

# Behind public sector efficiency: the role of culture and institutions\*

Raffaella Giordano  
Bank of Italy

Pietro Tommasino  
Bank of Italy

Marco Casiraghi  
Boston University

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## Abstract

Despite the common institutional framework, public sector efficiency varies significantly over the Italian territory. In this paper we compute objective measures of efficiency in the provision of several public services for the 103 Italian provinces. We then study the determinants of efficiency. In particular, we investigate the importance of a widespread civic culture and of decentralized service provision. While the former has a strong positive effect on efficiency, the latter appears to be efficiency-enhancing only in areas where efficiency is already at satisfactory levels.

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# 1 Introduction

The capability of a country's public sector to provide high-quality goods and services in a cost-effective way is crucial to foster long-term growth. It's up to politicians and bureaucrats to set rules and practices which increase efficiency and reduce slack, delivering the highest possible value for money to taxpayers.

However, the literature on political economy and public choice stresses that one cannot take for granted that public decision-makers will always use public resources in the most appropriate way. The relationship between citizens and politicians is to some extent similar to a principal-agent relationship, which creates risks of opportunistic behaviour and moral hazard.<sup>1</sup>

As we cannot have untarnished faith on the honesty and competence of public decision-makers, there is the need of well-designed formal rules for the political and administrative system: electoral rules, term limits, checks and balances, etc.

However, citizens' willingness to invest time and effort monitoring public affairs is also necessary, if policy-makers are to be held accountable for what they do, and deterred from wasting public resources. This in turn requires a shared set of values which go beyond narrow self-interest and, in particular, a widespread concern for public affairs. Indeed, there is a well-known free-riding problem inherent in the political sphere: the impact of a single individual on outcomes is negligible, while mobilizing in elections and in other political activities, distracting time and resources from the care of one's private affairs can be quite costly.

The first and foremost goal of this paper is to empirically assess the importance of citizens' values for public sector efficiency (PSE).

To this aim, we first propose and compute measures of efficiency for several public services (namely child care, education, health care, and civil justice), for the 103 Italian provinces. Concentrating on within-country differences, we can control for differences in formal institutions, and limit omitted variable bias. We document that, despite 150 years have elapsed since the political and administrative unification of the country, huge differences in PSE still remain across Italy's regions and provinces.

Then, we relate our measures of PSE to the prevailing attitudes toward politics. The task of eliciting people's values and preferences is notoriously problematic. While polls are a precious instrument, there is the risk of misreporting. On the other side, observable behaviour (e.g. voting, participating to protests or rallies), is often an imperfect proxy for the underlying preferences. In our empirical analysis, we rely on well-established indicators of cultural attitudes (including survey answers).

Apart from the aforementioned measurement problems, there is the problem that preferences concerning political engagement can be legitimately seen as endogenous. This is a common concern with any attempt to use preferences to explain political or economic outcomes (Guiso et al. 2006). We would ideally like to capture the effects of the truly exogenous component of values and preferences, which is really part of the society's cultural heritage.

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<sup>1</sup>The literature on the agency relationship between citizens and politicians is thoroughly surveyed and expanded by Besley (2006). Of course, focusing on this relationship we do not mean to downplay the other conflicts that shape political life, in particular that between groups of citizens with conflicting goals and values. However, in a context in which efficiency is the main dependent variable, the latter problem seems less pressing: even if people disagree about the size and the composition of public sector activities, they should all agree on the fact that public resources should not be wasted.

For example, Guiso et al. (2006) refer to culture as to "those customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generations to generations". While Italy is still quite homogenous ethnically and religiously, Italian regions are deeply different with respect to their century-long political history, and there is a vast literature arguing that its ancient vicissitudes still partly shape the political life of contemporary Italy (among which there is the seminal contribution of Robert Putnam, 1993).

So our empirical strategy is to address endogeneity of political preferences (as well as measurement error) instrumenting them with three sets of instruments: measures of political and social participation in early XX century in Italy (from Nuzzo, 2006), features of formal political institutions in place in the XIV century (from de Blasio and Nuzzo, 2006) and in the XVII century-XIX century period (from Tabellini, 2005).

Due to the institutional characteristics of the Italian public sector, our data-set can also shed some light on a second determinant of PSE besides political culture, namely the degree of centralization in public sector provision. We are interested to test the idea, which is present in the literature on fiscal federalism, that accountability is maximized when the decision-maker authority is set at lower levels of government. Decentralized government might be efficiency-enhancing for several reasons (Treisman, 2002, Oates, 2005, Rodden, 2006). One reason (originally advanced by Buchanan and Brennan, 1980) is that competition among jurisdictions limits the possibility of Leviathan-style local governments to extract resources from the polity. Local politicians have also more incentives to behave, given that their objective function is likely to be more sensitive to citizens' satisfaction in a given district (Seabright, 1996). Another reason is that in a decentralized framework citizens can assess more easily how resources are used: as Thomas Jefferson himself once said, "distance, by rendering detection impossible to their constituents, will invite the public agents to corruption, plunder and waste" (quoted by Treisman, 2002). Finally, decentralization might also improve government performance indirectly, by increasing political participation (Inman and Rubinfeld, 1997).

As the four public services which we study are delivered by different levels of government (Central Government provides education and administrates justice, Regions provide health care, Municipalities provide child day care), we can relate our service-specific measures of public sector efficiency to the degree of decentralization in service provision and to our measures of political preferences. Using quantile regression techniques,<sup>2</sup> we discover that decentralized provision has ambiguous effects. It reduces PSE in those provinces in which efficiency is low, but it enhances efficiency in those provinces in which it is high. This result is of great policy relevance. As decentralization might enhance the already existing differences between regions, forms of "two-speed decentralization", where only the most efficient regions are allowed to provide certain services, seem advisable.<sup>3</sup>

Our paper relates to a growing literature assessing the importance of culture for government performance. The seminal papers on this issue are Knack and Keefer (1997) and La Porta et al. (1997).<sup>4</sup> Both studies use a cross section of about 40 countries, and take indicators of trust and civicness from the World Value Survey. However, drawing inferences from cross-country data is

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<sup>2</sup>Koenker and Hallok (2001) provide a very readable introduction to the literature on this technique and a comprehensive set of references.

<sup>3</sup>A similar arrangement is in place in Spain, and has been proposed in Italy as well.

<sup>4</sup>See also La Porta et al. (1999).

problematic, due to the high number of possibly relevant variables. Moreover, as pointed out by Guiso et al. (2006), these early contributions did not control for the endogeneity of trust. Our paper is more closely related to Knack (2002), which uses data from US states (and controls for possible endogeneity). We differ from him because we use objective efficiency indicators, instead of perceived quality, as our dependent variable. We believe this is appropriate given that expectations concerning government performance might be unreliable: individuals in areas in which short-sighted selfishness and distrust are widespread, and governments consistently under-perform, will probably expect less from their politicians and public officials. Objective measures analogous to ours have been recently computed for a cross-section of countries by international organizations, such as the OECD (Hakkinen and Joumard, 2007, Sutherland et al, 2007), the IMF (Verhoeven et al. 2007) and the European Commission (European Commission, 2008).<sup>5</sup>

To our knowledge, the only other paper which uses an objective efficiency measure as a dependent variable is Borge et al. (2008). The authors build an aggregate index of public sector efficiency for almost 400 Norwegian provinces, for the years 2001-2005, encompassing six service sectors (elderly care, primary and lower secondary education, day care, welfare benefits, child custody and primary health care). The index is a simple ratio of a performance indicator (expressed in relation to the sample mean) and the amount of available fiscal resources. They relate this index to local government revenues and to local political characteristics such as party fragmentation, left-wing majority, voter turnout, top-down vs bottom-up budgetary procedures. They find in particular that a more cohesive government and a stronger democratic participation increase efficiency.

Another stream of literature studies the much broader issue of the impact of cultural traits on economic growth (Tabellini, 2005, 2008, de Blasio and Nuzzo, 2006). In contrast with this literature, we try to keep distinct generally pro-social values (what Tabellini calls "generalized morality") from values inherent to the political sphere. We stick to the idea, well-established in political science at least since Almond and Verba (1963), that political values (and more generally political culture), should be distinguished by morals. For example, it may well be possible that the recent decades witnessed an increase in the willingness to participate in pro-social activities (e.g. volunteering) together with a growing disillusion and detachment from politics (Inglehart, 1977).<sup>6</sup> Of course, pro-social values can have a positive influence on public service efficiency independently of their effect on political engagement (for example rising the likelihood of having honest politicians, so reducing the need for checks and balances).

Needless to say, we are deeply indebted with the work of Putnam (1993). As it is well known, one of the ideas in his seminal book is that a dense network of associations is often a pre-condition of effective collective action (see also Verba et al. 1995). While we control for the presence of social networks, our work also highlights the limits of an encompassing measure of "social capital", where moral and political values, beliefs, networks are merged together.<sup>7</sup>

The rest of the paper is structured as follows: in the second chapter we compute our sector-specific measures of public sector efficiency for several public services; in the third chapter we

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<sup>5</sup>See also OECD (2008) and Afonso et al. (2005). Within-country studies are also frequent. Afonso and Scaglioni (2005) provide efficiency measures for Italian regions.

<sup>6</sup>In the same vein, people in a community might have a high degree of interpersonal trust, but a high degree of mistrust with respect to political institutions.

<sup>7</sup>Critiques to the soundness of Putnam's approach come from the political science (Jackman and Miller, 1996) as well as from the economics (Durlauf, 2002) camp.

present our baseline econometric exercise, and in chapter four we report the results; chapter 5 concludes.

## 2 Public sector efficiency in the Italian provinces

### 2.1 Defining (in)efficiency

There are several well-established definitions of (in)efficiency of a production unit (be it an industrial plant, a firm, a public administration) in the microeconomic literature.<sup>8</sup> In this paper we use concepts of technical efficiency, all of which basically boil down to a comparison between actual and potential performance. More formally, suppose that several production units produce a certain output  $y$  with a certain input  $x$ , where  $T$  is the set of all technically possible input-output combinations. Define:

$$\begin{aligned} L(y) &= \{x | (x, y) \in T\} \\ P(x) &= \{y | (x, y) \in T\} \\ F(x) &= \text{Max}\{y | y \in P(x)\} \end{aligned}$$

Then a natural measure of inefficiency for a production unit  $i$ , which produces  $y_i$  units of output with  $x_i$  units of input, is:

$$Ineff_i^{OUT} = \text{Max}\{\theta | y_i \theta \in P(x_i)\} = F(x_i)/y_i.$$

Basically, it defines inefficiency as the ratio between potential (given technology and inputs) and actual performance. In turn, the inverse of  $Ineff_i^{OUT}$  can be taken as a measure of efficiency:

$$Eff_i^{OUT} = \frac{1}{Ineff_i^{OUT}}.$$

Another widely used measure is provided by:

$$Eff_i^{INP} = \text{Min}\{\theta | x_i \theta \in L(y_i)\}.$$

It measures how much less input unit  $i$  could use to produce the level of output it actually produces.<sup>9</sup>  $Ineff_i^{OUT}$  and  $Eff_i^{INP}$  are also referred to, respectively, as output-oriented and input-oriented Debreu-Farrell indices, while  $Eff_i^{OUT}$  is known as the Shephard index.<sup>10</sup>

In the rest of the paper, unless otherwise stated, we focus on  $Eff_i^{OUT}$  as our preferred definition of efficiency. However, our results do not change with different definitions of efficiency.

<sup>8</sup>Fried et al. (2008) is a comprehensive and up-to-date survey of the field of efficiency measurement.

<sup>9</sup>In the presence of constant return to scale the two scores coincide.

<sup>10</sup>As  $Ineff_i^{OUT}$  takes values between 1 and  $+\infty$ ,  $Eff_i^{OUT}$  takes values in (0,1). When we use efficiency as the dependent variable in our econometric exercises, we actually use deviations of  $Ineff_i^{OUT}$  from its sample mean.

## 2.2 Estimating the frontier

Whatever the definition of efficiency adopted, the main problem encountered in measuring efficiency is how to find out the potential production frontier. As the latter is unknown, in practice efficient performances are defined as un-dominated performances, i.e. performances located on the “best practice frontier”. To construct this frontier from the observed input-output pairs  $(x_i, y_i)$ , two approaches have been used in the literature: the parametric and the non parametric approach. The advantage of the non-parametric approach is of course that it does not require the specification of a functional form, so that it avoids the risk of confusing the effects of misspecification of the functional form with those of inefficiency. The basic idea underlying non parametric methods is quite simple. Given our sample of production units  $(x_i, y_i)$ , we use it to deduce the production possibility set  $T$ . Once we have such approximation of  $T$  -let us call it  $T'$ - we also have approximations of the sets  $L(x)$ ,  $P(x)$  and  $F(x)$  defined in equation 1:

$$\begin{aligned} L'(y) &= \{x | (x, y) \in T'\} \\ P'(x) &= \{y | (x, y) \in T'\} \\ F'(x) &= \text{Max}\{y | y \in P'(x)\}. \end{aligned}$$

So non-parametric methods differ in how they build  $T'$ . Our baseline measure of the efficiency of public spending in the Italian provinces is constructed applying a commonly used non-parametric method, called Data Envelopment Analysis (DEA).<sup>11</sup>In the DEA approach,  $T'$  is identified as the intersection of all the production sets which satisfy the following list of assumptions: (1) convexity; (2) free disposability; (3) all the  $(x_i, y_i)$  belong to the set; (4) to produce a strictly positive amount of output a strictly positive amount of input is needed. In practice, the various efficiency indexes in a DEA setting are computed solving linear programming problems.<sup>12</sup>

An important assumption involves returns to scale. In our baseline calculation, we do not restrict returns to scale in any way. We also provide PSE estimates in which constant returns to scale are assumed. Moreover, to further check the robustness of our results, we also use the deterministic frontier methodology, a parametric technique. In particular, we follow most of the

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<sup>11</sup>Another non-parametric approach that can be used to assess productive efficiency is the FDH (Free Disposal Hull) technique. The main difference between the two methodologies is that in the FDH assumption 1 (convexity) is dropped. The DEA efficiency frontier always encompasses the FDH frontier, so that some units which are efficient according to FDH method are instead inefficient according the DEA technique (see Tanassoulis et al. 2008 for further details).

<sup>12</sup>In the case of 1 input, 1 output and  $N$  productive units,  $Eff_i^{INP}$  equals:

$$Eff_i^{INP} = \text{Min} \left\{ \theta \text{ subject to : } \sum_{j=1}^N x_j \lambda_j \leq \theta x_i; \sum_{j=1}^N y_j \lambda_j \geq y_i; \lambda_j \geq 0 \forall j; \sum_{j=1}^N \lambda_j = 1 \right\}.$$

$Ineff_i^{OUT}$  is instead computed as:

$$Ineff_i^{OUT} = \text{Max} \left\{ \theta \text{ subject to : } \sum_{j=1}^N x_j \lambda_j \leq x_i; \sum_{j=1}^N y_j \lambda_j \geq \theta y_i; \lambda_j \geq 0 \forall j; \sum_{j=1}^N \lambda_j = 1 \right\}.$$

In both expressions the last constraint implies variable returns to scale (non-increasing returns to scale if it holds with  $\leq$ ). Dropping this constraint amounts to assume a production function with constant returns to scale.

literature by assuming a log-linear relationship:

$$\ln y_i = \alpha_0 + \alpha_1 \ln x_i + u_i, \quad u_i \leq 0.$$

Estimation is performed with a two-step procedure: first, an OLS estimation is run; second, the fitted residuals are augmented by the minimum constant which makes all of them less or equal than zero. It turns out that such procedure gives consistent estimates of the parameters  $\alpha_0$  and  $\alpha_1$  (Greene, 2008). Then the frontier is given by the function:

$$\ln y = \hat{\alpha}_0 + \hat{\alpha}_1 \ln x.$$

### 2.3 Input and output measures for the Italian public sector

In assessing the efficiency of public sector in the 103 Italian provinces we focus on four spending categories. Two of them are provided by the central government (judiciary and education); the remaining two (health and child care) are provided by local governments. Not for all categories we use spending as a measure for input. While for child care and health care public expenditure can be reasonably apportioned to individual provinces (in the case of child care we have even budgetary data for each municipality), for justice and education we prefer to measure inputs in terms of number of public employees (judges and teachers, respectively), as in these sectors most of the spending is accounted for by compensation of employees, on which accurate information at provincial level is available. Depending on the sector we consider averages over a given period of time (if it is sensible to assume that it takes time for public intervention to influence outcomes) or the most recent year for which data are available (when we have more straightforward output measures).

In what follows we provide information about how we measure inputs and outputs for each of the four spending categories and our data sources.

**Health** – We use as input per capita public health expenditure adjusted for the age structure of the population. We take averages over the years 1985-2007. Our computation is based on official statistics for expenditure and for population, and on coefficients provided by the Ministry of Health to compute the equivalent population (intuitively, these coefficients correct for the fact that health expenditure is concentrated on particular age-groups, so that regions with a higher share of elderly individuals tend to have higher per capita spending). All the data refer to the 20 Italian regions. Given the lack of province-level data, we assume here that our input measure does not vary across provinces within the same region. Our health performance indicator is the change in life expectancy between the years 1981-1983 and 2003-2005 (as customary, we use averages to reduce the influence of temporary and exceptional events, such as particularly rigid winters, on mortality rates). We take variations in life expectancy instead of levels to at least partially control for environmental factors which influence outcomes independently of public health care. Data for each province from 1992 onward are available from Istat (the National statistical office); for the previous years, we use data from Lipsi and Caselli (2002), who compute mortality tables for the Italian provinces in the years 1971-73, 1981-83, 1991-93.

**Education** – Our input measure is the number of teachers per pupil in the primary and first three years of secondary school (school year 2005-06). These data are published for each province by the Ministry of Education. Using teachers instead of spending, for which we do not have province-level data, does not affect our results. In fact, about 97% of education expenditure in Italy is

due to compensation of employees. As a measure of output, we use 6th and 9th grade students' performance in tests carried out by INValSI (the public institute in charge of evaluating the Italian educational system) during the school year 2005-06. Performance is measured by the average score (i.e., percentage of correct answers to a multiple choice questionnaire) obtained in the Italian, Math and Science tests. In contrast to evaluation exercises carried out by international institutions (e.g., OCSE-PISA, TIMSS, PIRLS), whose sample of pupils cannot be used for our purposes as it is not representative at the province level, INValSI evaluations encompass a much larger number of schools. Actually, for the 6th grade almost all the schools have been tested, while for the 9th grade we refer to a representative sample.<sup>13</sup>

**Civil Justice** – We take as input the number of judges per 1,000 new trials in 2006. This number has to be considered with caution for two main reasons. First, lower-level court districts in Italy do not perfectly overlap with provinces (there are 103 provinces and 165 *tribunali*<sup>14</sup>), so we restrict ourselves to the judges working in the main court (*tribunale*) of the province (it is typically located in the main city, even if it often has other subsidiaries inside the province, which we consider as well). Second, in many districts it is not clear how many judges work in the civil sector, and how many in the criminal sector. We use estimates of this ratio, computed using the available data.<sup>15</sup> Finally, our measure for output in the civil justice sector is the average length of trials in 2006, as estimated by Istat.

**Child care** – Our input is expenditure for child day-care and other infant services by municipalities in 2006 (again, we only consider the capital of the province). Our output is given by number of available seats in day care in 2006. Data come from the Ministry of Internal Affairs (*Certificati di conto consuntivo dei comuni*).

## 2.4 The map of public sector efficiency in Italy

In Table 1 we report regional averages of public sector performance indicators for each of the four spending items. In the last column we also report overall regional public sector performance, obtained as a simple average of the performances in each spending area. The indicators show notable differences across Italian regions. In all service categories regions in the South exhibit the lowest performance. Overall, public sector output in the South (whether measured in terms of health conditions, education, functioning of the judicial system, or provision of child care services) is 77 per cent of the Italian average. The gap is higher for the service supplied by municipalities (child care), for which the performances obtained by southern regions do not reach 50 per cent of the average.

The same picture emerges if we look at PSE. In Table 2 we report our baseline measures of efficiency. Again, for brevity, we show regional averages even if data show also significant variation across provinces within the same region. Again, overall public sector efficiency in the South is below the Italian average. The North is the geographical area showing the highest public sector efficiency. Geographical differences in efficiency are more pronounced in the sector that is delivered

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<sup>13</sup>Although on average the results reported by INValSI do not differ substantially from those shown by other international tests, the outcomes in the South, particularly those obtained by primary schools, have to be taken with caution, as they appear to many observers too favourable with respect to other evaluation exercises.

<sup>14</sup>Lower-level court districts (*circondari di tribunali*) are in turn grouped into 29 higher-level districts (*distretti di corte d'appello*).

<sup>15</sup>We are grateful to our colleague C. Giorgiantonio for providing us with these figures, based on data from the *Consiglio Superiore della Magistratura* website.



by municipal authorities: the standard deviation-to-mean ratio ranges between 0.55 (child care) and 0.08 (education). Interestingly, however, the dispersion in judicial efficiency scores is quite high as well (0.45), mainly due to the high efficiency of courts in the North-west (particularly, in Piemonte). Overall, the correlation between efficiency in different public services is not strong (Table 3), which seems promising for our empirical analysis.

Finally, we compare our baseline measure of total public sector efficiency with other indices, obtained by using different definitions of efficiency and frontier estimation methodologies (Table 4). The results just described for the baseline measure seem extremely robust. In particular, the correlation coefficient between the output-oriented DEA-based efficiency measures and the values obtained by estimating the frontier by means of the parametric approach is 0.86 (Table 5).

### 3 The determinants of public sector efficiency

What determines the efficiency of a public service? Our hypothesis is that a constant oversight of the citizens and users is crucial in keeping politicians and bureaucrats accountable. However, political participation has the nature of a public good: all citizens benefit from it in a non-rival, non-excludable way. This is true even for the most basic form of political participation, i.e. the act of voting: as highlighted by the literature on the so-called voting paradox, for narrowly self-interested citizens the costs of going to vote are likely to out-weigh the expected benefits. This is even more true for other more resource-consuming forms of political participation. Widespread altruistic values and a feeling of civic duty are required to provide the needed politicians' oversight. In addition, the institutional set-up influences the degree of politicians' accountability. Decentralized government makes it easier to obtain information on the conduct of public officers and to assess responsibility for inadequate performance and waste of public money. Decentralization can also have an indirect effect on accountability, by increasing the willingness to participate.

In what follows we first provide a very simple and sketchy conceptual framework in which these ideas are put down a little bit more formally. Then we go from theory to data, describing our cultural variables.

#### 3.1 A simple conceptual framework

To fix ideas we propose a straightforward extension of the retrospective voting model of Barro (1973) and Ferejohn (1987). In this model, the only relevant dimension of political conflict is the agency relationship between citizens and the political decision maker. In particular, there is no conflict of interests among citizens (who are assumed to behave in a coordinated manner), and there are no differences in competence or talent between politicians (so the problem is one of moral hazard).

In a certain province  $p$  a politician is in charge of providing a service  $s$ . He can either provide the service in an efficient way, by exerting an effort which costs him  $C$  in utility terms, or he can shirk, and provide the service inefficiently, but at no cost for him. However, shirking may have a cost for him in the election day, when he runs against an opponent. Suppose that a fraction  $q$  of citizens knows that he has shirked. In line with the literature on retrospective voting (Barro 1973, Ferejohn, 1986) we assume that these guys will punish him and vote for his opponent. The uninformed guys will instead randomize between the two candidates. If there are no relevant differences between candidates, this voting rule is quite natural. The incumbent utility is increasing in the fraction of

votes that he receives in that province, in particular, it will be equal to:

$$U\left(q + \frac{1-q}{2}\right) - C$$

if he exerts effort in providing the public good, and to

$$U\left(\frac{1-q}{2}\right)$$

if he shirks, where  $U(\cdot)$  is an increasing concave function. So he will behave if and only if  $q > q^*$ , where  $q^*$  is defined as the unique value of  $q$  for which:<sup>16</sup>

$$U\left(q + \frac{1-q}{2}\right) - C = U\left(\frac{1-q}{2}\right)$$

Ex ante, citizens can decide whether to acquire information about the actions of the politician. In particular, suppose that they can see whether the politician shirks or not at a cost  $c_s$ . If the politician does not shirk, and the public service is provided efficiently, each citizen will get a higher level of utility (say,  $u^h$ ) than if the politician shirks (say  $u^l$ ). However, from a purely self-interested point of view, of course, no citizen will find it optimal to acquire information, because he understands that the impact of his vote at the electoral stage will be negligible. As it is customary in the literature on voting, we assume that the overall utility of citizens does not only depend on the efficiency of the public service, but he also has a feeling of duty, so that he gets utility from the very act of getting informed about politics. In particular, the utility of citizen  $i$  is set equal to:

$$u - X_i(c_s - v_i),$$

where  $u = u^h$  if the politician behaves and  $u = u^l$  if the politician shirks,  $v_i$  represents the psychic gains that individual  $i$  gets from participating in politics,  $X_i$  is an indicator that is equal to 1 if the citizen acquires information and zero otherwise. Moreover, we assume that in the province  $p$   $v_i$  is distributed in the population according to a uniform distribution with support  $[0, v_p]$  (so provinces with a higher  $v_p$  have a higher degree of civiness). Then it turns out that the fraction of people that acquire information about service  $s$  in province  $p$  is equal to  $\min[0, 1 - c_s/v_p]$ , and this in turn implies that service  $s$  will be provided efficiently in province  $p$  if and only if:

$$1 - \frac{c_s}{v_p} > q^*.$$

In words, service  $s$  in province  $p$  will be provided efficiently if  $c_s$  is sufficiently low (which we argue that it is more likely to happen if the service is provided by the local government), and/or if  $v_p$  is sufficiently high (i.e. if the province is sufficiently imbued of civic values).

One can easily extend the basic framework to take into account another element that is considered relevant to determine PSE levels, namely the quality of politicians (Besley, 2006). While in our basic framework all politicians are purely self-interested, one could introduce a fraction of "good-spirited" politicians who always behave honestly, irrespectively of incentives. Let us set the fraction of "good" politicians equal to  $\pi_p$ , and let self-interested politicians differ with respect to

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<sup>16</sup>We stick to the assumption that  $U(1) - C > U(0)$ , so that  $q^*$  is between 0 and 1.

their level of  $C$  (which is continuously distributed according to a cumulative distribution function  $F_C(\cdot)$ ), and assume that the quality of the politicians is unobservable, so that an adverse selection component is added to the moral hazard one. In such a framework, the incentives of self-interested politicians change, because behaving honestly has now the further benefit of improving one's reputation in the face of the well-informed guys. In particular, in equilibrium the informed citizens understand that the probability that the incumbent is good, given he exerts effort, is:

$$\frac{\pi_p}{\pi_p + (1 - \pi_p)F_C(C^*)} > \pi_p$$

(while it is obviously 0 otherwise), where  $C^*$  is the level of  $C$  such that

$$U\left(q + \frac{1-q}{2}\right) - C = U\left(\frac{1-q}{2}\right)$$

and the probability of a high effort is  $\pi_p + (1 - \pi_p)F_C(C^*)$ , which is decreasing in  $\frac{c_s}{v_p}$  and increasing in  $\pi_p$ .<sup>17</sup>

### 3.2 Measuring preferences for participation

Measuring political participation and its cultural underpinnings is by no means straightforward. We try to capture the values that favour pro-social behaviour in a polity with two distinct proxies. First, we use survey data on morality taken from the 2004 Bank of Italy Survey on Household Income and Wealth (SHIW). The 2004 wave of the survey concerns a representative sample of the Italian population, consisting of 20,581 individuals (8,012 households). Details about the interviews and data collection procedures are in Banca d'Italia (2006). In a special section it was asked to a subgroup of the sample (about half of respondents) to what extent they deem the following three behaviours acceptable:

- a) not paying for one's ticket on public transport;
- b) keeping money obtained by accident when it would be possible to return it to the rightful owner (for example, if you found a wallet with the owner's name and address, or if you were given too much change at the supermarket check-out);
- c) not leaving one's name for the owner of a car you accidentally scraped while parking.

From the answers to these three questions (legitimacy was reported in a 1 to 10 scale) we get an index of reported "generalized morality". However, one thing is answering survey questions, quite another is actual behaviour. To get around this problem, we also used data on actual altruistic behaviour; in particular, following Guiso et al. (2004), we use the amount of blood donations. Putting together reported and "revealed" altruistic values, we construct an index of generalized morality (*morality*).

However, pro-social attitudes and values do not automatically translate into political participation. So our next step is to try to capture attitudes toward political engagement. We again exploit the fact that in the 2004 Bank of Italy's survey people were explicitly asked "How interested are you in politics". Four possible answers (Very, fairly, not very, not at all) were possible. Again, to bridge the gap between reported and actual preferences, we also used the amount of newspapers

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<sup>17</sup>Here we do the standard assumption that the informed voters confront the incumbent reputation with the reputation of an outsider chosen at random from the population, and reelect the first as long as his reputation is better.

sold in the province (taken from Cartocci, 2007) and turnout for referenda from 1946 to 1989 (again we follow here Guiso et al. 2004). Referendum turnout is a more accurate measure of participative attitudes than election turnout, because patronage motivations are absent (we do not consider post-1989 referenda because, given the existence of a minimum turnout threshold, in recent years abstention has been used by those contrary to the referendum objective as a means to make it fail).

Putting the three together we come up with an index of “interest in politics” (*intpol*).

As Verba et al. (1995) point out, the willingness to engage in policy is not enough. People willing to participate also need channels in order to be heard by power, and in particular the availability of associations. So we also include in our regression the number of not-for profit associations in the province (*network*).<sup>18</sup>

### 3.3 The empirical model

In our theoretical framework, political culture (in particular, the concern of citizens for public affairs) has an impact on efficiency (due to the pressure it puts on politicians). In our empirical analysis we try to capture this link estimating the following equation:

$$Eff_{s,p} = \beta_0 + \beta_1 morality_p + \beta_2 intpol_p + \beta_3 network_p + \beta_4 pop_p + \epsilon_{s,p},$$

where  $Eff_{s,p}$  represents our efficiency measure, for service  $s$  in province  $p$ ;  $morality_p$ ,  $intpol_p$ ,  $resources_p$  are respectively our morality, interest in politics, and resources indicators for province  $p$ . To control for the size of the province, which might be important if there are economies of scale in service provision, we introduce population ( $pop_p$ ) as an additional regressor. We estimate this equation separately for our four sectors.

## 4 Results

### 4.1 OLS estimation

In Table 6 we report estimation results. OLS estimates confirm our expectations: the coefficient of our indicator of “interest for politics” appears with the positive sign and is strongly significant in all regressions.

Instead, generalized morality and the presence of associative networks are often non significant or significant with the wrong sign. It is confirmed that to get an efficient public sector one needs effective and strong political pressure much more than a generic concern for others. As remarked by Putnam, “citizen in the civic community are not required to be altruists”, and altruism is neither sufficient nor necessary to participate in politics. To put it bluntly, institutional performance is more a matter of politics than of morals. Inefficient public action in the less developed areas of Italy might have more to do with political apathy and discouragement, with a sense of political ineffectiveness, than to the often quoted “amoral familism” (Banfield, 1958).

### 4.2 Instrumental variables estimation

While it is plausible that preferences shape political and economic outcomes, one cannot take for granted that preferences themselves are exogenous. Concerning our subject matter, there are

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<sup>18</sup>Figures are from Nuzzo (2006). We consider both *cooperative sociali* and *associazioni riconosciute*.

many reasons why current PSE may influence current interest for politics. Low quality government may indeed breed in some citizens discouragement and apathy with respect to politics, instead of pressures for change.

Ideally, we would like to capture the effects of the truly exogenous components of political values. To this aim, we resort to instrument variables estimation. Given the results from the OLS analysis, we use two parsimonious specifications. In the first one, only our *intpol* variable is taken as explanatory variable. In the second one, we use a composite index of *intpol*, *morality*, *networks*, which we label *social capital*.

We instrument our cultural variables with three different sets of variables:

(i) Features of formal political institutions in place in the XIV century (de Blasio and Nuzzo, 2006). The idea here is that while in the medieval *repubbliche* civic liberties and political engagement were flourishing, in the rest of Italian provinces institutional arrangements were characterized by weaker democracies and a less developed political life. In particular, de Blasio and Nuzzo (2006) distinguish other four kinds of government, namely, the dictatorial *signorie*, the absolutist kingdom of the church, the southern *Regno delle due sicilie*, and a residual group of provinces governed by foreign powers.

(ii) Features of formal political institutions in place in the period XVII century - XIX century taken from Tabellini (2005). He builds an index capturing the constraints imposed on the executive authority by the existing constitutional check and balances in pre-unitary Italian States.

The assumption underlying both sets of instruments is that ancient political history still shapes citizens' attitudes toward politics (without having a direct impact on today's PSE, which seems quite plausible).

We also experiment a third set of instruments, namely indices of political and social participation in early XX century, given respectively by electoral turnout in the last pre-fascism election and by the fraction of people participating in pro-social associations (both are taken from Nuzzo, 2006).

The results for the four service categories are summarized in Tables 7 a-d. The first stage regressions are quite encouraging: most instruments are significant, and together explain a good portion of today's values. Variations in the first and in the third set of instruments explain about 40-50 per cent of the variation in *intpol*. The second stage regressions confirm that political values matter in explaining political outcomes. The component of *intpol* explained by political history has a strongly significant, positive effect on PSE. In all four service categories, the size of the coefficients is larger than that obtained by running an OLS regression, suggesting that maybe instruments partly solve a measurement error problem affecting our independent variables.

## 5 The impact of decentralization

The impact of decentralization on policy-making is of course multifaceted (see for example Treisman, 2002; Rodden, 2006; Lockwood, 2006). On the one hand, it is often emphasized that local politicians are more easily monitored, so that (using the framework put forward in the previous chapter)  $c_s$  is lower if service  $s$  is provided by a lower level of government. On the other hand, there might be diseconomies of scale in providing services in a decentralized manner:  $C$  could be higher if the service is provided locally. This last point has an obvious impact on incentives: as  $C$  is higher for the decentralized providers (let us assume that for each politician the cost of effort is increased by a quantity  $\Delta C > 0$  equal for all of them),  $q^*$  and  $C^*$  are higher as well, so that the probability that self-interested politicians will behave in an honest way tends to be lower. Finally, the benefits

from decentralization are likely to depend on the quality of the local pool of politicians. All in all, we have that decentralization is beneficial if and only if:

$$(\pi_p - \pi_{mean})(1 - F_C(C^{*dec})) + (1 - \pi_{mean})(F_C(C^{*dec}) - F_C(C^{*cen})) > 0.$$

which can be true or false depending on the parameters, and on the specific characteristics of the province considered. In particular, the first term is positive in areas in which the public spirit is higher than the average, and negative otherwise. The second term is positive if and only if  $C^{*dec} > C^{*cen}$ <sup>19</sup>, i.e. if the increase in the benefits stemming from honest behaviour due to a stricter citizens'oversight is higher than the increase in the cost of effort, due to diseconomies of scale. To sum up, whether on average decentralized service provision enhances efficiency remains an empirical question.

Moreover, it is not even certain on a priori grounds whether the net benefits of decentralization increase with the degree of civickness. Indeed, while this is true for  $(\pi_p - \pi_{mean})(1 - F_C(C^{*dec}))$ , it can be easily shown that  $F_C(C^{*dec}) - F_C(C^{*dec})$  decreases as  $v_p$  rises (intuitively, the decrease in  $c_s$  due to decentralization is less important in those provinces in which there is a high level of  $v_p$ : in these provinces, people monitors politicians' behaviour in any case).

Our data-set allows us to study the impact of decentralization on PSE. Indeed, while some public services in our sample are provided by the Central government, other are provided by Local governments (Regions and Municipalities). Therefore, one way to assess the impact of decentralization is to pool the observations for all sectors together in a single regression, and control for decentralization. Formally, we estimate the following specification:

$$Eff_{s,p} = \beta_0 + \beta_1 morality_p + \beta_2 intpol_p + \beta_3 network_s + \beta_4 pop_p + \beta_5 center_s + \epsilon_{s,p},$$

where *center* is a dummy which is equal to 1 if the service is provided by the Central government (i.e. for justice and education).<sup>20</sup>

By pooling together observations referring to different sectors we impose strong restrictions on the parameters of the empirical model. As a consequence, the R-squared is very low (remember also that the correlations between efficiency measures across sectors are quite low as well). The results (shown in the first column of Table 8) confirm that *intpol* is the most important among our explanatory variables. Instead, the government level at which the service is provided does not seem to matter.

To test whether the mean effects of decentralization on PSE are different from the effects on the lower and the upper tails of the efficiency distribution, we perform quantile regressions. While *intpol* remains the main determinant of PSE at all levels of efficiency, the effect of decentralization (the coefficient of the dummy for Central government provision) is positive and significant for the lower quantiles (Table 8, columns 2 to 5). They become negative (and significant) in the upper

<sup>19</sup>The two thresholds are defined by the following indifference conditions:

$$\begin{aligned} C^{*cen} &= U(q^{cen} + \frac{1 - q^{cen}}{2}) - U(\frac{1 - q^{cen}}{2}); \\ C^{*dec} &= U(q^{dec} + \frac{1 - q^{dec}}{2}) - U(\frac{1 - q^{dec}}{2}) - \Delta C \end{aligned}$$

<sup>20</sup>To introduce the center dummy, we replaced in the OLS regression our dependent variable, the ratio of  $Eff_i^{OUT}$  to its sector-specific mean with  $Eff_i^{OUT}$  itself.

part of the efficiency distribution. This suggests that being managed at the central level improves PSE in areas where efficiency is low. In contrast, within the provinces where the quality of public services is higher, decentralized services are more efficient than centralized ones.

## 6 Conclusions

In this paper we build objective measures of PSE for Italian provinces. Using within country data not only allows to control for differences in formal rules and laws and reduces omitted variable bias, but also gives us the possibility to exploit the unique peculiarities of Italy's extremely long and rich political history. It turns out that, as Putnam (1993) imagined, this history still has an impact on today's Italian political life. We find that historically-determined values and attitudes toward politics still influence the quality of Italian public sector, much more than supposedly "amoral" and "selfish" attitudes do.

Our point is that, whatever the level of government involved, a well-functioning government requires active citizens, able and willing to monitor and sanction inefficient politicians. As Putnam puts it: "citizens in civic communities expect better government, and (in part through their own effort) they get it [...] if decision makers expect citizens to hold them politically accountable, they are more inclined to temper their worst impulses rather than face the public protests".

## References

- Afonso, A. and Scaglioni, C. (2005), "Public sector efficiency provision in Italian regions: a non-parametric analysis", mimeo.
- Afonso, A., Schucknecht, L. and Tanzi, V. (2005), "Public sector efficiency: an international comparison", *Public Choice*, vol. 123, pp. 321-347.
- Almond, G. and Verba, S. (1963), *The civic culture: political attitudes and democracy in five nations*, Princeton University Press, Princeton.
- Banca d'Italia (2006), "I bilanci delle famiglie italiane nell'anno 2004", in *Supplementi al Bollettino Statistico*, anno XVI, N. 7, 17 gennaio.
- Banfield, E. C. (1958), *The moral basis of a backward society*, The Free Press, New York.
- Barro, R. (1973), "The control of politicians: an economic model", *Journal of Political Economy*, vol. 87, pp. 940-971.
- Besley, T. (2006), *Principled agents? The political economy of good government*, Oxford University Press, Oxford.
- Borge, L.E., Falch, T. and Tvomo, P. (2008), "Public sector efficiency: the roles of political and budgetary institutions, fiscal capacity, and democratic participation", *Public Choice*, vol. 136, pp. 475-495.
- Brennan, G. and Buchanan, J. (1980), *The power to tax analytical foundations of a federal constitution*, Cambridge University Press, Cambridge, UK.

- Cartocci, R. (2007), *Mappe del tesoro: atlante del capitale sociale in Italia*, Il mulino editore, Bologna.
- De Blasio, G. and Nuzzo, G. (2006), "The legacy of history in economic development: the case of Putnam's social capital", Banca d'Italia, Temi di discussione (working paper), no. 591
- Durlauf, S. N. (2002), "Bowling Alone: A Review Essay," *Journal of Economic Behavior and Organization*, 47 (3), pp. 259-273.
- European Commission (2008), *Public Finances in EMU – 2008*, European Economy, no. 10/2008, European Commission, Brussels.
- Ferejohn, J. (1986), "Incumbent performance and electora control", *Public Choice*, vol. 50, pp. 5-25.
- Fried, H. O., Knox Lovell, C. A., Schmidt, S. S. (2008), "Efficiency and productivity", in Fried, H. O., Knox Lovell, C. A., Schmidt, S. S. (eds), *The measurement of productive efficiency and productivity growth*, Oxford university press, Oxford.
- Greene, W. H. (2008), "The econometric approach to efficiency analysis", in Fried, H. O., Knox Lovell, C. A., Schmidt, S. S. (eds), *The measurement of productive efficiency and productivity growth*, Oxford university press, Oxford.
- Guiso, L., Sapienza, P. and Zingales, L. (2004), "The role of social capital in financial development", *American Economic Review*, vol. 94 (3), pp. 526-556.
- Guiso, L., Sapienza, P. and Zingales, L. (2006), "Does culture affect economic outcomes?", *Journal of Economic Perspectives*, vol. 20 (2), pp. 23-48.
- Häkkinen, U. and Joumard, I (2007), "Cross-country Analysis of Efficiency in OECD Health Care Sectors: Options for Research," OECD Economics Department Working Papers 554.
- Inglehart, R. (1977), *The silent revolution: changes in values and political styles among Western publics*, Princeton University Press, Princeton.
- Knack, S. (2002), "Social capital and the quality of government: evidence from the States", *American Journal of Political Science*, vol. 46(4), pp. 772-785.
- Knack, S. and Keefer, P. (1997), "Does social capital have an economic pay-off ?", *Quarterly Journal of Economics*, vol. 112 (4), pp. 1251-1288.
- Koenker, R. and Hallok, K. F. (2001), "Quantile regression", *Journal of Economic Perspectives*, vol. 15(4), pp. 143-156.
- Inman, R. P. and Rubinfeld, D. L. (1997), "Making sense of the antitrust state-action doctrine: balancing participation and economic efficiency in regulatory federalism", *Texas law review*, vol. 75(6), pp. 1203-1299.
- Jackman, R. W. and Miller, R. A. (1996), "A renaissance of political culture?" in *American Journal of Political Science*, vol. 40, pp. 632-659.



- La Porta, R., Lopes-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1997), "Trust in large organization", *American Economic Review*, vol. 87, pp. 333-338.
- La Porta, R., Lopes-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1999), "The quality of government", *Journal of Law, Economics and Organization*, vol. 15 (1), pp. 222-279.
- Lipsi, R. M. and Caselli, G. (2002), *Evoluzione della geografia della mortalità in Italia. Tavole di mortalità e probabilità di morte per causa. Anni: 1971-1973, 1981-1983, 1991-1993*, Dipartimento di scienze demografiche – Università degli studi di Roma "La Sapienza", Roma.
- Lockwood, B. (2006), "Fiscal Decentralization: A Political Economy Perspective", in Ahmad, E. and Brosio, G. (eds), *The Handbook of Fiscal Federalism*, Edward Elgar, Cheltenham.
- Nuzzo, G. (2006), "Un secolo di statistiche sociali: persistenza o divergenza tra le regioni italiane?", Banca d'Italia, Quaderni dell'Ufficio ricerche storiche, no. 11.
- Oates, W. E. (2005), "Toward a second-generation theory of fiscal federalism", *International tax and public finance*, vol. 12, pp. 349-373.
- OECD (2008), *Going for growth 2008*, OECD, Paris.
- Putnam, R. (1993), *Making democracy work*, Princeton University Press, Princeton.
- Rodden, J. (2006), "The political economy of federalism", in Weingast, B. and Wittman, D. (eds.), *Oxford Handbook of Political Economy*, Oxford University Press, Oxford.
- Seabright, P. (1996), "Accountability and decentralization in government: an incomplete contracts model", *European Economic Review*, vol. 40, pp. 61-89.
- Sutherland, D., Price, R., Joumard, I. and Nicq, C. (2007), "Performance Indicators for Public Spending Efficiency in Primary and Secondary Education," OECD Economics Department Working Papers 546.
- Tabellini, G. (2008), "Institutions and culture", *Journal of the European Economic Association*, vol. 6 (2-3), pp. 255-294.
- Tabellini, G. (2005), "Culture and institutions: economic development in the regions of Europe", IGER, Bocconi University, mimeo.
- Tanassoulis, E., Portela, M. C. S. and Despic, O. (2008), "Data envelopment analysis: the mathematical programming approach to efficiency analysis", in Fried, H. O., Knox Lovell, C. A., Schmidt, S. S. (eds), *The measurement of productive efficiency and productivity growth*, Oxford university press, Oxford.
- Treisman, D. (2002), "Decentralization and the quality of government", UCLA Department of political science, mimeo.
- Verba, S., Schlozman, K. L. and Brady, H. E. (1995), *Voice and equality: civic voluntarism in american politics*, Harvard University Press, Cambridge, Mass.
- Verhoeven, M., Gunnarsson, V. and Carcillo, S. (2007), "Education and Health in G7 Countries: Achieving Better Outcomes with Less Spending", IMF working paper, no. 267 .

**Table 1. Public sector performance indicators**

<b>Region (1)</b>	<b>Health (2)</b>	<b>Education (3)</b>	<b>Judicial system (4)</b>	<b>Day care (5)</b>	<b>Total</b>
Valle d'Aosta	1,04	1,06	1,35	1,27	1,18
Piemonte	1,01	1,06	1,95	1,06	1,27
Liguria	1,00	1,01	1,04	1,16	1,05
Lombardia	1,18	1,04	1,43	0,71	1,09
Trentino Alto Adige	1,21	0,98	1,52	1,72	1,36
Veneto	1,20	1,04	1,10	0,65	0,99
Friuli Venezia Giulia	1,09	1,11	1,39	1,23	1,20
Emilia Romagna	0,98	1,05	1,03	2,35	1,35
Toscana	0,95	1,04	1,05	1,86	1,23
Umbria	0,91	1,02	0,97	1,17	1,02
Marche	0,98	1,05	0,97	0,79	0,95
Lazio	0,93	1,01	0,97	1,07	1,00
Abruzzo	0,88	1,03	0,95	0,63	0,87
Molise	0,84	0,98	0,93	0,24	0,75
Campania	0,94	0,96	0,95	0,21	0,77
Puglia	1,06	0,95	0,66	0,20	0,72
Basilicata	0,85	0,94	0,62	0,71	0,78
Calabria	0,87	0,93	0,77	0,13	0,68
Sicilia	0,91	0,95	0,83	0,48	0,79
Sardegna	0,95	0,95	0,74	0,72	0,84
<b>ITALIA</b>	<b>1,00</b>	<b>1,00</b>	<b>1,00</b>	<b>1,00</b>	<b>1,00</b>
North-west	1,06	1,04	1,44	1,05	1,15
North-east	1,12	1,04	1,26	1,49	1,23
Centre	0,94	1,03	0,99	1,22	1,05
South	0,91	0,96	0,81	0,42	0,77

(1) Regional values are obtained as simple averages of provincial values. - (2) Change in life expectancy. - (3) Invalsi score obtained by 6th and 9th grade students. - (4) Inverse of average length of trials. - (5) Number of available seats in day care per capita.

**Table 2. Public sector efficiency indicators (Output-oriented, DEA)**

<b>Region (1)</b>	<b>Health</b>	<b>Education</b>	<b>Judicial system</b>	<b>Day care</b>	<b>Total</b>
Valle d'Aosta	0,77	0,92	0,30		0,66
Piemonte	0,76	0,91	0,43	0,51	0,65
Liguria	0,74	0,87	0,23	0,39	0,56
Lombardia	0,87	0,89	0,32	0,28	0,59
Trentino Alto Adige	0,89	0,84	0,34	0,41	0,62
Veneto	0,88	0,89	0,24	0,35	0,59
Friuli Venezia Giulia	0,82	0,95	0,31	0,38	0,61
Emilia Romagna	0,72	0,92	0,23	0,75	0,66
Toscana	0,72	0,90	0,23	0,62	0,62
Umbria	0,69	0,88	0,25	0,48	0,57
Marche	0,74	0,91	0,21	0,41	0,57
Lazio	0,69	0,87	0,22	0,38	0,54
Abruzzo	0,66	0,89	0,21	0,28	0,51
Molise	0,62	0,84	0,21	0,19	0,46
Campania	0,70	0,83	0,21	0,20	0,49
Puglia	0,78	0,82	0,15	0,11	0,47
Basilicata	0,69	0,81	0,14	0,42	0,51
Calabria	0,68	0,81	0,17	0,20	0,46
Sicilia	0,67	0,82	0,18	0,28	0,49
Sardegna	0,70	0,82	0,16	0,30	0,50
<b>ITALIA</b>	<b>0,74</b>	<b>0,87</b>	<b>0,24</b>	<b>0,37</b>	<b>0,56</b>
North-west	0,79	0,90	0,32	0,30	0,62
North-east	0,83	0,90	0,28	0,47	0,62
Centre	0,71	0,89	0,23	0,47	0,57
South	0,69	0,83	0,18	0,25	0,49

(1) Regional values are obtained as simple averages of provincial values.

**Table 3. Correlations across sector-specific efficiency measures (1)**

	Health care	Education	Judicial system	Day care
Health care	1.00	0.19	0.33	-0.11
Education		1.00	0.26	0.32
Judicial system			1.00	0.01
Day care				1.00

(1) Measures refer to output efficiency (DEA).

**Table 4. Total PSE scores (1)**

Region (2)	Output efficiency (DEA)		Input efficiency (DEA)		Linear efficiency		Deterministic efficiency	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Valle d'Aosta	<b>0.66</b>	<b>1</b>	0.50	6	0.50	2	<b>0.78</b>	<b>1</b>
Piemonte	0.65	3	0.54	2	<b>0.53</b>	<b>1</b>	0.71	<b>2</b>
Liguria	0.56	11	0.45	10	0.43	10	0.63	10
Lombardia	0.59	7	0.50	6	0.50	2	0.67	3
Trentino Alto Adige	0.62	4	0.41	15	0.40	16	0.67	3
Veneto	0.59	7	0.51	4	0.50	2	0.67	3
Friuli Venezia Giulia	0.61	6	0.49	9	0.48	7	0.66	7
Emilia Romagna	<b>0.66</b>	<b>1</b>	<b>0.56</b>	<b>1</b>	0.49	5	0.67	3
Toscana	0.62	4	0.53	3	0.48	7	0.66	7
Umbria	0.57	9	0.50	6	0.47	9	0.63	10
Marche	0.57	9	0.51	4	0.49	5	0.64	9
Lazio	0.54	12	0.43	11	0.41	14	0.60	12
Abruzzo	0.51	13	0.43	11	0.42	11	0.59	14
Molise	<b>0.46</b>	19	0.39	18	<b>0.39</b>	18	<b>0.56</b>	20
Campania	0.49	16	0.40	17	0.40	16	0.58	17
Puglia	0.47	18	0.42	14	0.42	11	0.57	18
Basilicata	0.51	13	0.43	11	0.42	11	0.60	12
Calabria	<b>0.46</b>	19	<b>0.39</b>	18	<b>0.39</b>	18	0.57	18
Sicilia	0.49	16	0.41	15	0.41	14	0.58	16
Sardegna	0.50	15	<b>0.39</b>	18	<b>0.39</b>	18	0.59	14
<b>ITALIA</b>	0.56		0.46		0.45		0.63	
North-west	<b>0.62</b>		<b>0.50</b>		<b>0.49</b>		<b>0.69</b>	
North-east	0.61		0.49		0.47		0.67	
Centre	0.57		0.49		0.46		0.63	
South	0.49		0.41		0.40		0.58	

(1) Scores refer to overall public sector performance. - (2) Regional values are obtained as simple averages of provincial values.

**Table 5. Correlations across measures (1)**

	Output-oriented DEA	Input-oriented DEA	Linear efficiency	Deterministic efficiency
Output-oriented DEA	1.00	0.63	0.81	0.86
Input-oriented DEA		1.00	0.79	0.50
Linear efficiency			1.00	0.84
Deterministic efficiency				1.00

(1) Measures refer to overall public sector performance.

**Table 6. OLS estimation by sector - dependent variable: output efficiency (DEA) score (t-statistics in parentheses)**

	Health	Education	Judicial system	Day care
Constant	0.558 (5.19) ***	0.700 (10.44) ***	0.049 (0.12)	-0.601 (-1.23)
<i>Morality</i>	0.003 (2.29) **	0.002 (2.56) **	0.002 (0.33)	-0.001 (-0.10)
<i>Intpol</i>	0.005 (3.36) ***	0.002 (1.86)	0.017 (3.07) *	0.011 (1.76) *
<i>Net</i>	-0.003 (-2.78) ***	0.001 (1.21)	-0.006 (-1.49)	0.024 (4.62) ***
<i>Pop</i>	0.001 (1.47)	0.000 (-0.59)	-0.001 (-0.22)	0.002 (0.62)
R <sup>2</sup>	0.23	0.21	0.11	0.33
Observations	103	103	103	88

**Table 7a. Instrumental variable (2SLS) estimation: Health (t-statistics in parentheses)**

Sets of instruments	1: Political history I		2: Political history II		3: Past political participation	
	Two stages least squares					
<i>Intpol</i>	0.009 (4.65) ***		0.014 (4.90) ***		0.011 (5.70) ***	
<i>Soc cap</i>		0.009 (4.98) ***		0.022 (3.95) ***		0.02 (4.60) ***
	First stage for political participation					
<i>Repubbliche</i>	1.075 (0.51)	3.506 (2.18) **				
<i>Pontificio</i>	-6.007 (-2.26) **	-1.026 (-0.50)				
<i>DueSicilie</i>	-13.868 (-7.12) ***	-8.841 (-5.90) ***				
<i>Periferiche</i>	-0.616 (-0.21)	3.698 (1.68)				
<i>Limits to executive</i>			4.117 (6.70) ***	2.536 (4.94) ***		
<i>Election</i>					0.468 (7.88) ***	0.273 (5.33) ***
<i>Associations</i>					0.006 (0.68)	0.011 (1.56)
R <sup>2</sup>	0.42	0.43	0.31	0.19	0.46	0.32
Observations	103		103		103	

**Table 7b. Instrumental variable (2SLS) estimation: Education**  
(t-statistics in parentheses)

Sets of instruments	1: Political history I		2: Political history II		3: Past political participation				
	Two stages least squares								
<i>Intpol</i>	0.005 (4.48)	***		0.004 (3.01)	**	0.005 (4.17)	***		
<i>Soc cap</i>		0.006 (4.29)	***		0.006 (3.08)	**	0.007 (4.07)	***	
	First stage for political participation								
<i>Repubbliche</i>	1.075 (0,51)		3.506 (2,18)	**					
<i>Pontificio</i>	-6.007 (-2,26)	**	-1.026 (-0,50)						
<i>DueSicilie</i>	-13.868 (-7,12)	***	-8.841 (-5,90)	***					
<i>Periferiche</i>	-0.616 (-0,21)		3.698 (1,68)	*					
<i>Limits to executive</i>				4.117 (6,70)	***	2.536 (4,94)	***		
<i>Election</i>						0.468 (7,88)	***	0.273 (5,33)	***
<i>Associations</i>						0.006 (0,68)		0.011 (1,56)	
R <sup>2</sup>	0.42		0.43		0.31		0.19	0.46	
Observations	103		103		103		103	103	

**Table 7c. Instrumental variable (2SLS) estimation: Judicial system**  
(t-statistics in parentheses)

Sets of instruments	1: Political history I		2: Political history II		3: Past political participation				
	Two stages least squares								
<i>Intpol</i>	0.027 (3.85)	***		0.024 (2,94)	***	0.025 (3.81)	***		
<i>Soc cap</i>		0.028 (3,11)	***		0.038 (2,66)	***	0.041 (3,61)	***	
	First stage for political participation								
<i>Repubbliche</i>	1.075 (0,51)		3.506 (2,18)	**					
<i>Pontificio</i>	-6.007 (-2,26)	**	-1.026 (-0,50)						
<i>DueSicilie</i>	-13.868 (-7,12)	***	-8.841 (-5,90)	***					
<i>Periferiche</i>	-0.616 (-0,21)		3.698 (1,68)	*					
<i>Limits to executive</i>				4.117 (6,70)	***	2.536 (4,94)	***		
<i>Election</i>						0.468 (7,88)	***	0.273 (5,33)	***
<i>Associations</i>						0.006 (0,68)		0.011 (1,56)	
R <sup>2</sup>	0.42		0.43		0.31		0.19	0.46	
Observations	103		103		103		103	103	

**Table 7d. Instrumental variable (2SLS) estimation: Day care  
(t-statistics in parentheses)**

Sets of instruments	1: Political history I		2: Political history II		3: Past political participation						
	Two stages least squares										
<i>Intpol</i>	0,039 (4,38)	***		0,004 (0,31)		0,030 (3,32)	***				
<i>Soc cap</i>			0,060 (5,29)	***		0,006 (0,31)		0,044 (3,45)	***		
	First stage for political participation										
<i>Repubbliche</i>	0,716 (0,33)		3,254 (2,06)	**							
<i>Pontificio</i>	-5,808 (-2,23)	**	-0,878 (-0,42)								
<i>DueSicilie</i>	-14,684 (-7,28)	***	-9,344 (-5,84)	***							
<i>Periferiche</i>	-1,808 (-0,53)		1,222 (0,45)								
<i>Limits to executive</i>					3,655 (5,51)	***	2,228 (4,08)	***			
<i>Election</i>							0,447 (7,23)	***	0,268 (5,11)	***	
<i>Associations</i>							0,006 (0,51)		0,013 (1,45)		
R <sup>2</sup>	0,46		0,43		0,26		0,16		0,43		0,32
Observations	88		88		88		88		88		88

**Table 8. OLS and quantile estimations - dependent variable: output efficiency (DEA) score  
(t-statistics in parentheses)**

	OLS		Quantile regression: deciles							
			0.1		0.25		0.75		0.9	
<i>Constant</i>	0.268 (1.93)	**	-0.496 (-2.60)	**	0.211 (0.83)		0.647 (5.42)	***	0.258 (1.00)	
<i>Morality</i>	0.001 (0.67)		0.007 (2.23)	**	0.003 (0.88)		0.001 (0.38)		-0.001 (-0.35)	
<i>Intpol</i>	0.003 (1,62)	*	0.007 (4,17)	***	0.006 (3,05)	**	0.007 (3,05)	**	0.018 (5,45)	***
<i>Net</i>	0.001 (0,79)		0.004 (2,79)	**	0.002 (1,24)		-0.001 (-0,64)		0.001 (0,65)	
<i>Center</i>	-0.032 (-1,12)		0.111 (2,56)	*	0.031 (0,69)		-0.050 (-1,54)		-0.120 (-1,81)	*
R <sup>2</sup>	0.02		0.12		0.05		0.05		0.11	
Observations	397		397		397		397		397	