# THE WELFARE COSTS OF NATIONAL STANDARDS: THE CASE OF HEALTH CARE IN ITALIAN REGIONS 1999-2008

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# The welfare costs of national standards: The case of health care in Italian regions 1999-2008[+] (preliminary version)

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ABSTRACT

This paper analyzes the welfare effects deriving from the uniform level of public provision of a good dictated by a standard set up by the central government. The service is delivered by local governments but financed centrally through a proportional tax. The case in which local jurisdictions can top up the national standard with local financing is also considered. Citizens differ in income and choices are made through multi-level voting. It is shown that the national standard involves inefficiencies, while reforms aiming at restoring efficiency through decentralization are likely to involve equity problems. The model is tested with reference to public health care provision in Italy. The evidence supports the model's indications about the presence of inefficiencies in terms of too large/too small supply in poor/rich regions. Users' welfare in the richest regions also significantly depends on the tax burden, thus confirming the role of the redistributive policies that support the implementation of standards.

**Key words:** Decentralization, national standards, health care, welfare losses

**JEL**: D72, D73, H41, H72

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*1. Introduction*

According to most of the literature centralization is synonymous of uniformity of service provision and standards are the typical instrument to introduce uniformity. However, recent research[1] reckons that centralized and uniform provision is, neither in principle, nor in fact a necessity. Uniformity is rather the intended result of government action. All governments can, and do in fact, differentiate policies when they want to do so[2], except when differentiation is made impossible by the non rival and non excludable, i.e., pure public good character of the good they provide[3].

A rationale for the introduction of standards and uniformity among levels of government refers to the merit good argument, applied to intergovernmental relations. More generally, policies and goods can have a merit for the (benevolent or not) level of government that imposes them, but not for the other levels of government. Standards are thus a tool for securing that these policies will be implemented to the desired extent.

A second rationale, based on efficiency arguments, refers to externalities. By setting standards, the central government may aim at encouraging the activities that produce positive externalities and (by setting caps) can discourage those activities which originate negative externalities, according to a command and control approach such as that often applied with respect to consumers or firms[4]. Standards may be particularly relevant when the provision of public services is influenced by the so-called threshold technology (Hirshleifer, 1983), meaning that all subnational governments have to reach a given common level of service provision to make that service effective.

There is a lesser theoretical ground for justifying standards on purely equity grounds. Policies and goods frequently subject to standards, such as health care, are surely crucial for determining the well-being of the poor people, and standards are also often coupled with subsidies aimed at supporting their implementation in poor districts. Standards, however, are not necessarily the most suitable instrument to be used to enhance the welfare of the poor, and, more in general, for poverty alleviation policies. The main objection against standards is that they constrain the choices of poor potential beneficiaries in a way that can be contrary to their preferred strategy. For example, poor people may feel that standards for health spending are too high and they lead to a cut in expenditure for education below what they consider the absolutely minimum level for their well-being.

More in general, standards result - unless preferences are the same for every citizen (in which case they would be useless) - in a level of service provision that is necessarily too high for some citizens and too low for others, creating welfare losses. However, losses are not symmetric. Citizens who prefer more than what is provided for by the national standards can, in most cases, address the local government, the market, or other providers, such as associations of consumers or clubs to satisfy

[1] A survey of the literature on de/centralization referring to the OECD countries is provided by Ahmad, Brosio, and Tanzi (2008). See also Breton, 1996, and Lockwood, 2002.
[2] The motivation is often that of favoring districts who support the ruling parties (see, e.g., Picci and Golden, 2008).
[3] Conversely, decentralization can boost convergence in policies (Ahlin and Mörk, 2007), due, e.g., to mimicking by politicians to ensure reelection.
[4] For a discussion of the political economy implications of this approach see Crémer and Palfrey, 2006.

them. Adjustment is not feasible to those who prefer less than what is publicly provided, since there is no way to reduce, individually, the level of publicly provided services. Moreover, centralization via standards may also impose costs on individuals with high preferences. This happens when alternatives to public provision of the service are less efficient.

The diffusion and persistence of standards notwithstanding the aforementioned drawbacks, however, invites to a more close investigation of the political economy problems involved. In this paper we aim at bringing together suggestions coming from previous studies that tackle specific aspects of the question, in order to build and to test a simple compact model. More specifically, Crémer and Palfrey (2000, 2002, 2006) studied the effects of standards in a very general framework, in which voters differ in preferences over a single issue dimension. The focus of the authors is on the working of a multi-level voting process. While many useful insights about the welfare effects of standards are drawn, at this level of generality the redistributive problems often raised by the financing side of policies involving standards cannot be studied. The latter topic is quite important in practice, since standards pertaining to public provision of goods are routinely linked to some form of relief for the poorest areas that have to implement them. To focus more closely on the financing side, one can note that there are analogies between the working of national standards which allow for supplementary supply of goods by local jurisdictions and the situations in which a good is only centrally supplied by the public sector but can be supplemented by citizens through private purchases on the market. Epple and Romano, 1996, discuss this case considering agents which differ in income, and work out the implications for the functioning of the median voter/median income model. The interplay between equity and efficiency problems, which naturally arises when both public supply of goods and financing through redistributive taxation are considered, is tackled by Brosio et al., 2002. They show that conflicts deriving from the efficiency losses stemming from centralized decisions, which mainly hit the poor, may be appeased by implicit forms of income transfers (in the specific case of Italy, tolerance of a larger tax evasion in the poorest areas). Brosio et al. assume that jurisdictions differ in income, but do not allow for the possibility of supplementary local provision of goods or private purchases on the market.

Building on the aforementioned contributions, in this paper we present a basic model describing the determination of the quantity of a publicly provided good in a national and then multi-level median voter framework, and discuss its welfare implications. Taxation is redistributive and preferences for the publicly provided good are determined by voters' income. This may appear as a non-necessary specification, which restricts the generality of the analysis. Most of the modern literature prefers to ascribe differences in preferences to general factors[5], such as ethnicity, culture, and religion. However, many countries, particularly the industrialized ones, are quite homogeneous in these terms, while income and wealth conditions surely differ and impact on the willingness to pay for services. Moreover, the assumption about the role of income in shaping preferences allows the derivation of clear-cut results.

[5] For an applied study see, e.g., Strumpf and Oberholzer-Gee, who show that in the U.S. decentralization of regulation is observed in states with huge heterogeneity of preferences on liquor sales, while centralization prevails with less extreme disparities.

From the theoretical point of view, our contribution shows that also when preferences vary only with income, inefficiencies and strategic behaviour in multi-level median voter models can arise in a system that provides for national standards. Abolishing standards and resorting to decentralization, however, affects welfare in a way that depends also on the changes in the financing system, which are likely to ensue with decentralization. Distributional conflicts thus provide a likely explanation of the persistence of central standards and of the difficulties in implementing welfare enhancing reforms.

In the empirical part of the paper, we consider the case of Italy, which has a national health system where regional governments provide the services while the central government determines minimum uniform standards and provides substantial equalization grants. Data support the indications of the model about the presence of inefficiencies both for the poor and for the rich areas of the country, which, however, go in different directions (i.e., implying a public supply too large in the poor areas and too small in the rest of the country). Moreover, it turns out that in the richer Northern regions welfare is negatively influenced by indicators of the tax burden, thus confirming the importance of the financing side.

The work is organized as follows: section 2 contains the analysis, section 3 the empirical evidence and in section 4 some conclusions are drawn.

## *2. The analytical framework*

The following discussion is presented in as much of an intuitive guise as possible. Since we build on existing models (i.e., Epple and Romano,1996, Crémer and Palfrey, 2000, and Brosio, Cassone and Ricciuti, 2002) to construct a unified approach suitable for the empirical analysis, we can dispense with most technicalities. More specifically, in subsection 2.1 the simplifying assumptions of no scale economy and no spillover effect between jurisdictions are introduced and it is shown that they are not restrictive, at least with reference to health care provision. The cases in which the national standard is compulsory (subsection 2.2) and in which it represents a minimum that can be supplemented by local production (subsection 2.3) are then considered.

### *2.1. Hypotheses about scale economies and spillover effects.*

According to the literature (see, for example, Cremer and Palfrey, 2000 and Lockwood, 2006) the benefits from centralization deriving from better preference-matching can be nullified by the operation of scale economies. Unitary costs can decrease enough with the expanded size of jurisdictions and this would allow full compensation of the welfare losses due to worse adaptation to local preferences. The scale economies argument has lost, however, most of its power with the separation of production of services from their provision. This means that small-sized jurisdictions may still reap the advantages of scale economies by associating among themselves or by subcontracting the effective production of the services they have decided to deliver.

To this it has to be added that in the particular case of hospital care, i.e., the most likely to exhibit scale economies among health services, economies of scale are considered to be modest and circumscribed to relatively small hospitals (John Posnett, 1999; Kristensen T., K. Olsen, J.

Kilsmark and K. Pedersen, 2008).Italian regions have an average size of about three million people that is big enough to exploit economies of scale with an appropriate spatial organization of hospital care, with the exception possibly of only one region.

The benefits from decentralization can also be imperiled by the existence of spillovers. In the case of hospital care, for example, the mobility of patients, determined by quality differentials, could create congestion in jurisdictions that attract patients and costs for insufficient use of capacity in the jurisdictions from where mobility originates. Interregional mobility takes place also in Italy. Congestion and insufficient use are, however, a short-term problem, because capacity will be adjusted to match mobility flows. In addition efficiency is promoted by the benefit principle (which in this case requests the correspondence between area of impact and political area of the jurisdiction), also applied in Italy, that asks the regions of origin to pay fully, according to the standards, the costs imposed on the receiving regions.

*2.2. Compulsory national standards*

Consider an economy made up of 9 agents, in which each agent belongs to a jurisdiction *d=A,B,C*, each comprising three agents *i=1,2,3*. Incomes $y_{id}$ are distributed as follows:

$$y_{1A} < y_{1B} < y_{1C} < y_{2A} < y_{2B} < y_{2C} < y_{3A} < y_{3B} < y_{3C} \qquad (1)$$

Hence $y_{2B}$ is the national median income, while jurisdiction A is the relatively poor one and jurisdiction C is the relatively rich one.

Let us consider the case in which the decision about the standard amount of health care $h_g$ that must be supplied by the public sector to each individual is taken by voting at the national level. Moreover, citizens can buy on the market further amounts of the service. Citizens are informed about their tax price and about the market price of health care. The quantity of health services bought in the market (if any) is $(h - h_g) \geq 0$.

Each agent's utility depends on health services *h* and on a numeraire good x. Both *x* and *h* are private[6] and normal goods. All agents have the same strictly concave utility function, given by *U(x,h)*.
The public sector produces health services under a constant returns to scale technology at marginal cost *c*. Thanks to this assumptions, production can actually be decentralized, that is each region can produce $h_g$ complying with the national standard. Local production does not entail externalities.
Production is financed through a uniform proportional tax rate, *t*, levied by the central government. The total tax payment for each individual is *ty*. There are no other public expenditures, so tax receipts are solely used for providing health services.

The government balances the budget at the national level, and thus

$$ch_g = ph_g = t\bar{y}$$

[6] It is widely held that health services are basically private goods that the public sector may supply. While there are many relevant externalities, we disregard them for the sake of simplicity.

where a unit price $p=c$ is accounted for, $\bar{y}$ is national average income, while $t = \frac{ph_g}{\bar{y}}$ represents the equilibrium tax rate, $\frac{p}{\bar{y}}$ is the average tax price nationwide, while the individual tax price is $\frac{py}{\bar{y}}$.

Good $h$ is also provided by the market or by other providers at price $\frac{p}{\alpha}$, where $0<\alpha<1$ is an efficiency factor. When $\alpha \to 0$ the market is completely inefficient and there is no way of buying outside the public sector. When $\alpha \to 1$ the market tends to be as efficient as public provision: voters not satisfied with the level of government provision can buy the quantity they prefer. The assumption of an efficiency level lower in the market than in the public sector is aimed at capturing some features of health care provision in European countries, where the public sector is the unique supplier in many fields, the market is segmented and private supply often specializes in providing high quality of accommodation for less serious illnesses, with high prices.

As long as an individual buys (h-$h_g$) on the market, her budget constraint is:

$$y(1-t) = x + \frac{p}{\alpha}(h - h_g)$$

where $y(1-t)$ is the agent's net income.
Her utility function can thus be written as

$$U\left[y(1-t) - \frac{p}{\alpha}(h - h_g), h\right]$$

In order to find out the voting behaviour of such an agent, one can consider her marginal rate of substitution $MRS_{h_g,t}$, that is:

$$MRS(h_g, t)_{|h_g<h} = \frac{dt}{dh_g} = \frac{p}{y\alpha}$$

The slope of the indifference curve is thus positive and constant. The agent's indifference curve is linear.

Let us now consider larger levels of $h_g$ provision so that no supplement is bought on the market. In this case the utility function can be rewritten as

$$U[y(1-t), h]$$

and we have

$$MRS(h_g, t)_{|h_g=h} = \frac{dt}{dh_g} = \frac{U_h}{yU_x}$$

Thus for these (larger) $h_g$ levels the indifference curve becomes[7] concave, due to the diminishing $MRS_{h,x}$.

To describe the effects of income on preferences, let us note that a larger income entails a smaller slope of the indifference curve *ceteris paribus*. When the indifference curve becomes concave also the changes in the $MRS_{h,x}$ due to income changes might become relevant. We focus on the case in

[7] Epple and Romano, 1996, show that the indifference curve is continuous.

which $\frac{\partial MRS_{h_g,t}}{dy} > 0$ (Slope Rising in Income, SRI), which occurs whenever the income elasticity of demand is larger than the (absolute value) of the price elasticity. This seems to be the case for health care. More generally it is widely held that the share of GDP absorbed by publicly provided goods increases with the increase of GDP. Under the SRI assumption the indifference curves of the richer agents cross those of the poorer from below in the ($h_g$,$t$) plane.

The result of voting can be found out in Figure 1, in which the agents' indifference curves represent the tax rate the agent is willing to bear for each $h_g$ level in order to stay at a given utility level, while the straight line from the origin represents the tax rate needed to balance the budget at each $h_g$ level (that is $t = \frac{ph_g}{\bar{y}}$). Agents utility increases in the South-East direction, so their best choice (their vote) is at the tangency between the indifference curve and the budget constraint. As long as also the richest agent, endowed with income $y_{3C}$ finds that her tax price is lower than the market price of health care, that is

$$\frac{p}{\alpha} \geq \frac{py_{3C}}{\bar{y}}$$

she will vote for a positive amount (the slope of her indifference curve at the origin is larger that that of the budget balancing tax rate). Concavity of the indifference curves implies that for each agent there is just one optimal vote. The preferred $h_g$ level is increasing in income thanks to the SRI assumption. Hence the decisive agent is the one endowed with the median income, which coincides with the median of incomes in the B jurisdiction, that is $y_{2B}$.

Since the cost of health care on the market is larger than in the public sector, the alliance between the very poor and the very rich, all aiming at a small public expenditure, often envisaged in models of this type (Epple and Romano, 1996) does not materialize. The rich (mainly belonging to jurisdiction C) in fact would like to receive their (large) desired amount in the public sector. Since the median voter prevails instead, they can then buy some further amount on the market: their actual consumption, however, will be below that for which they voted for in the public sector, due to the higher price they face in the market.

The system entails some redistribution as poor agents pay a relatively small tax price; they, however, bear a welfare loss due to a provision too large for them. In figure 1, considering median voters in each jurisdiction, the loss of the one belonging to the poorest jurisdiction, endowed with income $y_{2A}$, corresponds to the difference between $t_B$ and $t_A$. Similarly, the welfare loss of the rich, as long as the market price is prohibitive, is shown by the difference between $t_C$ and $t_B$.

A welfare improvement for the majority of voters in the poor jurisdiction would occur if the amount of the in-kind transfer exceeding that preferred by the local median voter would be transformed into a cash transfer[8].

[8] Also the richest agent in this jurisdiction might benefit, as long as her preferred amount is low enough with respect to the national median. Moreover, such a voter might also use the cash transfer for buying supplementary amounts on the market. For the richest jurisdiction a parallel intervention would be the resort to local taxes for financing further local supply, in order to benefit at least two voters out of tree.

[FIGURE 1 about here]

This arrangement, however, can be problematic from a political point, since it changes the type of redistribution. While the in-kind transfer provision system might be accepted upon a merit good argument, a stronger opposition can arise with respect to a system involving cash transfers.

*2.3. National standard plus local supply*

A less far reaching reform, that at first sight might give more leeway to local jurisdictions in order to solve the efficiency problem is to set the national standard (which determines the nationally funded provision) as a basic minimum, while local jurisdictions are let free to supply and to finance on their own further services. This approach would grant the possibility of setting the standard at a level suitable for the poor jurisdictions, while at the same time allowing the richer ones to produce in the public sector the amount they desire. If, however, local tax systems differ from the national one in the visibility of the burden, while both the national standard and the local health supply are decided through voting, there is no guarantee of an efficiency improvement. To clarify the problems that might arise, let us assume that production corresponding to the national standard is still financed centrally by a proportional income tax. The further local supply $h_l$, if any, while having the same marginal cost $c$, is financed through highly visible users' direct payments, entailing a "perceived" unit price $p_l$ such that

$$\frac{p}{\alpha} > p_l > \frac{py_3}{\bar{y}}$$

i.e., the perceived local price[9] $p_l$ is smaller than that prevailing in the private sector $\frac{p}{\alpha}$ but larger than any tax price paid to implement the national standard. This perception might be driven, e.g., by the fact that the national government also resorts to public debt in order to finance the service[10], while local governments are compelled to balancing the budget. The perception of a local price larger than the central one seems appropriate for describing the current Italian situation. Since the regions' budget is largely absorbed by health care, any increase in health supply implies either visible cuts in the supply of other services or the resort to copayments by citizens or the danger of creating budget imbalances. To balance their budget regions are then compelled to increase the rates of highly visible taxes, such as the surcharge on the income tax (Irpef) and the regional business tax (Irap)[11].

Considering voters' preferences, since the "local" price is smaller than the market price, all voters prefer to be served by the regional supply with respect to the private one, and by the nationally mandated supply with respect to the regional one.

Let us assume that the national vote comes first, then there is the local one. Proceeding backward and assuming that $h_g$ has already been set by national voting and thus is compulsory for all local jurisdictions, in local elections all voters will face a unit price $p_l$. Hence their demand, provided that

[9] The local price might difffer from one jurisdiction to another.

[10] That is $ph_g = \gamma ch_g = t\bar{y}, \ldots 0 < \gamma < 1$.

[11] Big regions such as Lazio, Campania and Sicilia were forced to take these measures, while others are in danger if they do not cut their expenditure.

they all have the same utility function, will be larger the larger their income[12]. Hence local elections will set $h_l \geq 0$ at the level preferred by the agent characterized by the median income at the local level.

As for the national level, by following an approach like that of Crémer and Palfrey, 2000, one can assume that voters cast their vote for the national standard after having anticipated the equilibrium total supply in their jurisdiction, that will result at the end, when also local voting has taken place. More specifically, a voter who would prefer a total public supply smaller than the median in her jurisdiction, can prefer to cast a national vote equal to that median if, by so doing, the national standard is driven nearer to that median. The idea is that this voter cannot win locally, but by aligning the national standard to the local median she reduces her own expenditure, since national financing is less costly than the local one. In sum, being unable to reduce the amount of supply, she tries to reduce its cost by strategically adapting the national supply to local preferences.

With reference to the income distribution assumed in (1), let us consider a case in which $p_l$ is not very large in jurisdiction C, so that after voting locally in this jurisdiction a total supply $T = h_g + h_l(y_{2C}) \geq h_g^*(y_{2B})$ would arise, i.e., whichever the national standard $h_g$, through local voting jurisdiction $C$ would produce an amount larger than the amount preferred by the agent endowed with the median income nationwide. In such a case the voter endowed with income $y_{1C}$ realizes that it is better for her to vote $T$ at the national level. As a consequence, the national standard is set at $T$, that is at an amount larger than that arising when the standard cannot be supplemented by local provision[13]. The paradoxical implication stressed by Crémer and Palfrey for a similar case is the national standard increases more the lower is the local price, since a low local price boosts demand.

Since national standards can work poorly both when they are mandatory and when they refer to basic levels of service that can be supplemented by local provision, one wonders if it would be better to dispense with them altogether, through full decentralization of supply coupled with proportional taxes levied on local incomes. However, if each jurisdiction were to rely only on its own income tax base for financing the service, the flow of resources from the richer local jurisdictions that drives the tax price down in the poor ones would end. In the poor jurisdiction the line representing the tax rate requested to balance the budget would become more steep[14]. While a poor jurisdiction would then be able at choosing her preferred health care provision, the loss of transfers might negatively affect its welfare. Equalization grants can be introduced, but poor local jurisdictions might prefer to oppose decentralization for the fear that the rich ones use the excuse of correcting the inefficiencies to get rid of redistributionaltogether. Rich local jurisdictions might

[12] Under the SDI assumption, that is, of income elasticity of demand larger than price elasticity (in absolute value), the preferred total amount $h_g+h_l$ of public health supply is increasing in income, as in the case considered in subsection 2.2. Thus, for given $h_g$, the preferred $h_l$ is larger the larger is income.

[13] Other income distributions do not imply this effect, as long as no strategic move by a voter can force the national standard at the level she prefers.

[14] In jurisdiction A it would become $\frac{ph_g}{y_{2A}} > \frac{ph_g}{y_{2B}}$

oppose the resort to pure income transfers on the basis of worries about the possible diversion of monetary resources away from merit goods by the poor receiving jurisdictions.

*3. Empirical analysis*

The debate about policies could become more focussed if more information were available about the actual welfare implications of national standards. We use Italian data to test whether efficiency losses and distributional problems actually arise.

According to the model presented in section 1, under the balanced-budget assumption, the tax rate preferred by the median voter equals the share of health expenditure on GDP, that is $t = \frac{ph_g}{\bar{y}}$ (see also Figure 1). As a consequence, voters with an income lower than the median should find that the actual share of health expenditure on GDP is too large (for the poor) or too small (for the rich). As long as the mean and the median income coincide analogous information is conveyed by the per capita health expenditure as a share of each citizen's income. Since supply is too large for the poor $\frac{ph_g}{y} > \frac{ph_g}{\bar{y}} > \frac{ph_g^*}{\bar{y}}$ must hold, where the first term indicates the incidence of health expenditure dictated by the national standard on the poor's income and the last term the tax rate for which such an agent votes for, involving a smaller health supply $ph_g$*. For those who have incomes above the mean the inequalities are reversed. Summing up, given the amount of health expenditure chosen by the mean(=median) voter, welfare should thus be decreasing in the share of health expenditure on their income for the poor, and increasing in the same variable for the rich. However, as long as the median voter's income differs from $\bar{y}$, the aforementioned share would not provide a correct indication for voters with incomes comprised between the mean and the median.

Coming to the empirical analysis, in the actual world the median can differ from the mean income, while the median voter territorial location is not available.. We must thus resort to a more rough strategy, that unavoidably involves some approximation. We split the Italian regions in two sub-samples, made up respectively by the regions belonging to the Northern and to the Central-Southern part of the country, a division usually considered in economic and political analysis, and often specifically used for health services[15], to distinguish the haves and the have-nots. We expect that in both areas the average citizens' satisfaction for the health services depends on the share of health expenditure on the regional GDP (after having controlled for the role of other variables that might also be at stake). The expected sign of this variable is negative in the Centre-South (since there the incidence of the service provision is more likely to be too high) and positive in the North (for the opposite reason).

While the share of expenditure on local GDP should impact on the evaluation of welfare provided by the service mainly on the supply side, the net effect of the policy on utility should depend also on the financing side, which can vary from one region and another, according to their tax base and to whether the region has budget imbalances or decides to supply more than the national standard. The

[15] For its relevance for health care, see Mapelli, 2012.

topic of territorial redistribution through taxation is highly debated and highly visible in Italy. Thus we resort to a variable describing the per capita tax burden of each region and here too we expect that the variable has a different impact on welfare in the poor receiving regions and the rich paying ones.

### *3.1 The main traits of the Italian health care system*

Italy has a national health service where regional governments are responsible for the provision of the services, while the central government determines minimum uniform standards enlisting and describing the services to deliver all over the country– the so-called Essential Levels of Service (LEA in the Italian acronym) and provides equalization grants aimed at bringing each region to a level of per-capita revenue destined to finance health care very close to that of the richest regions, notwithstanding its income and wealth conditions. Regions can go beyond the LEA resorting to their own budget, but budget constraints have become harsher in recent years. The working of the revenue system is summarized in table 1 that follows. Column 2 shows per-capita total revenue destined for health care. It has to be noted that the revenue available to finance health care of the richest region, Lombardy, is lower than that of the poorest region, Calabria. Own regional taxes shown in column 3 – namely, IRAP (a regional tax on business) and the regional surcharge on the personal income tax – show a large variation moving from the richest to the poorest regions. For example, in Lombardy own taxes represent 52,4% of total revenue destined to health care, while this share is only 9,4 percent in Calabria. The gap between own and total revenue is filled mostly by equalization grants aimed at ensuring the homogeneous level of services among all regions. In the case of Calabria other revenue represents more than 90 percent of revenue.

Individuals supplement publicly provided services with their own expense for medicines (including co-payments), dental and other specialist care and hospital services. The share of private on public expenditure is substantial amounting to more than twenty percent of the latter and is steadily increasing over the years.

[TABLE 1 about here]

### *3.2 Variables*

To examine the issue of how national standards impact on welfare we use as a dependent variable the share of patients of each region that reported high satisfaction levels in a national survey. Satisfaction can be though of as a behavioural definition of utility. It is in fact a complex concept that relates to many factors, such as subjective preferences (impact of health care on utility), objective characteristics of the service received (quality of care), past experience and future expectations, as well as individual values and those of society (Carr-Hill, 1992). According to the available literature, when abstracting from expectations, income has a positive impact on patient satisfaction for public health care. With higher income patients can afford better medication and treatments, and receive the same benefits from the public sector as at a lower share of income. As an increase in the perceived value of consumed hospital offerings, these betterments lead to higher patient satisfaction (Frank et al., 2009).

There is little doubt that expectations play a fundamental role in expressions of satisfaction. People rarely make absolute judgments, but based on their knowledge they draw comparisons from their past or from their future expectations. The degree to which the health care experience meets a patient's expectations is an important determinant of satisfaction.

Patient's expectations are not static and change with time, knowledge, and accumulated experience. Increasing quality of care may increase the levels of expectation. As a result, there may be a paradoxical lowering of satisfaction with increasing quality of care (Chow et al., 2009).
It is thus clear that in order to use satisfaction as a proxy of utility one must control form many other relevant factors.

Since public health care services are aimed at benefiting the population also when in health, by providing a form of insurance, an alternative dependent variable that one might consider is satisfaction of the population as a whole. Since, however, those who receive hospital treatments are potentially more in need, their evaluation is likely to be more positive[16] and thus can provide a more severe test about welfare losses that might nevertheless occur due to the national standard.

In our data, satisfaction was measured as a summary judgement by asking the respondents if they were satisfied with the hospital physician services as a whole with five response categories that ranged from very dissatisfied (=1) to very satisfied (=5). However, it is questionable whether patients themselves make a fine distinction in this field. Hence our dependent variable is the share of population that in each region reported to be either satisfied or very satisfied, a rescaling which represents a research procedure not distorting the results (Fornell et al., 1996). The test thus refers to a subset of health care services.

To control for the actual quality of care received, we introduce the patient immigration index: Regions providing better quality should attract more patients.

Although the expectation that patients have of health care system affect their perception greatly and, in turn, their satisfaction with care (Chow et al., 2009), demographic characteristics may have an even greater impact on satisfaction, especially in circumstances where the entire population is provided with equal services as in centralized countries. Perhaps the most consistent characteristic to use as a control variable is patient's age, with a significant body of evidence suggesting that older people are normally more satisfied with healthcare than their younger counterparts (Nguyen Thi et al., 2002). Elderly citizens – in our case people aged over 65 years - have a poorer than average health status and require more health care consumption relative to the others.

Further control variables are suggested by the literature on satisfaction: total regional population captures potential congestion on hospital services; the ratio of hospital beds to population represents the relative use of factors in hospital production, capturing possible shortages or waste.

[16] Satisfaction expressed by the whole population with respect to public health care is routinely much lower in Italy (see, e.g., Mapelli, 2012).

Finally, to test the impact of the central mandate on utility, we introduce the ratio of public health expenditure to GDP[17]. The hypothesis to be tested is that in poor regions satisfaction is inversely correlated with such a ratio, which represents an indicator of the disproportionality of health supply with respect to local demand. A relationship exhibiting the opposite sign should occur in rich regions, where the national standard drives down a consumption which is more desired the higher is the income level.

To consider the financing side, we use the variable *irap*, wich measures in per capita absolute amount the proceeds from IRAP (business tax) plus those of the regional surcharge on IRPEF (personal income tax ), which are the most visible sources destined to financing health care.

*3.3 Data*

Data were obtained from the Annual Survey on Italian Households (*Analisi Multiscopo*) conducted by the National Institute of Statistics (Istat) as well as complementary statistical information from a web page of Italian Ministry of Finance that contains a collection of fiscal information at the regional level. We have collected data for 20 Italian regions for the period 1999-2008.[18] Variable names along with summary statistics are given in Table 2.

[TABLE 2 about here]

On the basis of the analytical approach, the dependent variable is information on satisfaction score, *sat*. Data limitations require us to use a parsimonious set of covariates. In particular, factors that may influence satisfaction include:

- *gdp*, per capita GDP measured at current prices converted in real terms (100=1995);
- *mob*, the ratio between regional hospital discharges of patients coming from other regions and total regional hospital discharges
- *pop65*, the percentage of people aged 65 years and over;
- *pop*, total population in thousands;
- *beds*, the ratio of hospital beds to 1,000 population;
- *health*, the ratio of public health care expenditure to gdp.
- *irap*, per capita irap plus regional surcharge to irpef conveyed to finance health care.

*3.4 Method and results*

Although a number of studies on patient satisfaction use multiple linear regressions, this is generally regarded as inappropriate for ordinal data [Hastie et al., 1989]. Hence, in what follows we

[17] Satisfaction instead refers to a specific component of health service. Since, however, around a half of the budget available for the implementation of the LEA, i.e. the national standards for health services, in the years considered was assigned specifically for hospitals (Mapelli, 2012), considering the total health expenditure as we do is harmless since we take a multiple of the relevant variable.

[18] No statistical returns of hospital satisfaction were made in 2004.

adopt a quasi-likelihood analysis applying link functions appropriate for binary data to patient satisfaction data which are proportional ranging from 0 to 1. In fact, unlike linear regression, quasi-likelihood does not require the equi-distant assumption on the levels of the response variable. Rather, by specifying a family of link functions the scale can be estimated from the data [Preisser, 2003]. Data is analyzed using STATA (Version 10.1, StataCorp, College Station, TX).

To run the test the sample is split in two sub-samples, made up respectively by the regions belonging to Northern and to the Central-Southern part of the country, a division usually considered in economic and political analysis.

[TABLE 3 about here]

Columns (1) and (2) and columns (3) and (4) show the coefficient results and the standard deviations of the two sub-sample pooled regressions[19].
The first step in interpreting results is to review the output for evidence of overdispersion. The dispersion parameters are lower than 1 which indicates that there is no overdispersion in both subsamples. A plot of the Pearson residuals against the linear predictor is also performed to informally check on the adequacy of the assumed link function. If the logistic regression model were true, we would expect to see a horizontal band with most of the residuals falling within ± 3. No visible problems with both model fits was found.

Results indicate that per capita GDP is significant at the 1 percent level and has the expected positive sign in both sub-samples. The paradoxical lowering of satisfaction with increasing quality of care is confirmed in Northern regions. An increase of the ratio between regional hospital discharges of patients coming from other regions and total regional hospital discharges and regional population are associated to lower satisfaction indexes in the richer regions. In such cases it could occur that congestion effects reduce hospital quality drawing disconfirmation from people's expectations. The same explanation can justify the negative sign of the variable referred to the elderly patients, whose larger incidence in the Northern regions can be associated with congestion in the specific structures that treat them.

Finally, the coefficient associated to the ratio of public health care expenditure to GDP is negative and statistically significant in the Southern regions, thus implying that welfare losses arise due to the distortion of supply with respect to local demand. This finding confirms that centralization reduces the welfare of poorer regions, preventing them from tuning the level of publicly provided services in order to meet their preferences. In the Northern regions the opposite sign is found, thus implying a potential demand not satisfied. The burden of taxes instead turns out to influence negatively the patients' satisfaction in the Northern Regions, but has the opposite sign, while being not significant, in the Centre-South, where redistribution increases the amount of available resources.

[19] F-tests are performed on the null hypothesis that the coefficients for each variable are the same for each year (Levaggi and Zanola, 2003). The null hypothesis of equal coefficients could not be rejected in either case, therefore data can be pooled.

## *4. Conclusions*

Through a basic model and an empirical analysis we confirm that centralization of standards produces welfare losses, particularly for individuals that are interested to a level of service provision that is lower than the actual one. This is the case of low income individuals. Centralized standards increase the opportunity costs for these individuals by forcing them to pay a tax rate higher than their preferred one, or to spend a subsidy for an item that does not have the highest priority for them. To this extent the argument proposed here can be seen as an extension of the usual argument about welfare costs brought by in-kind grants. But standards also hurt the rich, as long as supplementary provision by local jurisdictions or the market is available only at a higher price.

We also show that, when local provision supplements the centrally mandated one, there is no warranty of an efficiency improvement; things might actually get worse if local provision is perceived as more costly than the national one and richer voters behave strategically in order to push the national standard nearer to the median preference in their jurisdiction.

The hypothesis of welfare losses due to the national standard has been tested using information on satisfaction of users of the Italian health care system. The statistical analysis confirms that satisfaction is negatively linked to the impact of national standards both in poor Central-Southern regions and in the rich Northern ones, while the underlying preferences in the two areas diverge. Moreover, in Northern regions, which are harnessed by the redistributive process, satisfaction is also negatively affected by the burden of taxation.

While in this paper an aggregated analysis was performed with reference to the Italian regions, a firmer ground to the testing would be provided by individual disaggregated data. However, this data is not available at the moment.

Finally, the arguments developed in the paper have important policy implications questioning the rationale and the cost-effectiveness of policies based on central standards that are intended to foster the access to services by the poorer segments of the population. The paper suggests that the same level of satisfaction that is reached with centralized-standards-*cum*-redistribution could be attained in a decentralized setting with equalizing grants. This more efficient arrangement, however, is often blocked by the disputes about the division of potential gains and by the reciprocal mistrust between the parties involved.

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**FIGURE 1**

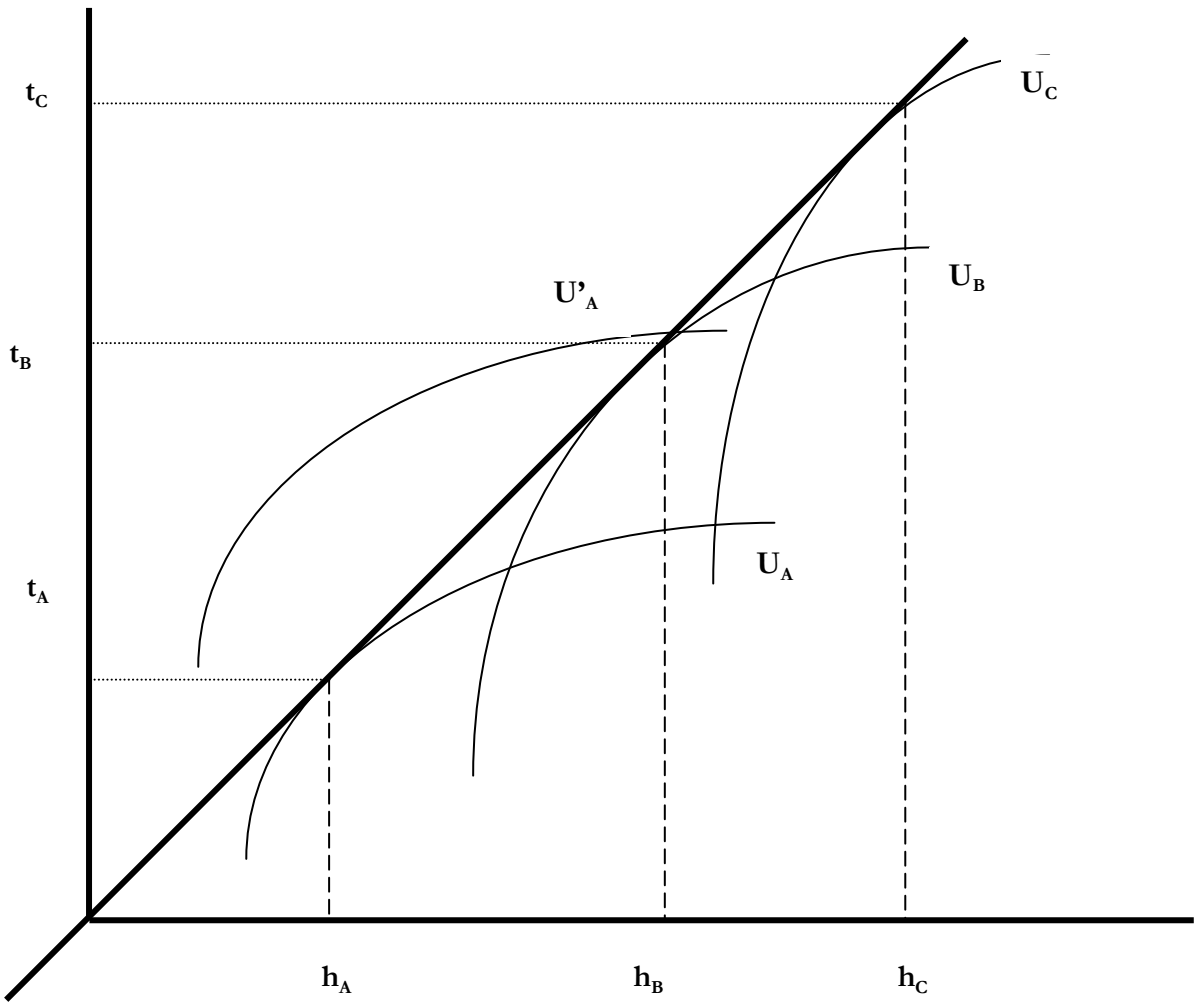

**TABLE 1. Financing of public health care in Italy, 2010**

| Regions | Per capita total revenue (Euros) | Per capita tax revenue | % ot tax on total | % ot transfers and other on total |
|---|---|---|---|---|
| Piemonte | 1949 | 691 | 35.5 | 64.5 |
| Valle d'Aosta | 2267 | 772 | 34.1 | 65.9 |
| Lombardia | 1784 | 934 | 52.4 | 47.6 |
| P.A. Bolzano | 2203 | 859 | 39.0 | 61.0 |
| P.A. Trento | 2109 | 700 | 33.2 | 66.8 |
| Veneto | 1804 | 718 | 39.8 | 60.2 |
| Friuli | 2012 | 746 | 37.1 | 62.9 |
| Liguria | 2015 | 591 | 29.3 | 70.7 |
| E. Romagna | 1878 | 786 | 41.9 | 58.1 |
| Toscana | 1914 | 666 | 34.8 | 65.2 |
| Umbria | 1828 | 492 | 26.9 | 73.1 |
| Marche | 1866 | 570 | 30.5 | 69.5 |
| Lazio | 1800 | 796 | 44.2 | 55.8 |
| Abruzzo | 1818 | 424 | 23.3 | 76.7 |
| Molise | 1793 | 205 | 11.4 | 88.6 |
| Campania | 1701 | 303 | 17.8 | 82.2 |
| Puglia | 1754 | 297 | 16.9 | 83.1 |
| Basilicata | 1798 | 169 | 9.4 | 90.6 |
| Calabria | 1835 | 122 | 6.6 | 93.4 |
| Sicilia | 1732 | 365 | 21.1 | 78.9 |
| Sardegna | 1752 | 438 | 25.0 | 75.0 |
| **Italy** | 1822 | 611 | 33.5 | 66.5 |

Source: Ministry of the Economy, *Relazione Generale sulla Situazione Economica del Paese, 2010*.

**List of variables**

- *gdp*, per capita GDP measured at current prices converted in real terms (100=1995);
- *mob*, the ratio between regional hospital discharges of patients coming from other regions and total regional hospital discharges
- *pop65*, the percentage of people aged 65 years and over;
- *pop*, total population in thousands;
- *beds*, the ratio of hospital beds to 1,000 population;
- *health*, the ratio of public health care expenditure to gdp:
- *irap*, irap (business tax) plus regional additional to irpef, per capita (business and income tax), conveyed to finance health care.

**TABLE 2. Summary statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| *sat* | 180 | .364 | ,124 | .138 | .667 |
| *gdp* | 180 | 27,620.9 | 8,030.026 | 13,192.3 | 45,827.45 |
| *mob* | 180 | 9.849 | 5.671 | 3.8 | 24.8 |
| *pop65* | 180 | .197 | .029 | .135 | .268 |
| *pop* | 180 | 2,901,965 | 2,311,471 | 118,754 | 9,692,541 |
| *beds* | 180 | 4.122 | .629 | 2.955 | 5.969 |
| *health* | 180 | 6.891 | 1.702 | 4.193 | 10.939 |
| *irap* | 180 | 613.863 | 298.566 | 96.073 | 1,341.192 |

**TABLE 3. Results**

| | North | | Centre and South | |
|---|---|---|---|---|
| | **Coef.** (1) | **Std.Err.** (2) | **Coef.** (3) | **Std.Err.** (4) |
| *gdp* | 2.029*** | .528 | 1.004*** | .278 |
| *mob* | -.036*** | .015 | -.019** | .010 |
| *pop65* | -6.888*** | 1.860 | 6.656*** | 2.649 |
| *pop* | -.120*** | .045 | .241*** | .053 |
| *beds* | .278*** | .085 | .066 | .064 |
| *health* | .214*** | .068 | -.088*** | .032 |
| *irap* | -.767*** | .315 | -.162 | .136 |
| *cons* | -14.976** | 3.944 | -4.145** | 1.955 |
| | | | | |
| (1/df)Deviance | .0179 | | .0218 | |
| (1/df) Pearson | .0178 | | .0216 | |
| AIC | 1.080 | | .968 | |
| N | 90 | | 90 | |

Note: *.**.*** significance at .10, .05, . .01, respectively.