Società italiana di economia pubblica
XXI CONFERENZA

PUBLIC CHOICE E POLITICAL ECONOMY
I fondamenti positivi della teoria di finanza pubblica

Pavia, Università, 24-25 settembre 2009

WHAT HAPPENS TO INTERREGIONAL REDISTRIBUTION AS DECENTRALISATION GOES ON? EVIDENCE FROM THE ITALIAN NHS

CATERINA FERRARIO, ALBERTO ZANARDI

What happens to interregional redistribution as decentralisation goes on? Evidence from the Italian NHS

Caterina Ferrario
(caterina.ferrario@unife.it)
Università di Ferrara &
Econpubblica-Università Bocconi

Alberto Zanardi
(alberto.zanardi@unibo.it)
Università di Bologna &
Econpubblica-Università Bocconi

September 2009

Abstract

In this paper we explore how political pressures for an increased decentralisation of revenue and expenditure competencies to sub-national governments may affect the degree of interregional redistribution accomplished by the public sector. We do this by focusing on a specific case, that of the National Health Service (NHS) in Italy. We estimate redistribution across regional jurisdictions by the NHS under the current institutional setting and under hypothetical alternative decentralised scenarios. Using actual regionalised public budget data for the years 1999-2006, we find that the NHS reduces differences in regional per-capita GDP by about 7% of GDP. This effect amounts to approximately 16% of redistribution by the total public budget and is largely driven by NHS expenditures. We then show that these results are subject to significant changes under alternative scenarios of intergovernmental relations, which we construct consistently with current instances emerging from the Italian debate on fiscal decentralisation reform. We show that political pressures for lower central government involvement in decentralised policies, such as health care, may result in lower levels of income redistribution across Italian regions.

Keywords: Health, Redistribution, Intergovernmental Relations, Decentralisation, Regions
JEL classification: E62, H23, H50, H70, R10

1. Introduction

The public budget redistributes resources across citizens (interpersonal redistribution), levels of government (intergovernmental redistribution) or across sub-national or regional territories (interregional redistribution). Interregional redistributive effects may result from policies and programmes purposely designed for that aim (e.g. investments to fill infrastructure gaps, intergovernmental transfers), or from policies and programmes pursuing interpersonal redistribution (e.g. health care, social policies, education, income support). In the latter case, regional redistributive outcomes are an unintended by-product and occur when the personal attributes relevant for accessing welfare state programmes' net benefits are heterogeneously distributed across regions.

As maintained by most of the literature, income redistribution is more efficiently accomplished by the central government (Musgrave, 1959). Recent trends towards a more decentralised setting of intergovernmental fiscal relations, which characterise a number of western countries (OECD, 1997; Joumard and Kongsrud, 2003) as well as many developing countries (World Bank, 1997; Bird and Vaillancourt, 1998), suggest that existing levels of income redistribution across territories may be substantially revised in response to decentralization: when a former central government uniform policy is transferred to the autonomous responsibility of regional governments and these are allocated the former sources of financing, if the latter are not uniformly distributed across regions, then we may expect the interregional redistribution formerly carried out the central government policies is strongly weakened.

While the demand for decentralisation is generally driven by concerns for higher efficiency, increased revenue and expenditure autonomy at the local level, wider differentiation of services across the country and increased accountability of political decision makers (Oates, 1999; Tanzi, 1996), in some cases it is also sustained by localised preferences for lower degrees of solidarity across regions with different needs and fiscal endowments (for instance in the political debates of Belgium or Italy). In addition, when a former central government function is decentralised both as regards revenue and expenditure, if some degrees of equity across the country are desired – for instance to guarantee all citizens uniform minimum service standards – then explicit vertical or horizontal equalisation schemes may be needed to top up own resources of regions with lower fiscal endowments and/or higher needs. While these schemes may

not entail any change to the flows of resources from richer to poorer territories that were implicit in the formerly centralised setting of intergovernmental relations, they however make more explicit who is gaining and who is loosing, and how much. Thus these schemes may produce, or further foster, requests for a reduction in the level of interregional solidarity and redistribution.

Italy is a country with stark regional differences in terms of per-capita income, population structure and economic development. Moreover public budget in Italy strongly redistributes income across regional jurisdictions (Decressin, 2002) primarily as a result of the intervention of the central government and social security institutions (Arachi *et al.*, 2009). Italy has also recently experienced strong political demands for the decentralisation of public functions. Since the early 1990s the Italian institutional setting has undergone radical reforms pursuing higher decentralisation of revenue and expenditure responsibilities (Arachi and Zanardi, 2004), primarily from the central government to the regional government tier. Although these processes are not yet completed, intergovernmental fiscal relations are significantly reformed: a number of public functions have been decentralised and, according to a recent Constitutional reform, others should soon follow.

The Italian National Health Service (NHS) provides an interesting perspective on the intertwining of decentralisation processes and interregional redistribution for two reasons, both strongly connected to the peculiarities of the Italian institutional arrangements. First, health care is one of the major fields of public intervention. Second, by the Italian Constitution health care is now assigned to regional competency, but the central government still plays a significant role in the structure, operation and funding of the NHS. In particular, on the expenditure side, the central government sets minimum service standards which all regions should meet. It correspondingly runs vertical equalising transfers to regional governments, in order to top up regions' own revenues and allow minimum standards to be offered all over the country. Hence citizens are guaranteed equal minimum health care services regardless of where they live and of their participation to the funding of health care programmes. Given that average per-capita income and average tax contributions are unequally distributed across regional jurisdictions, these arrangements have potentially high redistributive effects.

In the lively Italian political debate on decentralisation, the NHS will be probably invested in the in the foreseeable future by requests for a weakening of the interregional redistribution currently carried out by central government equalizing transfers. This may imply a reduction of minimum service standards set by the central government and, as a consequence, may result in substantial disparities in health care services provision across territorial jurisdictions, due to differences in regions' own tax resources.

The aim of this paper is to estimate the degree of redistribution across Italian regional jurisdictions accomplished by the NHS both in the current institutional setting and in some hypothetical future scenarios resulting from the implementation of the decentralization reform. The paper is organised as follows. Section 2 introduces the main features of the Italian NHS and discusses the perspectives of interregional equalization in the public health care sector in the light of the current debate on fiscal federalism reform. Section 3 addresses the main methodological issues for the estimation of interregional redistribution by the NHS. Section 4 presents the results on the estimated income redistribution by the NHS in the current institutional setting. These results are also compared with redistribution by the overall public budget and investigated in terms of the progressivity of NHS programmes. Section 5 evaluates the impact of the future fiscal federalist reform on the interregional redistributive effects of the Italian NHS, on the basis of different assumption on minimum standards of health care services and funding mechanism. Section 6 concludes.

2. The Italian NHS: fundamental facts

The NHS is one of the most relevant public programmes in Italy: the provision health care services accounts for about 14% of the general government total expenditure (2006). As the result of a sequence of major reforms in the 1990s funding and organization of service provision in the Italian NHS is increasingly falling within the regional governments' competence. In Italy, like in many western countries, decentralization is seen as an attractive framework for health system organization and management, incorporating elements of local control with hoped-for efficiencies in the management of financial and human resources (Banting and Corbett, 2002; Dirindin and Pagano, 2001). As a result of this process, the Italian NHS is currently organized

into two tiers: the central government, which has programming and funding responsibilities, and the 21 regional governments, which supervise the provision of health care services in their jurisdiction and apportion the overall financial resources to the productive units (approximately 200 Local Health Units (LHU) and 100 Independent Hospitals over the country).

Each LHU is, under the supervision of the corresponding regional government, directly responsible for the provision of comprehensive care to its entire resident population, regardless of income or occupational status. The regional governments allocate resources among different productive units and also hold some tax-raising powers in order to (partially) fund the delivery of health care services and pick up their LHUs´ deficits if actual costs exceed the relevant standards. In addition, regional governments are entitled to charge users with co-payments for the provided services.

Despite this devolution of spending and tax-raising responsibilities, the central government still retains a critical role in ensuring that all citizens have uniform access to health care. To this end the central government sets minimum standards of health care services to be provided by all regional governments and manages a vertical (from the central government to the regions) equalization mechanism in order to transfer funds to those regions that, given the strong interregional differences in the distribution of the regional tax bases, are unable to fully fund minimum standards.[1]

Finally, the reform of the financing system of decentralized governments adopted in 2009 confirms, and even strengthens, this institutional framework. The central government has exclusive legislative powers to set minimum levels of public services, when those services refer to citizens' civil and social rights, to be provided uniformly all over the country. Health services, like education, child care and income support, certainly fall into this area. Moreover the reform requires that for those services a system of equalizing transfers providing for full financing of standardized expenditure needs in different regions should be applied, regardless of different fiscal capacities across regions.

[1] Actually the funding of minimum standards is accomplished by an annual decision about the total amount of national public resources to be devoted to health care sector resulting from lengthy central government-regional governments negotiations. The total amount of resources is then allocated across regions according to a formula which fundamentally takes into account the overall dimension and the composition by age groups and gender of regional populations and a set of territorial epidemiologic indexes.

As a result of these institutional arrangements, regional governments' revenues currently financing the NHS can be grouped as follows:

1. *regional taxes*, amounting to 42% of total revenues of the NHS (in the average of 1999-2006), including the regional business tax (IRAP) and the regional surtax on personal income tax;
2. *central government transfers*, including the *National equalizing fund* (amounting to 49% of total revenues and mainly financed by a tax sharing of national VAT) and the *National health fund* (amounting to 4% of total revenues and financed by central government receipts);
3. *co-payments for services*, directly levied by regional governments and amounting to 4% of total revenues.

The composition of the sources of financing show the enduring relevant equalising role of the central government. Indeed, as a result of the combination of minimum standards of health care services, of central government commitment to top up regions' own revenues, and of strong interregional differences in regional fiscal capacities devoted to health care financing, the Italian NHS produces a strong redistributive effect across territorial jurisdictions. Moreover, the decentralization of taxing powers to the regional level of government, by requiring a transparent intergovernmental equalizing transfer system, makes more manifest the size of this redistribution across regional jurisdictions. However the interregional redistributive power implicit in this institutional framework is conditional on the levels of health care needs that the central government actually decides to finance in different regions. As decentralisation discloses the interregional redistributive role of the public budget, the scope of the current interregional solidarity may be brought into question. In particular, in sectors such as health care, where expenditure needs equalisation requires the setting of minimum service standards, if strong taxing powers are assigned to regional level, rich jurisdictions have incentives to support low "minimum" standards only, and thus to limit interregional redistribution.

3. Methodological approach

3.1. Methodological background

The role of the public budget in redistributing income across different jurisdictions has been analysed in a number of works.[2] Most studies that estimate regional redistribution by the public budget regress a regional "activity" variable (output or income) including net transfers from the public sector on the same regional variable before net transfers across regions. Estimates of regional redistribution may be computed with reference to the action of the general government or of single levels of government (central government, regional governments, local governments). Net transfers may be measured through *fiscal balances*, that is the difference between total expenditure by a given level of government in a given region (net of transfers to other levels of government) and total revenues by that level in the same region (net of transfers from other levels). Revenues and expenditures should be allocated to regional territories according to the benefit principle, that is to the territory residents of which pay the contributions and receive the benefits. This allocation may be significantly different from that resulting from the cash-flow – or expenditure – principle, which assign resources to the jurisdiction of the government actually collecting revenues or paying out expenditures.

3.2. The data

In order to estimate the redistributive effects of public intervention in the NHS, and then to compare them with redistribution accomplished by the overall public budget, data on regional revenues and expenditures by the public sector respectively for health care and for total programmes are needed. Therefore we collected two different datasets for Italy, both covering the years 1999-2006. The starting year is set at 1999, a year that marks a significant discontinuity in the structure of health care revenues, due to radical changes implemented in the financing of the NHS. Data are referred to the 15 Ordinary Statute Regions (OSRs) only, excluding the 5 Special Statute Regions (SSRs), due to their peculiar financing structure and spending autonomy.

[2] Italianer and Pisany-Ferry, 1992; Sala-i-Martin and Sachs, 1992; Von Hagen, 1992; Bayoumi and Masson, 1995; Obstfeld and Peri, 1998; Decressin, 2002; Mélitz and Zumer, 2002; Padovano, 2007; Arachi et al., 2009.

The *General report on the national economy* (*Relazione generale sulla situazione economica del paese*), published each year by the Italian Ministry of economy, records revenues and expenditures by regional governments for NHS programmes on a cash basis. For our purposes these data are adjusted under three respects:

1. to re-allocate revenues and expenditures across regional governments according to the benefit principle instead of the current cash-flow approach;
2. to remove the equalising component of the NHS financing mechanism;
3. to offset excess revenues (surpluses) or excess expenditures (deficits).

As regards the first point, data recorded by the *General report* do not reflect revenues collected by each regional government from, and expenditures paid to, residents of its jurisdiction. With reference to expenditures, although benefits are mostly delivered by regional governments (through the LHU and Independent Hospitals) to their own constituency, in some cases benefits may accrue to residents of other jurisdictions. This is particularly notable in Italy, due to the significant interregional mobility of NHS patients (especially from southern to northern regions). Therefore in order to measure the benefits from health care programmes to each constituency, the raw data on regional expenditures are adjusted for net expenditures for interregional patient mobility.[3]

As for regional government revenues, these are recorded by the *General report* and disaggregated by source of financing (regional taxes, central government transfers, co-payments for services). Again, they may include resources collected from other constituencies, in particular due to the relevant role still played by central government transfers in the financing of the Italian NHS. Vertical transfers from the central government are financed through central government tax revenues, the source of which is not necessarily located in the jurisdiction where they are then transferred to. As stated in point 2, the equalising component of the NHS financing mechanism need to be netted out in order to derive the regional distribution of revenues according to the benefit principle and thus vertical transfers need to be re-allocated to the jurisdiction where they were collected. This is done by re-regionalising the two funds of interregional transfers working in the NHS (the *National equalising fund* and the *National health fund*) according to the regional distribution of central government receipts. The *National*

[3] Net expenditures for inter-regional patients mobility are recorded by the *General report* for each region *i* as expenditures for services to non-residents less expenditures by other regional governments for services to the residents of region *i.*

equalizing fund is re-regionalised according to the regional distribution of VAT receipts, and the *National health fund* is re-regionalized according to the regional distribution of overall central government taxes. This amounts to netting out central government vertical transfers from regional governments budgets and transforming them in horizontal transfers among regions. Therefore we implicitly transform the actual vertical equalisation scheme into an implicit horizontal equalisation scheme. No adjustment is applied to the other sources of regional governments' revenues: regional taxes and co-payments for services. For the former, we assume that each regional government collects revenues from its own constituency only.

Finally, regional governments' revenues and expenditures are adjusted to offset excess revenues (surpluses) or, more frequently, excess expenditures (deficits). When calculating fiscal balances, we take into account that they have two components (as clearly recognised by Ruggeri, 2008): the first is the balanced budget component that is the part of fiscal balances that, for the overall country, records the same amounts for revenues and expenditures. The second component is overall excess revenues or expenditures (surplus/deficit). The essential difference among the two components does not rest in their redistributive power, but in their inter-temporal nature. Both components impact on the regional distribution of economic activity in the year when they are registered, but in an inter-temporal perspective one can expect the deficit/surplus component to be netted out, as deficits or surpluses cannot be maintained indefinitely. We therefore isolated the balanced budget component of fiscal balances to separately estimate its redistributive effects.

After these adjustments, per-capita benefits from the NHS result to be distributed almost homogeneously across regions, although slightly lower in southern regions and greater in little regions (see table 1 and figure 1). On the contrary per-capita contributions to the NHS are strongly correlated to regional GDP, higher in richer regions and lower in poorer ones (see again table 1 and figure 1).

Fiscal balances, derived for each region, as said before, as the difference between benefits and contributions, give a preliminary picture of the main patterns characterizing interregional fiscal flows accomplished by the NHS (see again table 1). First, there is substantial redistribution from the wealthier to the poorer jurisdictions (i.e., those with per-capita GDP above or below the national average). Moreover, the size of the fiscal

balances is to some extent correlated with the surface area of the region – generally higher in smaller regions (Liguria, Umbria, Molise, Basilicata). Figure 2 gives a summary description of the distribution of per-capita fiscal balances implicit in the NHS across the OSRs.

As for the general government, the data are taken from the *Territorial public accounts* (*Conti pubblici territoriali*) currently produced by the Ministry of the economic development, and previously by the Ministry of Economy. The *Territorial public accounts* provide the allocation of revenues and expenditures flows collected/paid by each different level of government (central government, regional government, local government, social security institutions) across the 20 Italian regional territories. These are as well adjusted to transform the territorial allocation of public revenues and expenditures from a cash-flow approach to a benefit approach. In particular, expenditures are adjusted applying different procedures to different kinds of goods (pure public goods, pure private goods, mixed goods), and data on regional expenditures for healthcare are again adjusted for interregional patient mobility.[4] Once these adjustments have been applied, the per-capita fiscal balances corresponding to the difference between benefits and contributions of general government total budget have been derived for each regional jurisdiction. The results are reported in the last column of table 1.

TABLE 1 APPROXIMATELY HERE

FIGURE 1 APPROXIMATELY HERE

FIGURE 2 APPROXIMATELY HERE

3.3. Specification of the econometric model

Starting from the regional fiscal balances calculated as reported in Section 3.2., first of all we derive a summary measure of the interregional redistribution accomplished respectively by the NHS and the overall public intervention. We take per-capita regional GDP as a measure of economic "activity" before net transfers from the public sector. Following the approach proposed by Bayoumi and Masson (1995), as later developed

[4] The adjustments applied here are thoroughly described in Arachi *et al.* (2009).

by Mélitz and Zumer (1998, 2002), applied to Italy by Decressin (2002) and partially modified by Arachi *et al.* (2009), a summary measure of interregional redistribution can be derived by running an OLS estimation on the following model:

$$\tilde{y}_{it} = \alpha_2 + \beta \tilde{x}_{it} + \eta_{it} \quad (1)$$

where:

- i (=1,…, 15) and t (=1999,…, 2006) respectively denote the regions and the year;
- η is the error term;
- $$y_{it} = \frac{Y_{it}}{\sum_{j=1}^{15} Y_{jt}} \text{ and } x_{it} = \frac{X_{it}}{\sum_{j=1}^{15} X_{jt}} \quad (2)$$

  where Xit is per-capita GDP in region i and year t, while Yit, is given by Xit plus the corresponding fiscal balance; all variables are divided by nationwide values to control for shocks that are common to all regions and may be absorbed via the national budget;
- tildes denote the trend component of y_{it} and x_{it} over time isolated by applying the Hodrick and Prescott (1997) filter.

The amount of redistribution is given by $1 - \beta$. For example, if β =0.9, then a region with per-capita GDP 1 euro higher than the average ends up with disposable resources 90 cents higher than the average, implying a redistribution of 10% of GDP.

4. The redistributive effects of the NHS under the current institutional setting

4.1. Estimates of interregional redistribution

The estimated values of regional redistribution by the NHS and total public budget – when only the balanced budget component is taken into account – are reported in table 2 (column 2). The table also presents the effect of benefits only (the effects of contributions in isolation can be derived as a difference between the overall effect of fiscal balance and the effect of benefits alone) derived by considering as endogenous variable the per-capita GDP plus benefits.

The NHS significantly reduces differences in per-capita GDP across regional jurisdictions (by 7% of GDP). The bulk of the redistribution in health care can be ascribed to benefits from public expenditures (5.2% of GDP, that corresponds to 75% of

total interregional redistribution). This result can be easily predictable by examining figure 1: benefits levels are very similar across Italian regions, which conversely differ significantly in terms of per-capita GDP, and this suggests strong redistributive flows from higher to lower-income regions. Fiscal contributions play only a minor redistributive role: the mix of taxes used to finance health care are only poorly progressive with reference to GDP.

Compared to the NHS only, the general government total budget has much larger interregional redistributive effects (39.8% of GDP). Again this effect is mainly driven by the regional distribution of benefits and less by contributions. General government contributions, however, redistribute relatively more than NHS contributions: almost 40% of total redistribution compared to only 25% of redistribution in the case of the NHS.

Finally the lower section of table 2 reports the estimated degree of redistribution under the hypothesis that the NHS is totally financed by central government transfers and therefore the distribution of contributions corresponds to that one of central government tax revenues. Under this hypothesis, that is equivalent to the case of a totally centrally financed NHS, interregional redistribution turns out to be lower (6.6% of GDP) than that in the current financing structure of the NHS (as mentioned before, 6.9% of GDP). In other terms interregional redistribution is enhanced, rather that contained, by the decentralisation process. This is due to the main tax source actually devolved to regional governments, i.e. the regional business tax (IRAP). The distribution of the tax base of IRAP is highly polarized between low and high-income regions and this raises the need of stronger redistribution by equalising transfers managed by the central government.

TABLE 2 APPROXIMATELY HERE

4.2. On the progressivity of the NHS

As observed in Section 4.1, NHS has a much smaller redistributive impact compared to overall public intervention. However this does not necessarily imply that health care programmes have a low redistributive power. It may rather result from the limited

financial dimension of the NHS compared to public programmes as a whole (as mentioned before about 14% of total public expenditures). In order to investigate the interregional redistributive properties of the NHS, it is useful to resort to a different measure of redistribution, by adapting the Reynolds-Smolensky index for redistribution originally developed for taxes only. Equations 3 and 4 report the Reynolds-Smolensky-type index of redistribution respectively for contributions and for benefits. In the former case it is defined as twice the area between the concentration curve for regional GDP less contributions and the Lorenz curve for regional GDP before public intervention, in the latter as twice the area between the concentration curve for regional GDP plus benefits and the Lorenz curve for regional GDP before public intervention:

$$RS_T = 2\int_0^1 \left[L_{GDP-T}(x) - L_{GDP}(x) \right] dx \qquad (3)$$

$$RS_G = 2\int_0^1 \left[L_{GDP+G}(x) - L_{GDP}(x) \right] dx \qquad (4)$$

Table 3 reports the values of the Reynolds-Smolensky index calculated both for the NHS and for all public programmes distinctively for benefits and for contributions. A comparison with Table 2 shows that the Reynolds-Smolensky index is consistent with the results drawn from the regression analysis: both the benefits and the contributions components of the NHS have a redistributive impact on regional GDP, with the former playing a greater role than the latter. However the redistributive effects of NHS are more limited than that one of the general government total budget for both benefits and contributions.

A more thorough evidence about the interregional redistributive properties of NHS benefits and contributions can be attained by decomposing the Reynolds-Smolensky index (see Kakwani, 1977 for taxes and the extension to benefits by Lambert, 2001). In particular, the following identities holds, respectively for contributions and for benefits:

$$RS_T = \frac{\bar{t}}{1-\bar{t}} \cdot KAK_T \qquad (5)$$

$$RS_G = \frac{\bar{g}}{1+\bar{g}} \cdot KAK_G \qquad (6)$$

that says that the Reynolds-Smolensky index is equal to the product of a measure of the programme incidence (where $\bar{t}$ ($\bar{g}$) is the average contribution (benefit) rate) [5] and an index of the programme departure from proportionality (the Kakwani index – KAK). The specification of this latter index is based on that introduced by Kakwani (1977) for taxes and is extendible to benefits as follows:

$$KAK_T = 2\int_0^1 \left[L_{GDP}(x) - L_T(x) \right] dx \qquad (7)$$

$$KAK_G = 2\int_0^1 \left[L_G(x) - L_{GDP}(x) \right] dx \qquad (8)$$

The Kakwani index measures programme progressivity as twice the area between the Lorenz curve for regional GDP before public intervention and the concentration curve for taxes and as twice the area between the concentration curve for benefits and the Lorenz curve for regional GDP before public intervention. For taxes only, a positive (negative) Kakwani index implies progressivity (regressivity). The reverse holds in the case of benefits.

Table 3 reports the result of this decomposition applied distinctively to benefits and contributions in the case of the NHS and of total public budget. Of course the smaller redistributive power of the NHS compared to total public budget can be ascribed to the limited size of public intervention when health care sector only is considered (in terms of benefits 6.4% vs 53.6% of GDP). But, in the opposite direction, contributions/benefits turn to be more progressive/regressive in the case of the NHS than in the case of total public budget (0.125 vs 0.101 for benefits; 0.037 versus 0.016 for contributions). Finally, both in the case of the NHS and the total budget, benefits are more regressive than contributions are progressive.

TABLE 3 APPROXIMATELY HERE

[5] Although we imposed that total contributions and total benefits are equal year by year, the average contribution and benefit rates are not equal for the period 1999-2006 (see table 3) due to the construction procedure we adopted. Regional data have been standardised and expressed in current prices by applying a regional price deflator, in order to allow the comparability of contributions and benefits of different years and regions. As a result total contributions and benefits are no more equal and consequently average rates differ.

5. The impact of fiscal decentralisation on interregional redistribution by the NHS

5.1. Possible scenarios of future decentralization in the NHS

As discussed in Section 4, the NHS in Italy currently produces strong interregional redistributive effects, crucially driven by the present level and structure of expenditures, which in turn depend on central government policies under two respects: the setting of minimum service levels and the peculiar financing mechanism adopted (the central government tops up insufficient regional governments resources).

Both these features may be put under question by the current political pressures calling for a higher degree of regional autonomy in the financing and provision of health care services and therefore implying a revision of central government role in health care policies. These decentralisation trends in the health care sector are not specific to Italy only, but can be identified in a number of western countries (Banting and Corbett, 2002; Saltman *et al.*, 2007) and are also supported by some evidence of increased efficiency, effectiveness and quality of services (Cantarero and Pascual Saez, 2006; Robalino *et al.*, 2001). As regards the NHS in Italy, two main changes to the current structure of health care policies may result from these political instances in favour of decentralization:

1. a reduction of minimum standards for health care services set by central government, allowing higher regional autonomy and increased possibilities of services differentiation across regions;
2. a revision of the financing mechanism to guarantee the minimum standards to be offered in all regions.

Both these changes may impact on the level of interregional redistribution attained by the NHS. In the following we attempt to evaluate these impacts.

In particular, the lowering of minimum standards for health care services would clearly imply a decrease of central government equalising transfers to poorer regions and, as a consequence, of these regions' levels of health care expenditures. This in turn would entail a reduction of the degree of interregional redistribution by the NHS. Given that the political debate on decentralisation process in Italy is still ongoing, we may only make assumptions on the new levels of minimum service standards. Therefore, to evaluate the impact of a reduction of minimum service standards on regional

redistribution by the NHS we will apply increasing proportional cuts to the current levels of regional expenditure (10%, 20%, up to 90%).

Similarly, the current political debate does not provide any clear hint on the second policy option, namely the financing mechanism to be adopted to guarantee minimum standards. Therefore we will again make different assumptions on this. In doing so, we depart from the current dual financing structure of the NHS, based on regions' own fiscal revenues and copayment charges on the one side, and on central government transfers financed by central government tax revenues on the other. We then envisage three alternative scenarios for the financing of new minimum standards. All three scenarios share three basic hypotheses: total amount of resources devoted to the financing of the NHS remain unchanged at the current level; regional distribution of sources of NHS revenues is unaltered and equal to the current one; it is the task of the central government to set compelling minimum service standards for health care services provided by regional governments.

Conversely, the three scenarios entail different roles and involvement of central government in the management and allocation of NHS financial resources and, as the flip side, a growing role of decentralised governments.

1. The first scenario (*"transfer-based financing"*) assumes that the central government has full control of financial resources: it collects all revenues and transfers resources to all regions in order to guarantee the financing of minimum standards. This first scenario depicts a hypothetical benchmark case, helpful to evaluate the next two, which are designed more consistently with decentralization instances.
2. In the second scenario ("*vertical equalising fund"*), the central government has control only over a subset of revenues, while the remaining ones are assigned to regional tax autonomy.
3. Finally, in the third scenario ("*horizontal equalising fund"*) the central government has no control over financial resources, which are all under regional control. Its role is limited to setting minimum service standards and compelling regional governments to set up and finance an horizontal equalising fund to allow the provision of minimum standards in all regions.

Scenario 1: transfer-based financing

The central government has control over all financial sources, which are treated as central government revenues, disregarding their current nature (regional government revenues and central government revenues). These resources are used to finance a system of transfers to regional governments, so that each region is guaranteed sufficient revenues to provide minimum standards. As minimum standards are reduced, current revenues are in excess with respect to minimum standards to be financed. According to decentralizations instances calling for fiscal resources being left to the jurisdictions they originated from, we assume that these excess revenues are given back to the regions and distributed among them according to their territorial source.

As stated in equation (9), for each region *i* (and for each year, but for simplicity purposes in the following the year index is omitted), we assume that given the current level of expenditures (G_i), the new level of expenditure ($G_i^{'}$) is set equal to a given percentage α of G_i (90%, 80%,…,10%), which we define as compulsory expenditure ($\overline{G}_i^{'} = \alpha G_i$) plus an additional expenditure equal to the regional share of remaining resources. As explained above, remaining resources, given by the difference between total revenue and total compulsory expenditure by all regions, are distributed across regions according to the distribution of overall NHS revenues (with R_i denoting the amount of the NHS total revenue whose territorial source is region *i*). In symbols:

$$G_i^{'} = \overline{G}_i^{'} + (\sum_{i=1}^{15} R_i - \sum_{i=1}^{15} \overline{G}_i^{'}) \cdot \frac{R_i}{\sum_{i=1}^{15} R_i} \qquad (9)$$

Scenario 2: vertical equalising fund

The central government has control only on part of the NHS revenues (those that in the current setting are assigned to the central government). Consequently regions have control on the remaining NHS resources (exactly those that are currently allocated to regional tier of government). Thus the dual nature of NHS revenues is openly acknowledged with $R_i = R_i^{RG} + R_i^{CG}$, where R_i^{CG} denotes the share of total revenues whose source is region *i* that are currently collected by central government, while R_i^{RG} is the share collected by the regional government of region *i*.

For some regions, own resources may be enough to finance minimum standards, for some other not. The central government sets up a vertical equalising fund, financed by its own revenues, in order to guarantee all regions sufficient financial resources to meet minimum service standards. Obviously, as minimum standards are cut, the number of regions unable to meet standards through their own resources decreases and the dimension of the central government vertical equalising fund consequently shrinks. Thus, a growing percentage of current central government revenues are not needed to finance the vertical equalising fund and are given back to the regions and distributed among them according to their territorial source. This implies that *all* regions receive a share of excess revenues, regardless of whether they are unable to meet minimum standards with their own resources or not, that is regardless of whether they benefit from vertical equalising transfers or not.

Then for each region *i*, the level of expenditure for health care services is given by own resources plus a transfer from the central government plus the regional share of central government excess revenues:

$$G_i^{'} = R_i^{RG} + TR_i + (\sum_i R_i^{CG} - \sum_i TR_i) \cdot \frac{R_i^{CG}}{\sum_i R_i^{CG}} \qquad (10)$$

Under the assumption that the central government covers regional fiscal capacity's gaps through its transfers, the central government transfer in favour of region *i* is equal to the difference between minimum standards and own regional revenues, if this gap is positive, whereas it is zero for regions able to finance minimum standards with their own revenues:

$$TR_i = \overline{G}_i^{'} - R_i^{RG} \qquad \text{if } \overline{G}_i^{'} > R_i^{RG};$$

$$TR_i = 0 \qquad \text{if } \overline{G}_i^{'} \le R_i^{RG}. \qquad (11)$$

Therefore, formula (10), which gives each region's expenditure, may take two alternative forms, depending on whether minimum service standards are higher or lower/equal than regional own revenues:

If $\overline{G}_i^{'} > R_i^{RG}$:

$$G_i^{'} = R_i^{RG} + (\overline{G}_i^{'} - R_i^{RG}) + (\sum_i R_i^{CG} - \sum_i TR_i) \cdot \frac{R_i^{CG}}{\sum_i R_i^{CG}} = \overline{G}_i^{'} + (\sum_i R_i^{CG} - \sum_i TR_i) \cdot \frac{R_i^{CG}}{\sum_i R_i^{CG}} \qquad (12)$$

If $\bar{G}_i^{'} \leq R_i^{RG}$:

$$G_i^{'} = R_i^{RG} + (\sum_i R_i^{CG} - \sum_i TR_i) \cdot \frac{R_i^{CG}}{\sum_i R_i^{CG}} \quad (13)$$

From equation (10) and (13) it is clear that "rich" regions (whose own revenues are higher than minimum service standards), despite receiving no equalising transfers from the central government, are able to provide a level of health care services above minimum standards with their own resources thanks to the central government excess resources given back to regions.

Scenario 3: horizontal equalising fund

In a strengthened decentralization perspective, all resources whose source is in region *i* are controlled by the regional government of region *i* (thus there is no distinction between current regional government and central government revenues). However, regions are involved in an horizontal equalising fund, financed by "rich" regions and assigned to "poor" regions (i.e. those whose own resources are below minimum service standards) to guarantee all regions sufficient resources to provide minimum service standards set by central government. As before, the overall dimension of the equalising fund shrinks as standards are reduced.

Then for each region *i*, the level of expenditure for health care services is given by the regional revenues, plus a transfer from the horizontal equalising fund:

$$G_i^{'} = R_i + TR_i \quad (14)$$

The transfer is positive for "poor" regions, negative for "rich" ones. We assume that "rich" regions use only former central government revenues to finance the equalising fund. Therefore "rich" regions may belong to two different groups, depending on whether minimum standards are lower or higher than own revenues. If standards are lower, all former central government tax revenues may be used to finance the fund, if they are higher, only the part of former central government tax revenues that remains after they have been used to top up own revenues to reach minimum standards may be used. Therefore transfers from the equalising fund may be defined as follows:

If $\bar{G}_i^{'} > R_i$

$$TR_i = \bar{G}_i^{'} - R_i \quad (15)$$

If $\overline{G}_i^{'} \le R_i$ and $\overline{G}_i^{'} \le R_i^{RG}$

$$TR_i = -\left\{ \frac{R_i^{CG}}{\sum_{j:\overline{G}_j^{'} \le R_j and \overline{G}_j^{'} \ge R_j^{RG}} \left[\left(R_j^{RG} + R_j^{CG} \right) - \overline{G}_j^{'} \right] + \sum_{k:\overline{G}_k^{'} \le R_k and \overline{G}_k^{'} < R_k^{RG}} \left[R_k^{CG} \right]} \cdot \sum_{l:\overline{G}_l^{'} \ge R_l} \left[\overline{G}_l^{'} - R_l \right] \right\} \quad (16)$$

If $\overline{G}_i^{'} \le R_i$ and $\overline{G}_i^{'} > R_i^{RG}$

$$TR_i = -\left\{ \frac{(R_i^{RG} + R_i^{CG}) - \overline{G}_i^{'}}{\sum_{j:\overline{G}_j^{'} \le R_j and \overline{G}_j^{'} \ge R_j^{RG}} \left[\left(R_j^{RG} + R_j^{CG} \right) - \overline{G}_j^{'} \right] + \sum_{k:\overline{G}_k^{'} \le R_k and \overline{G}_k^{'} < R_k^{RG}} \left[R_k^{CG} \right]} \cdot \sum_{l:\overline{G}_l^{'} \ge R_l} \left[\overline{G}_l^{'} - R_l \right] \right\} \quad (17)$$

For “poor” regions total expenditures, equal to their revenue plus transfers, are exactly equal to minimum standards. Conversely, “rich” regions are generally able to provide service levels above minimum standards.

5.2. The effects on interregional redistribution

Under all the three scenarios just described, we assume that the central government may set different minimum service standards (90% of the current level of each region expenditures, then 80%, 70% and so on, up to 10%) and then we estimate the corresponding degree of interregional redistribution following the approach illustrated in Section 3. Under all scenarios, the level of estimated interregional redistribution decreases as minimum standards are lowered. However, the pattern of this reduction in the degree of redistribution is different for each of the considered scenario, as shown in table 4 and depicted in figure 3.

In particular, under the scenario 1, the degree of redistribution decreases linearly as minimum standards reduce. In the contrary, under the scenario 2, for higher levels of minimum standards redistribution decreases at a lower pace than under the scenario 1, but when standards are very low (70% or less than current expenditures), then the decrease of redistribution becomes steeper than in the first case. Finally, under the scenario 3, the decrease in the degree of estimated redistribution is always steeper than in the other two cases and redistribution becomes null for standards equal or below 50% of current ones.

TABLE 4 APPROXIMATELY HERE

FIGURE 3 APPROXIMATELY HERE

The observed decreasing levels of redistribution are to be imputed to different reasons under the three scenarios. Under scenario 1, they are due to the reduction of minimum standards and therefore of compulsory expenditures, while the additional expenditure is distributed according to the distribution of revenues and therefore its net redistributive effect is zero. As minimum standards reduce, redistribution decreases at the same rate.

Under scenario 2, total expenditures of each region are determined by three components, as described in equation (10). For the first and the latter ones (regional revenues and resources given back to regions by the central government), their territorial distribution is the same as that of their source and therefore they have no net interregional redistributive effect. The whole redistribution is therefore due to the second component that is central government transfers, whose distribution is different from that of the source of revenues that finance these transfers. As transfers decrease, so does redistribution. The decreasing equalising role of transfers is due to the combined effect of two factors: first, the reducing difference between minimum standards and own revenues of the regions actually receiving these transfers and, second, the decreasing number of regions that benefit from the equalising fund. This latter effect is easily illustrated: as minimum service standards are reduced, an increasing number of regions becomes able to finance these standards by means of their own revenues and therefore those regions are entitled to receive equalising transfers anymore. When we compare scenario 1 and 2, the different slopes of the redistribution patterns may be explained referring again to the formula to calculate regional expenditures. When limited reductions of minimum standards are considered, for all regions, even the "richest" ones in terms of own revenues, holds that $\overline{G}_i' > R_i^{RG}$. Therefore for both scenarios expenditures are given by minimum standards plus an additional component, as described in equation (9) and (12), respectively. In equation (9) this additional component is distributed across regions as overall revenues (central government plus regional government revenues), and therefore its net redistributive impact is zero. On the contrary, in scenario 2 the additional component is distributed as central government revenues only, which, as explained in Section 4.1., are more homogeneously distributed

across regions than overall revenues. For larger cuts of minimum standards (higher than 30%) redistribution starts decreasing at a higher speed than in scenario 1. The reason is that an increasing number of regions are such that $R_i^{RG} \geq \overline{G}_i^{'}$ and therefore equation (13) holds – instead of equation (12). Since R_i^{RG}, the first element of equation (13), is by definition larger than $\overline{G}_i^{'}$, the first element of equation (9), and given that this case applies to high per-capita GDP regions, then the reduction of minimum standards for scenario 2 assigns relatively more resources to high per-capita GDP regions. As a result, in this case the interregional redistributive effect is more strongly weakened.

Finally, under scenario 3, interregional redistribution decreases more sharply than under the previous cases. This is because in this case "poor" regions are guaranteed only minimum standards and no extra money, whereas "rich" regions are endowed with minimum standards plus all resources that are not required by the horizontal equalising fund.

More detailed information about the effects of the reduction of minimum standards when the different scenarios are considered can be drawn by looking at the resources that each region can devote to health care expenditures. For each single region and specifically for the year 2006 only, table 5 shows the level of health care expenditures that those regions could finance as a percentage of current ones. It is worth emphasising that the reduction of minimum standards gives rise to a wide differentiation across regions of health care expenditures. In particular, when, as an example, a 30% reduction of minimum standards is considered, under scenario 1 Lombardia can afford an expenditure of 109.6% of its current one, while Molise, to the other extreme, should reduce its expenditure to 86.7%. This range shrinks when we move to scenario 2 (Lombardia:105.7% compared to Campania: 92.5%) and widely increases under scenario 3 (Lombardia: 129.2% compared to Molise, Puglia, Basilicata and Calabria: 70%).

TABLE 5 APPROXIMATELY HERE

6. Conclusions

The aim of this paper is twofold. First of all, we measure income redistribution among Italian regions accomplished by the NHS under the current institutional setting. The existing intergovernmental fiscal relations concerning the NHS in Italy are explicitly considered as well as the current political pressures for an increased decentralisation of expenditure and revenues responsibilities to regional governments. So, in the second part, the paper evaluates the impact of these pressures on the redistribution effected by the NHS. However, as the outcomes of these pressures in terms of the future shape of the NHS financing and expenditure profiles are only partially foreseeable, we make some alternative assumptions on them, and measure the redistribution effects under each of them.

Using panel data for 1999-2006 we find that NHS contributions and benefits reduce regional differences in per-capita GDP of approximately 7 percentage point: a region with per-capita GDP 1 euro higher (or lower) than the national average ends up, as a results of the NHS programmes, about 93 cents higher (or lower). This compares with the redistributive effect of the overall public budget, equal to 38% of GDP. Most of the NHS redistributive impact is due to benefits, almost equally distributed in per-capita terms across regions, while the distribution of the NHS revenues sources show a significant correlation with regional per-capita GDP and thus contributions have a lower redistributive impact. Finally we find that a reform of the NHS in terms of a reduction of minimum compulsory service standards to be provided in all regions always produces a reduction of redistribution across Italian regional jurisdictions. However, as minimum standards are reduced, the rate of the decrease in the interregional redistributive effects crucially depends on the financing arrangements of health care services that will be actually adopted in the future reforms of the Italian NHS.

These results raise some significant policy issues for the design of the NHS financing mechanism. First, obviously, given a certain level of minimum standards, the redistributive effect crucially depends on the regional distribution of revenue sources assigned to regional governments: the more equally distributed in per-capita terms, the lower the redistributive effects. For instance, we show that in the current NHS financing scenario, redistribution across regions would be lower if regional revenue sources were

distributed as current central government taxes, instead of the more unequally distribution across regions of current regional government revenues.

Second, enhanced federalist financing mechanisms need to take into account also some implicit incentive effects. For instance, scenario 3 shows that “richer” regions in terms of per-capita revenues are compelled to finance equalising transfers and may end up with resources in excess of minimum standards, while “poorer” regions end up with nothing more than minimum standards. Under this scenario for “poorer” regions it might not be worth to increase their own fiscal effort as long as this would simply allow them to autonomously finance minimum standards: their additional fiscal effort would simply substitute equalising transfers from “richer” regions. “Poorer” ones would end up with unchanged resources while their effort would simply result in a net benefit for “richer” regions which would need to finance lower equalising transfers. This would happen also if “poorer” regions were able to increase own revenues to a point that their overall resources were slightly in excess of minimum standards: they then would be compelled to finance equalising transfers with their extra resources, leaving them with little of the extra money they collected.

Finally, the effect of more decentralized financing mechanisms need to be considered also with reference to the interregional mobility of patients: as minimum standards decrease and services in “poorer” regions are nothing more than these, an increase of interregional mobility of patients would be likely. If compensations to “richer” regions were to be financed by the central government, then the implicit effect would be a return to central government transfer finance (but with negative redistributive effects) and with efficiency effects to be evaluated. Conversely, if compensations were to be financed by horizontal transfers from “poorer” regions to “richer” ones, then a crucial issue would be how “poorer” regions could fund them and whether these schemes would reduce “poor” regions resources and even threaten the provision of minimum standards.

References

Arachi G., C. Ferrario and A. Zanardi (2009), *Regional redistribution and risk sharing in Italy: the role of different tiers of government*, forthcoming in Regional Studies.

Arachi G. and A. Zanardi (2004), *Designing Intergovernmental fiscal relations: some insights from the recent Italian reform*, Fiscal Studies, vol. 25, 3, September.

Banting K.G., S. Corbett (2002), *Health policy and federalism: a comparative perspective on multi-level governance*, McGill-Queen's University Press, Kingston, Ont.

Bayoumi T. and P.R. Masson (1995), *Fiscal flows in the United States and Canada: lessons for monetary union in Europe?*, European Economic Review 39, 253-274.

Bird R. and F. Vaillancourt (eds.) (1998), *Fiscal decentralization in developing countries*, Cambridge University Press, Cambridge.

Cantarero Prieto D. and M. Pascual Saez (2006), *Decentralisation and health care outcomes: an empirical analysis within the European Union*, Working Paper n. 220, FEDEA - Fundación de Estudios de Economía Aplicada, Madrid.

Decressin J. (2002), *Regional income redistribution and risk sharing: how does Italy compare in Europe?*, Journal of Public Economics, 86, pp. 287–306.

Dirindin N. and E. Pagano (2001), *Governare il federalismo: Le sfide per la sanità*, Il Pensiero Scientifico Editore, Roma.

Ferrario C. and A. Zanardi (2009), *From interpersonal to interregional redistribution: the case of social policies in Italy*, forthcoming in E. Ongaro, A. Massey, M. Holzer and E. Wayenberg (eds.) "Governance and intergovernmental relations in the European Union and the United States: policy and management", Edward Elgar, Cheltenham.

Hodrick R.J. and E.C. Prescott (1997), *Postwar U.S. business cycles: an empirical investigation*, Journal of Money, Credit and Banking, 29, 1-16.

Italianer A. and J. Pisani-Ferri (1992), *Systèmes budgetaires et amortissement des chocs régionaux: implications pour l'Union Economique et Monétaire*. Economie Prospective Internationale, 51, pp. 49-69.

Joumard I. And P.M. Kongsrud (2003), *Fiscal relations across government levels*, OECD Economic Department Working Papers, 375, 10, December.

Kakwani N.C. (1977), *Measurement of tax progressivity: an* international *comparison, Economic Journal*, 87, pp. 71-80.

Lambert P.J. (2001), *The distribution and redistribution of income: a mathematical analysis*, Manchester University Press, Manchester.

Mélitz J. and Zumer F. (1998), *Regional redistribution and stabilization by the center in Canada, France, the UK and the US*, CEPR Discussion Paper n. 1829.

Mélitz J. and Zumer F. (2002), *Regional redistribution and stabilization by the center in Canada, France, the UK and the US: A reassessment and new tests*, Journal of Public Economics, 86, 263-286.

Oates W.E. (1999), *An essay on fiscal federalism*, Journal of Economic Literature, 37, 1120-1149.

Obstfeld M. and G. Peri (1998), *Regional non-adjustment and fiscal policy*, Economic Policy, 13 (26), pp. 207-259.

OECD (1997), *Managing across levels of government*, OECD, Paris.

Padovano F. (2007), *The politics and economics of regional transfers*, Edward Elgar, Cheltenham.

Robalino D.A., O. Picazo and A. Voetberg (2001), *Does fiscal decentralization improve health outcomes? Evidence from a cross-country analysis*, World Bank Policy Research Working Paper n. 2565, World Bank, Washington D.C.

Ruggeri J. (2008), *Regional fiscal flows: measurement tools*, Paper presented at the Symposium on Fiscal Federalism organised by IEB, Barcelona, June.

Sala-i-Martin X. and J. Sachs (1992), *Fiscal federalism and optimal currency areas: evidence for Europe from the United States*, in Canzoneri M.B., V. Grilli and P.R. Masson (eds.), "Establishing a central bank: issues in Europe and lessons from the US", Cambridge University Press, Cambridge, pp. 195-227.

Saltman R.B., V. Bankauskaite and K. Vrangbæk (2007), *Decentralization in health care: strategies and outcomes*, European Observatory on Health Systems and Policies.

Tanzi V. (1996), *Fiscal federalism and decentralization: a review of some efficiency and macroeconomic aspects*, Annual World Bank conference on development economics,Washington, DC.

Von Hagen J. (1992), Fiscal *arrangements in a monetary union: evidence from the US*, in: Fair D.E. and C. De Boissieu (eds.), "Fiscal policy, taxes and the financial system in an increasingly integrated Europe", Kluwer, Dordrecht, pp. 337-359.

World Bank (1997), *World development report: The State in a changing world*, Oxford University Press, New York.

Table 1. NHS and general government total budget (per-capita average values 1999-2006, euro 2006)

Regions	GDP	National Health Service						General government total budget
		Benefits	Contributions				Fiscal balances	Fiscal balances
			Regional gov taxes	Central gov taxes	Fees	Total		
Piemonte	27 279	1 618	660	985	96	1 741	-123	-212
Lombardia	32 314	1 498	899	1 094	73	2 065	-566	-3 425
Veneto	28 921	1 567	733	997	106	1 835	-269	-1 382
Liguria	25 539	1 751	531	979	65	1 575	176	1 894
Emilia-Romagna	30 818	1 596	766	1 086	109	1 961	-365	-1 806
Toscana	27 050	1 590	622	978	94	1 694	-104	71
Umbria	23 632	1 602	479	857	83	1 419	183	2 549
Marche	24 716	1 590	581	890	80	1 551	38	732
Lazio	29 448	1 823	749	1 027	68	1 843	-21	-1 206
Abruzzo	20 745	1 582	395	723	61	1 178	403	1 914
Molise	18 027	1 677	200	652	49	901	776	3 558
Campania	16 073	1 565	277	609	48	933	632	3 124
Puglia	16 376	1 446	274	623	49	946	500	2 975
Basilicata	17 225	1 487	177	569	38	784	703	4 020
Calabria	15 818	1 521	148	596	36	780	741	4 579
Italy (OSR)	25 631	1 586	601	906	79	1 586	0	0

Table 2. NHS and general government total budget: degree of redistribution through fiscal balances (% GDP, 1999–2006)

	Redistribution (% GDP)	
	$1 - \beta_2$	
Number of observations	120	
	National Health Service	General government total budget
Benefits	5.2%	22.5%
	(0.0015131)	*(0.0092267)*
Fiscal balances	6.9%	38.1%
	(0.0021095)	*(0.0117604)*
Fiscal balances	6.6%	
(NHS totally financed by CG transfers)	*(0.0019248)*	

Note: White corrected standard errors in parentheses

Table 3. Redistribution, incidence and progressivity of benefits and contributions (NHS and public budget)

		National Health Service	General government total budget
Benefits	Reynolds-Smolensky index RS	0.0077	0.0343
	Average benefit rate g	0.0659	0.5176
	Kakwani index KAK	0.1250	0.1007
Contributions	Reynolds-Smolensky index RS	0.0024	0.0161
	Average contribution rate t	0.0614	0.5049
	Kakwani index KAK	0.0372	0.0158

Table 4. Redistribution through the NHS as % GDP under different assumptions on the level of minimum service standards for health care services and different hypotheses on the financing mechanism, OSRs, 1999-2006

	Redistribution (%GDP)		
Minimum service standards in percentage of actual recorded expenditures	Scenario 1	Scenario 2	Scenario 3
100%	6.906	6.906	6.906
90%	6.215	6.431	5.193
80%	5.525	5.957	3.511
70%	4.834	5.451	1.928
60%	4.143	4.818	0.614
50%	3.453	3.925	0.079
40%	2.762	2.737	0.000
30%	2.072	1.438	0.000
20%	1.381	0.419	0.000
10%	0.691	0.012	0.000
0%	0.000	0.000	0.000

Table 5. Levels of regional health care expenditures as minimum service standards decrease (% of current expenditure in 2006)

Scenario 1

Minimum service standards (% of current expenditures)	Redistribution (%GDP)	Piemonte	Lombardia	Veneto	Liguria	Emilia-Romagna	Toscana	Umbria	Marche	Lazio	Abruzzo	Molise	Campania	Puglia	Basilicata	Calabria
100%	6.906	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
90%	6.215	100.6%	103.2%	101.6%	99.2%	102.1%	100.8%	98.8%	99.8%	99.8%	97.9%	95.6%	96.4%	97.2%	95.6%	96.0%
80%	5.525	101.2%	106.4%	103.2%	98.3%	104.2%	101.5%	97.6%	99.7%	99.5%	95.7%	91.1%	92.7%	94.4%	91.3%	92.0%
70%	4.834	101.9%	109.6%	104.8%	97.5%	106.2%	102.3%	96.4%	99.5%	99.3%	93.6%	86.7%	89.1%	91.6%	86.9%	88.1%
60%	4.143	102.5%	112.7%	106.4%	96.6%	108.3%	103.0%	95.2%	99.4%	99.1%	91.5%	82.3%	85.4%	88.8%	82.6%	84.1%
50%	3.453	103.1%	115.9%	108.0%	95.8%	110.4%	103.8%	94.0%	99.2%	98.8%	89.4%	77.8%	81.8%	86.0%	78.2%	80.1%
40%	2.762	103.7%	119.1%	109.6%	94.9%	112.5%	104.5%	92.8%	99.0%	98.6%	87.2%	73.4%	78.2%	83.2%	73.9%	76.1%
30%	2.072	104.4%	122.3%	111.2%	94.1%	114.6%	105.3%	91.5%	98.9%	98.4%	85.1%	69.0%	74.5%	80.4%	69.5%	72.1%
20%	1.381	105.0%	125.5%	112.9%	93.3%	116.7%	106.0%	90.3%	98.7%	98.1%	83.0%	64.5%	70.9%	77.6%	65.2%	68.1%
10%	0.691	105.6%	128.7%	114.5%	92.4%	118.7%	106.8%	89.1%	98.6%	97.9%	80.9%	60.1%	67.2%	74.8%	60.8%	64.2%
0%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%

Scenario 2

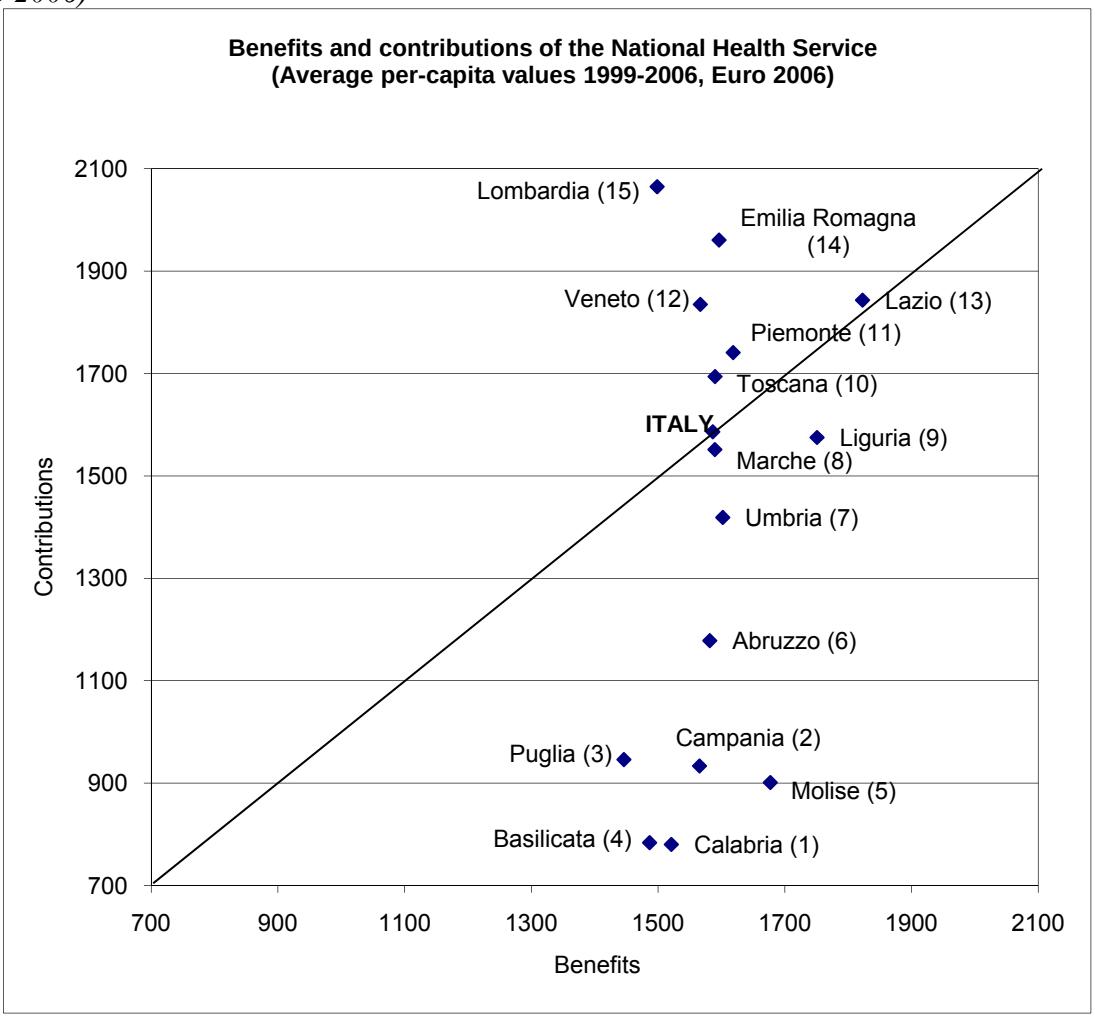
Minimum service standards (% of current expenditures)	Redistribution (%GDP)	Piemonte	Lombardia	Veneto	Liguria	Emilia-Romagna	Toscana	Umbria	Marche	Lazio	Abruzzo	Molise	Campania	Puglia	Basilicata	Calabria
100%	6.906	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
90%	6.431	100.7%	101.9%	100.9%	100.1%	101.7%	100.9%	99.6%	100.0%	99.2%	98.5%	97.6%	97.5%	98.1%	97.7%	98.2%
80%	5.957	101.4%	103.8%	101.8%	100.2%	103.3%	101.8%	99.1%	100.1%	98.3%	97.1%	95.2%	95.0%	96.2%	95.4%	96.4%
70%	5.451	102.0%	105.7%	102.7%	100.3%	105.0%	102.7%	98.7%	100.1%	97.5%	95.6%	92.8%	92.5%	94.3%	93.0%	94.7%
60%	4.818	101.6%	112.2%	102.5%	99.4%	105.5%	102.4%	97.2%	99.1%	95.7%	93.2%	89.6%	89.2%	91.6%	89.9%	92.0%
50%	3.925	99.3%	120.8%	105.9%	96.6%	110.0%	100.2%	94.1%	96.3%	92.3%	89.4%	85.0%	84.6%	87.4%	85.4%	87.9%
40%	2.737	100.9%	126.0%	110.7%	91.0%	115.0%	102.2%	88.2%	93.4%	93.1%	83.1%	78.3%	77.8%	80.9%	78.8%	81.5%
30%	1.438	104.1%	129.5%	113.9%	89.5%	118.5%	105.4%	86.0%	96.4%	95.8%	77.0%	70.6%	70.0%	73.3%	71.0%	73.9%
20%	0.419	105.9%	131.5%	115.7%	91.2%	120.4%	107.2%	87.6%	98.1%	97.4%	78.5%	61.8%	63.4%	71.7%	62.3%	65.3%
10%	0.012	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
0%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%

Table 5. (continue)

Scenario 3

Minimum service standards (% of current expenditures)	Redistribution (%GDP)	Piemonte	Lombardia	Veneto	Liguria	Emilia-Romagna	Toscana	Umbria	Marche	Lazio	Abruzzo	Molise	Campania	Puglia	Basilicata	Calabria
100%	6.906	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
90%	5.193	99.8%	115.4%	105.8%	90.9%	108.7%	100.7%	90.0%	95.1%	94.7%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
80%	3.511	102.1%	123.8%	110.4%	89.8%	114.4%	103.3%	86.7%	95.5%	94.9%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
70%	1.928	104.7%	129.2%	114.1%	90.6%	118.6%	105.9%	87.2%	97.2%	96.5%	78.4%	70.0%	70.0%	71.9%	70.0%	70.0%
60%	0.614	106.1%	131.7%	116.0%	91.5%	120.7%	107.5%	87.9%	98.3%	97.6%	78.7%	60.0%	63.6%	72.0%	60.0%	60.2%
50%	0.079	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
40%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
30%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
20%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
10%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%
0%	0.000	106.2%	131.9%	116.1%	91.6%	120.8%	107.6%	87.9%	98.4%	97.7%	78.7%	55.7%	63.6%	72.0%	56.5%	60.2%

Figure 1. NHS benefits and contributions by region (average per-capita values 1999-2006, Euro 2006)



Note: region per-capita GDP ranking from the poorer to the richer in parentheses

Figure 2. Fiscal balances of the NHS (average per-capita values 1999-2006, Euro 2006)

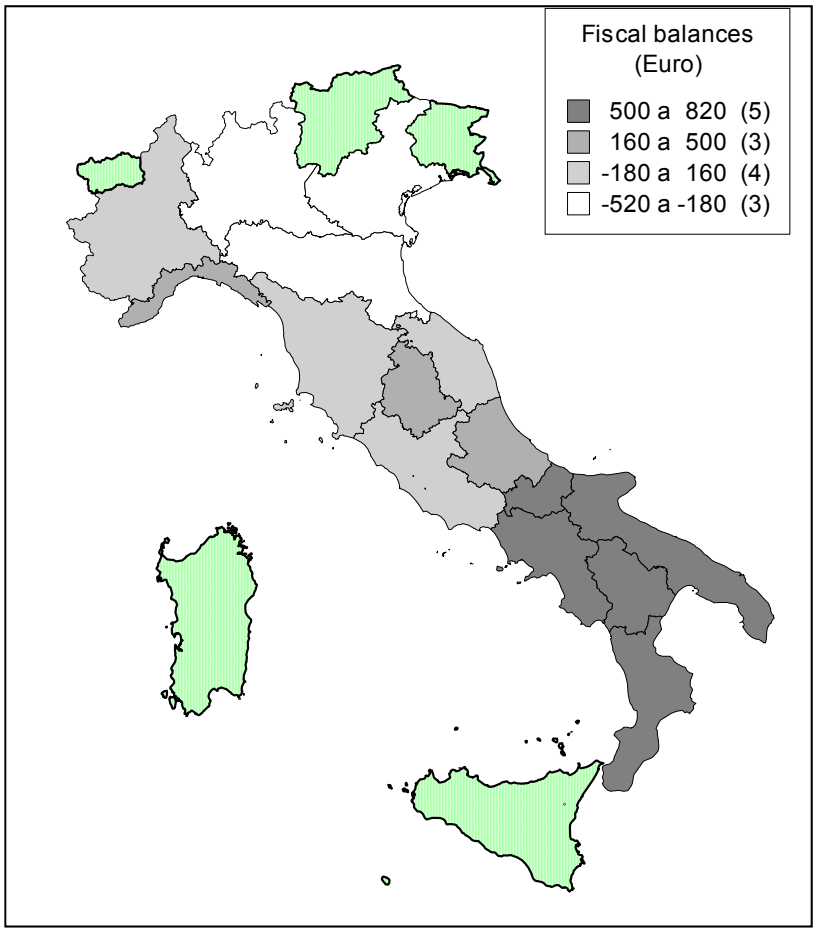


Figure 3. Redistribution through the NHS as % GDP under different assumptions on the level of minimum service standards for health care services and different hypotheses on the financing mechanism (OSRs, 1999-2006)