subsidies and financial aids (above one thousand euros) to public and private entities: beneficiary; amount; regulation; procedure supervisor; criteria of selection; project and beneficiary's curriculum	—	—
Real estate and asset management*	Real estate	Census of all the properties*		✓
	Rentals	Rentals paid and received*		✓
Services provided*	Service Charters and quality standards	Service Charters and quality standards*		✓
	Waiting lists	Expected and actual waiting times for each type of service*		✓
Territory planning and governance	Territory planning and governance	All types of territorial plans and their variants. For each Act: drafts before the approval; resolutions for adoption or approval and technical attachments	—	—
		Full documentation related to each procedure for the presentation and approval of urban or private initiative or urban transformation proposals	—	—
Other content - Corruption	Prevention of Corruption Supervisor	Prevention of Corruption Supervisor	—	—
	Transparency Supervisor	Transparency Supervisor	—	—

Source: own elaborations on ANAC resolution.

Notes: Adapted from [9] and translated from ANAC resolution. 77 / 2013 – Annex 1. The original Annex 1 is available in Italian at https://www.anticorruzione.it/portal/public/classic/AttivitaAutorita/AttiDellAutorita/_Atto?id=0a64b73a0a778042039baa3213e920a8 . Selected items used for CTI (Galli et al., 2017) are indicated by an asterisk (*). ✓ indicates for which pillar the obligations were selected for.

Table B_2. Values of the CTI, CTI n and CTI $MaEf$ at regional level

Regions	CTI	CTI n	CTI $MaEf$
ABRUZZO	0.60	0.49	0.70
BASILICATA	1.16	1.08	1.24
CALABRIA	0.52	0.51	0.53
CAMPANIA	0.21	0.26	0.17
EMILIA ROMAGNA	0.90	0.83	0.97
FRIULI-VENEZIA GIULIA	1.02	0.88	1.16
LAZIO	0.35	0.29	0.41
LIGURIA	1.07	1.07	1.07
LOMBARDY	0.85	0.74	0.95
MARCHE	1.03	1.12	0.94
MOLISE	0.00	0.00	0.00
PIEDMONT	0.95	0.86	1.05
APULIA	0.40	0.37	0.42
SARDINIA	0.71	0.66	0.77
SICILY	0.64	0.58	0.71
TRENTINO-ALTO ADIGE/SÜDTIROL	0.37	0.61	0.12
TUSCANY	1.01	0.89	1.14
UMBRIA	0.33	0.12	0.54
AOSTA VALLEY	0.72	0.47	0.97
VENETO	0.92	0.83	1.01

Source: own elaborations on ANAC resolution - Annex 1 and Section ‘Transparent Administration’ of the LHAs’ websites. For the sake of simplicity, we present the data aggregated at regional level. Data for LHAs are available upon request.