

DOES HOSPITAL COMPETITION AFFECT CITIZENS' PERCEIVED HEALTH?

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PRELIMINARY

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Abstract. We exploit the differences between Italian Regions in the implementation of pro-competitive health reforms to assess their impact on self-assessed health status (SAH) and on the use of health care services. We consider a survey of more than 600,000 individuals, over the years 1993-2007, with information on both individuals' perceived health and their access to a number of health services. Our results suggest that "more competition" does not lead to a worst health outcome. However, while no significant changes emerge in SAH, the reform marked a moderate decrease in hospitalization (from -0.3 to -0.8 percentage points) and in Day Hospital treatments (-0.3 p.p.), coupled with a clear decrease in the access to emergency services (from -1.7 to -3 p.p.). These reductions in the access to health services are stronger if we restrict the analysis to the immediate post intervention period, when the reform had full political support. We also consider a number of sensitivity checks, in which we further exploit the different timing of the introduction of the reform and we amend our baseline specification by adding region-specific trend. We find results to be robust to these additional checks.

Keywords: Health reforms, self-assessed health

JEL-codes: I11, I18

1. Introduction

Competition is a key concept in economics: competitive markets allow economies to achieve Pareto efficient allocation of resources via a system of decentralized decisions. Crucial for the working of this mechanism is the incentive effect provided by prices. However, according to the traditional welfare economics approach, the functioning of the competitive process is subject to a set of conditions (like the price-taking behavior and the absence of any information asymmetries), which makes the government intervention somewhat needed in markets plagued by ‘market failures’. This interference can take various forms, from the more pervasive, like the public ownership of suppliers, to the more limited ones, like the public regulation of prices. But also these solutions have been criticized by the more recent public choice approach, which emphasize ‘government failures’ as opposed to ‘market failures’. Political rents can substitute market rents, making less clear whether government intervention can deliver better allocation than the price mechanism.

Health care services represent a pretty clear example of markets which require government intervention because of different failures. For instance, hospitals have quite often monopoly power, and physicians and nurses enjoy clear advantages in terms of information as for the quality of services they provide. The traditional approach to solve these problems – pursued in almost all European countries, despite the notable exception of the USA - has been the public ownership of hospitals, and a heavy regulation of health care professions. However, these policies have frequently driven economies further away from efficiency: for example, public ownership made budget constraints for hospitals soft (e.g., Duggan, 2000; Kornai, 2009), while public contractual arrangements with health professionals demonstrated to be unable to solve moral hazard and adverse selection problems.

In order to achieve some gains in terms of efficiency in a public, heavy regulated, world, it does not come as a surprise, then, that these ‘government failures’ have induced some European administrations to bring back the ‘market mechanism’ also in the case of health care services. The Netherlands and the UK adopted the model of ‘quasi-markets’ at the beginning of the Nineties for hospital services (e.g., Bartlett and Le Grand, 1993). The model requires, on the one hand, a public purchaser of services to contract with public and private suppliers for the services offered to citizens; on the other hand, citizens are free to choose the producer from which to obtain the service they need. Supporters of the model argue that hospitals need to offer procedures at lowered costs in order to effectively compete for patients and public funds. Opponents of such model suggest both the risk of cream skinning, with private hospitals selecting less costly patients, and the risk of a lower quality, as a cost-saving policy by private producers, especially when information on quality

is not directly available to patients. Evidence on the impact of these pro-competitive reforms have been provided in recent years by a strand of literature reviewed in Gaynor et al. (2012). The general conclusion is that competition has a *positive* effect on health outcomes, in particular on the quality of health care services, but institutional details do matter. For instance, Propper et al. (2008), considering the first wave of reforms in the English National Health Service (NHS), find that hospitals in more competitive markets reduced the quality of care (here measured by the ‘30-day’ death rate for Acute Myocardial Infarction, AMI) in order to cut waiting times. This result is explained by the fact that public information on quality was not available at that time, while waiting times were an important policy concern. Moreover, prices were negotiable between buyers and hospitals, and negotiations included results on waiting times, so that hospitals substituted less observable quality with more observable waiting times. On the contrary, Cooper et al. (2011), considering the second wave of reforms in the UK, find that quality (measured by the same AMI death rate) improved where competition was more fierce. This is due to the implementation of a new fixed-price funding mechanism called ‘payment-by-results’, largely mirroring the US prospective payment system based on Diagnosis-Related Groups (DRGs), and the provision of information about quality to patients.

In the absence of any evidence on the outcomes of pro-competitive reforms, also Italy adopted the ‘quasi-markets’ model at the beginning of the Nineties. The expected result was an improvement in efficiency, which could help the country, subject to a severe financial crisis, to meet the requirements imposed by the Maastricht Treaty to public finances. The reform introduced a fixed-price model based on DRGs, similar to the US one. However, differently from the UK, where the NHS is highly centralized, Regions were in charge of implementing the reform; and this resulted in different Regions creating different regulations. Moreover, information about quality was – and to large extent still is – virtually unavailable, making the option of quality reduction a potential problem.

What has been the impact of this Italian reform on health outcomes? Despite the centrality of this question for assessing the comparative merits of different models of health care organization, there is still no evidence on the topic. This paper is a first attempt to provide an answer to such question. We exploit the differences between Regions in the implementation timing of pro-competitive reforms to assess their impact on a particular health outcome, self-assessed health status (SAH), which can be influenced both by changes in providers’ behavior in terms of services provided, and by how these changes are perceived from patients. We consider a survey of more than 600,000 individuals, over the years 1993-2007, which makes available information on both

individuals' perceived health and their access to a number of health services. Using a difference-in-differences approach which exploits the different timing of the reform's implementation in the Italian regions, and controlling for individual's characteristics (like gender, age and education) and for region and year fixed effects, our results suggest that more competition does not lead to a worst health outcome. However, while no significant changes emerge in SAH, the reform marked a moderate decrease in hospitalization (from -0.3 to -0.8 percentage points) and in Day Hospital attendance (-0.3 p.p.), coupled with a clear decrease in the access to emergency services (-1.7 or -3 p.p., according to the time period considered). These reductions in the access to health services are stronger if we restrict the analysis to the immediate post intervention period, when the reform had full political support. We also consider a number of robustness checks and the potentially heterogeneous effects of the reform across different groups by age, gender, and education. In all cases our conclusions are largely confirmed.

The remainder of the paper is structured as follows. In Section 2 we provide essential background information on the Italian quasi-market reforms. In Section 3 we describe the data and our identification strategy. Results are discussed in section 4. Brief concluding remarks follow in section 5.

2. The Italian 'quasi-market' reforms

The Italian NHS – enacted with Law 833 in 1978 – is a public universalistic scheme covering health care risks, and represents the central institution in the conduct of health care policy. Public health care spending in Italy reached about 7% of GDP in recent years, from 6% at the beginning of the '90s. Even spending less than other comparable public systems, the Italian NHS obtained good results in terms of the (average) quality of services provided, and rank among the top positions according to international evaluations of the overall performance by the WHO (see, e.g., the World Health Report 2000). In fact, the increase in spending has been paired with an improvement in the population health, measured for instance by average life expectancy at birth: males gained about six years from the beginning of the Nineties, reaching 79.4 years; females expectations raised from 80 to 84.5.

Since the Italian NHS is a regional health care system, health policy is the result of a complex network of institutional and political rules. The Constitutional mandate on health care (which dates back to 1948, and has been reformed in 2001) attributes to the Central Government: 1) the definition and the guarantee of Essential Levels of Care (*Livelli Essenziali di Assistenza*, or LEA, national mandatory standards for health services); 2) the responsibility for framework legislation; 3)

the ultimate responsibility for health care financing. According to Constitution, Regional Governments are instead in charge of: 1) the organization and the provision of health services (e.g., the management of public hospitals and Local Health Units); 2) the provision of additional services with respect to the mandatory national standards (LEA). As there are 15 Ordinary Statute Regions (plus 5 Special Statute Regions), even in the presence of national mandatory standards, it is not surprising that there are territorial differences among Regional Governments along several dimensions, from the organization of health services provision to the reimbursement mechanism for hospitals.

The introduction of quasi-markets is due to the 1992-1993 reforms, a framework legislation by the Central Government that was inspired by similar developments in the British NHS in 1990, and was required by the severe financial crisis afflicting the country, at odds with the conditions imposed by the Maastricht Treaty signed in 1992. The explicit aim of the reform was to boost the productive efficiency of hospitals, and the overall efficiency of public spending in the sector (e.g., Turati, 2013). The move toward quasi-markets commanded two basic changes to the organization of the NHS. First, the old Local Health Units (*Unità Sanitarie Locali*, USL; public bodies that jointly managed the tasks of insuring patients and of producing services) were transformed into Local Health Companies (*Aziende Sanitarie Locali*, ASL). In essence, the law designed a new type of publicly owned firm, with a strong focus – at least in the aim of its proponents – on the efficient management of the budget. The transformation required a new internal organization for ASL, quite close to that of a private firm: a Board of Directors and a Chief Executive Officer, to be appointed by Regional Governments, and a Board of Statutory Auditors for internal audits. This is why the 1992-1993 reforms are often identified in Italy as the ‘business-transformation’ of the NHS. A second change, required by the move toward the quasi-market model, was to separate producers from purchasers of services. The basic implication here was for ASL to hive off hospitals, and to create the so-called *Aziende Ospedaliere* (AO, literally Hospital Firms), public hospitals quite similar to the NHS Trusts of the UK reform. ASL were supposed to retain mostly administrative services (including the definition of needs at the local level), and then to contract with different producers (from newborn public AO to private hospitals) the services for all residents in their jurisdiction.

This fundamental change had different implications: since the ASL had to contract with producers, a price for the services to be purchased also needed to be defined. The solution proposed by the Central Government was to introduce a prospective payment system (PPS) based on Diagnosis Related Groups (DRG) - created in the US at the beginning of the Eighties and

experimented in the US Medicare - which basically substituted per-day fees for private providers and full ex-post payment for public hospitals with a fixed price reimbursement mechanism for both types of producers. A national listing of tariffs was proposed by the Central Government in the decree of the Ministry of Health 14 December 1994 n. 169, but – coherently with the regional nature of the NHS – an opportunity was given to Regional Governments to adopt their own set of tariffs, more tailored to actual costs of their local producers. In any case, the new PPS had to be started between 1995 and 1997, and regions that did not set their own prices had to adopt the national ones, that were updated in the meanwhile with the decree of the Ministry of Health 30 June 1997 n. 178.

Given this national framework legislation, the Regional Governments replied in different ways, creating a large variability in the quasi-markets model at the local level. Only one region separated all providers from purchasers, and adopted its own set of tariffs since 1997, identifying what has been called the ‘Lombardy model’ (e.g., Brenna, 2011). Other three regions defined their region-specific prices in 1997 (Emilia-Romagna, Tuscany and Umbria), followed by another one (Veneto) in 1998, but their organizational choice was to maintain the Local Health Firm as an integrated insurer-producer for almost all (if not all, in the case of Tuscany) hospitals (Ministero della Salute, 2013). Here we consider the definition of a region-specific set of tariffs as the key policy to implement the pro-competitive reform designed in 1992-1993 by the National Government. In fact, as suggested for instance by Di Loreto and Spolaore (2004), regional tariffs reflect more the definition of incentives for pursuing specific goals in the supply of hospital services than the ‘efficient’ costs for producing those services. Hence, we can assume that the Regional Governments that defined their own tariffs were also those that expected incentives to work according to the baseline quasi-markets model.

Interestingly, while some regions believed in the potential improvements that can be gained via price incentives, after the initial years following the reform the ‘quasi-market’ model was abandoned by the Central Government in favor of a budget-based approach. The D.Lgs. 19 June 1999 n. 229 is a framework legislation with which the Central Government reneged the benefits of competition in health care, and assumed a more centralist approach. While centralization was outdated, because Regional Governments already obtained a large degree of autonomy, the idea that competition has to be abandoned in order to control expenditure gained popularity among regions too. Also the ‘Lombardy model’ was then transformed in a ‘quasi-administered’ system, which sacrificed pure competition in favor of the budget based approach (Brenna, 2011). However, the budget-based approach has not sacrificed the DRGs based payment system for hospitals, which is

still alive, and it is used to define budgets for hospitals, as well as the free choice for patients and the separation of insurers from producers. Price incentives can then still be used, and are still used by Regional Governments. Indeed, other three regions defined their own set of tariffs in recent years: Sicily and Piedmont since 2002, and Lazio since 2005 (see, e.g., Carbone et al., 2006).

What has been the impact of the quasi-market reform on the activity of hospitals? Cerbo and Langiano (2004), after ten years from the original DM 169/94, identified four main trends which paralleled the evolution of the hospital industry in other comparable European countries: 1) a significant reduction in the number of hospitals' beds for acute care; 2) an increasing substitution of inpatient with outpatient care; 3) a substantial decrease in the average length of stay for acute care; 4) an increase of the share of surgical admissions out of total admissions, which increases the complexity of care. While this evidence is based on aggregate or local unrepresentative data, evaluations based on nationally representative micro-data are still absent in the literature. Do these changes had any real impact on SAH, or do they just contribute to wipe out inefficiencies? Is the impact more pronounced in regions that adopted their own set of tariffs in order to tailor more finely price incentives for their hospitals? These are the questions we ask in the following empirical analysis.

3. Data and identification strategy

We use individual level data to explore whether the introduction of region-specific tariffs had any impact on people's SAH, checking also the impact on their use of health care services. We draw data from the Survey on the Everyday's Life of Italian Households (*Indagine Multiscopo sulle Famiglie*) which has been run annually (with the exception of year 2004) by the National Statistical Institute (ISTAT) since 1993. The survey covers a rich set of demographic controls, and it provides information on several aspects of the everyday life of Italian households, from dwelling conditions to education, health status, labour market behaviour, transportation and time use. The sample is designed to represent the population of Italian households. The sampling unit is the household, and the information is available both at the family level, and at the level of each component. Each year, a sample of nearly 20,000 households (about 60,000 individuals) is interviewed. For the purposes of our analysis, we select individuals older than 15, yielding a sample of about 660,000 observations over 14 waves (1993-2007).¹ We use survey weights throughout the analysis.

¹ Unfortunately we can not rely on the survey years from 2008 onwards as the wording of the question which is used to build the main outcome variable is different. While this makes years 2008-2011 unconditionally not comparable with previous ones, it is not affecting the estimates, which are based on differences *between* regions. The different wording is

The survey contains identifiers of the geographical region of residence which is crucial for our analysis because it enables us to allocate individuals to treatment and control groups according to the survey year and region of residence, following the staggered-by-region design of the reform implementation. In particular, our treatment is defined by the adoption at the regional level of a set or region-specific DRG tariffs as alternative to those defined at the national level. Clearly, the introduction of a set of DRG tariffs is only part of the wider set of policy interventions aimed at increasing efficiency in the health care sector by adopting the quasi-market model that were carried out by the Italian regions in the same years. But, as we discussed above, regional governments implementing their own tariffs are more keen at exploiting the working of the market mechanism, via price incentives for producers. Within the national framework that required the adoption of the centrally defined tariffs by 1997, the timing of implementation of regional specific DRG prices - and thus of the pro-competitive reform of the health care system - varies across regions (see Table 1 in the Appendix), allowing the identification of the effects of the reform in a difference-in-differences set-up. Our baseline specification models the effect of the reform as follows:

$$Y_{irt} = \alpha + \beta R_{rt} + x'_{irt} \gamma + \delta_r + \tau_t + \varepsilon_{irt} \quad (1)$$

where Y_{irt} represents a set of outcomes variables (SAH, access to services, satisfaction with services); R_{rt} is the dummy variable equal to 1 if region r implemented its own region-specific tariffs in year t ; x_{irt} is a set of control variables for individuals' socio-demographic characteristics (age and its square, gender, education); δ_r are regional fixed effects and τ_t year fixed effects; finally, ε_{irt} is the error term which we cluster at the region-year level, so to allow for time-spatial correlation. Clearly, our main interest is in the coefficient β : a negative and statistically significant coefficient in the SAH equation should be interpreted as the price mechanism having a detrimental effect on health.

The Multiscopo survey reports information about several variables that are of interest to our analysis as individual outcomes Y that are potentially affected by the reform of the health system. Specifically, we focus primarily our attention on self-assessed health status (SAH), but – since the potential impact on health of the reform will go through the impact on services supplied - we also study access to Day hospital and Emergency Room (ER) treatments, as well as ordinary hospitalization and satisfaction with the service for those hospitalized. Descriptive statistics for all these variables are in Table 2 in the Appendix. The first column reports means on the entire sample.

in fact the same for all the regions in the sample. The results including 2008-2011 are available from the authors upon request.

Columns 2 and 3 show mean values of the outcomes according to treatment status. From column 4 to 6 we exploit the time dimension to highlight the fact that 1997 represent a turning point in health care policies for all the regions. In addition, in order to capture differences in the central government policy orientation against the quasi-market model from 2000 onwards, we divide the post reform period into two sub-periods accordingly.

Our main outcome variable is self-perceived health. It is reported on a 1-to-5 scale, which we convert into a binary variable equal to one for scores 4 and 5. SAH is a commonly used summary measure for general health, that has been shown to be strongly correlated with morbidity and mortality and with other objective measures of health, such as limitations in functioning, level of energy and physical symptoms (among others, Idler, 1992; Idler and Benyamini, 1997; Kennedy et al., 1998). On average the health status does not vary much overtime (columns 4 to 6) and over the treatment status (columns 2 and 3). In Figure 1 we represent the variation in SAH over time and by treatment groups: these unconditional averages do not show any change after the reform was implemented.

While SAH can be retained as a good proxy for true health status it may nevertheless be biased in a number of directions. For instance, Franks et al. (2003) show that self rated health is influenced by gender, age, ethnicity, education and income. Bauhoff (2011) illustrate that increasing information on health issues make in fact SAH more closely related to objective health, reducing the people's overestimation of their health status. But also access to information can be influenced by socio-demographic factors, like gender, age and education. In our study we will limit the bias that originates from individual characteristics controlling for all the socio-demographic factors (but income) available in the Multiscopo Survey and for a set of year and region fixed effects. More importantly, since we aim at testing whether the reform was effective in improving efficiency without impacting on health, an additional concern would be if the treatment altered individual health perception in a way that tends to make individuals feel better/worse off in a fictitious way when the reform is implemented. Suppose for instance that – in order to increase efficiency – hospitals react by reducing inappropriate treatments: some people may simply *feel* worse off because they experience a reduced access to care.

We then take into account additional outcomes Y that characterize the individuals' experience in the access of health care services, namely whether they use Emergency Room treatments, a Day Hospital service, or an ordinary hospitalization.² These outcomes are binary indicators, equal to 1 if the individual ever used the service at least once in the last three months.

² The question about Day Hospital use was administered until 1999.

For those that have been hospitalized we also consider a binary indicator for whether they were satisfied with the services provided by the doctors during hospitalization. These are all outcomes that might have been related to the reform's attempts to reduce health care service expenditures. The descriptive statistics in Table 2 (columns 4 to 6) show indeed that - in the post reform period - there is a strong reduction in the use of health care services (ER, hospitalization and Day Hospital). The reform's effect is also evident looking at columns 2 and 3, namely comparing the regions according to their treatment status. What we will uncover in the econometric analysis is if this reduction is more pronounced in the regions where the commitment to improve efficiency was stronger, namely in the regions that chose their own DRG tariff, remembering that the introduction of the DRG mirrors a genuine intention to restructure the health care system.

In a further set of robustness checks, we also consider two indicators for objective health status - average life expectancy (ALE) and infant mortality rate (IMR) - available at the year-region level, which are commonly used in the literature as a proxy for health status (e.g., Piacenza and Turati, 2014; Baltagi et al., 2012, Akkoyunlu et al., 2009, Hall and Jones, 2007, Papageorgiou et al., 2007, Crémieux et al., 2005, Shaw et al., 2005) and are provided by ISTAT (Health For All, 1993-2007). In addition, we also take into account the possibility that individuals reacted to the reduction in the publicly provided services by increasing their consumption of private ones. In particular, we investigate whether there was any variation in the probability to buy a private health insurance by considering a binary indicator equal to 1 if at least one family member has a private health insurance. Since it is not clear from the questionnaire whether the insurance covers the household's head, all members or just some of them, the unit of analysis in this case will be the household and not the individual. As a consequence, all the other control variables are computed as averages at the family level. If anything the health status, in terms of average life expectancy and infant mortality rate, seems to be improving over time (col 4,5 and 6) and in the treated regions (col 2 and 3), even if at this point we can not claim that it was because of the reform. Private insurance ownership slightly increased over time and in the treated regions. The empirical analysis that follows will explore whether the reform played a role or not.

Finally, since Difference-in-difference estimators identify parameters of interest based on the common trend assumption, we assess the robustness of our analysis to this assumption, by also providing evidence from an augmented specification in which we allow for region-specific time trends. We also explore the heterogeneity of reform effects across socio-demographic groups.

4. Results and discussion

4.1 Baseline results

Estimates of equation (1) show no significant change in SAH in the treated regions, while it marked a clear decrease in the probability of accessing the ER (-1.7 or -3 percentage points according to the time period considered) and a moderate decrease in hospitalization (from -0.3 to -0.8 p.p.) and in Day Hospital (-0.3 p.p.) (see Table 3, Panel A and C). The effect of the reform is stronger if we restrict the analysis to the immediate post intervention period, namely when the reform had full political support. Before the reform, the average ER attendance rate was about 12%, meaning that the intervention reduced the ER access by 25%. Following the same reasoning the reduction in hospitalization and in Day Hospital attendance was respectively of 9% (0.8/9) and 10% (0.3/3). In the treated regions, people that have been hospitalized are less satisfied by the medical assistance provided by doctors, although the coefficient is not statistically significant in the first sub-period considered (panel C). Nevertheless, the hospitalized people's evaluation of their health status is not significantly affected by the reform, so their "dissatisfaction" does not impact on how they feel, and how they perceived their health status.³ Overall, these results suggest that while SAH remains unchanged, the use of health care services is reduced substantially, possibly meaning that before the reform the use of health care services was disproportionate with respect to the actual needs. The reform triggered an improvement in the efficiency of health spending without altering the quality of the services supplied and the provision of services really needed by citizens.

As Table 1 illustrates, while most of the regions enforced the reform in 1997 or in 1998, Piedmont, Lazio and Sicily implemented the reform later on, in 2002, 2005 and 2002 respectively. The delay in implementation of region-specific tariffs in these three regions can be exploited to check our identification strategy, exploring if the reform's impact varies with its timing. If we are correctly identifying the reform's impact from other potential confounding factors, the reform's effect should be stronger if Piedmont, Lazio and Sicily are left out the analysis in the long run, but we should see no effect on the estimated parameter in the short run, since these regions are not in the treatment group yet. If we exclude the three regions, the reform's effect on ER access increases to -3.3 p.p. and on hospitalization to -0.08 p.p. (long run results, Panel B). This result is consistent with the reform's timing, as the three regions are in the treatment group for a shorter time span and implemented the reform when the Central government already abandoned the quasi-market strategy to improve spending efficiency. The short run results instead are virtually identical, as none of the

³ To control for this, as a separate check we regress the health status as in equation (1) restricting to the sample of people that have been hospitalized and results confirm that also for these selected group of individuals the reform did not alter the health status.

three ‘late’ regions had implemented the reform yet (Panel C and Panel D). In general, the results obtained varying the sample confirm our identification strategy as it allows us to capture correctly the reform’s effect.

4.2 Robustness checks

In what follows we extend the analysis in different ways. First we amend the baseline specification adding region-specific trends, to explore if other region specific factors played a role with respect to the outcome considered. Then we consider ALE and IMR, to provide evidence that objective health status is not affected by the reform. Since ALE and IMR data are defined at the regional level, we will repeat also the baseline analysis done in the previous section with regional level data, to show that the estimation of the reform’s effect does not depend on the way data are aggregated. Private health insurance ownership is also taken into account as individuals may have substituted publicly provided services with private ones. This is checked using also the region specific trend augmented specification. Finally, we check whether the experience of a different organization of the public health care system with respect to the NHS introduced in 1978 impact on the perception of individuals’ health status following the reform.

Region-specific trends. Our baseline specification controls for year and region fixed effects, but there could be region-specific trends in SAH and in the use of health care services that could be confounded with the reform and that we are not capturing. Our major concern would be if individuals modify the subjective evaluation of their health status changing their reference point and adapting it to what they perceive to be the standard for health conditions. In this case, if the average level of health conditions may get worse, the reference point may be shifted accordingly but not individuals’ health perception. The vignette-anchoring method (see, for example, Kapteyn et al., 2007) would be helpful in this case, but those kind of questions are not administered in our survey. Although the visual representations of SAH and the share of people that used ER treatments, Day Hospital and ordinary hospital treatments is quite reassuring (Figures 1 to 4), we augment the baseline specification in equation (1) with the interactive term between the region dummy variables and a linear trend. The results show that the reform’s impact is less strong with respect to both ER access and hospitalization, but no change in SAH emerges. The Day Hospital reduction is actually slightly stronger in this more demanding specification. Overall the estimates confirm our previous findings, if anything regional trends should not have been played an important role in changing individuals’ behavior and SAH in the years of the reform (see Table 4 in the Appendix).

Objective measures of health. Our SAH measure of health is clearly subjective so that – despite the large literature suggesting a clear link between subjective and objective measures – our results could still be biased by subjective feelings. In order to overcome this problem we consider two more objective indicators of population health, like the IMR and the ALE. Table 5 (in the Appendix) illustrates the reform’s effect on these two objective health status indicators; since we use data aggregated at the regional level we also replicate the analysis with the baseline outcomes. Results clearly show that the reform’s effect is identical to the one estimated by equation (1) and that the impact on the objective outcome is almost never different from zero. Since both ALE and IMR can respond to a shock such as the reform under analysis with some delay (as discussed, e.g., by Piacenza and Turati, 2014) we also test if this is the case pretending that the reform was implemented from 1 to 3 years later. The results (not shown here) confirm that the ‘fake’ reform’s effect was never different from zero.

Substitution of public with private services. A third concern is related to the fact that individuals might have been forced to substitute public services with private ones. While we are still lacking a clear model rationalizing the relationships between public and private health care spending (e.g., Levaggi and Turati, 2010), this likelihood can clearly bias our results: competition fueled by the new reimbursement mechanism brought about a reduction in the provision of services by public hospitals, which further resulted in an increased demand of private services; these are the services that allowed no change in SAH. To check for this issue, missing a direct measure of out-of-pocket spending and of the use of private services, we consider the demand for private health insurance. The change in private health insurance ownership (Table 6 in the Appendix) is estimated in two ways: first with region and year fixed effects only (columns 1 and 3) and then with also region specific trends (columns 2 and 4). Overall, it is not affected by the reform, and thus there is no evidence of an increase in the use of private health insurance to compensate for a potential lack in the provision of public health care services.

A cohort-wise analysis. As briefly explained in the introduction, in 1978 there was a radical change in the organization of the Italian public health care service: a public universalistic scheme substituted a highly fragmented system of insurance funds, mainly reflecting the corporative nature of the Italian Welfare State (e.g., Turati, 2013). It is then interesting to explore if there are variations in individuals’ perception of their health that depend on the different ‘organizations’ of the public health care schemes that they might have experienced during their lifetime. Individuals born before 1948 - and thus aged at least 30 in 1978 - are those that potentially used the health care services

before 1978, and thus may react differently to the 1997 reform with respect to those that did not use the health care service before 1978.

The baseline specification of Equation (1) is amended introducing an interaction term between the reform and a dummy variable which identifies those that are born before 1948. The results are in Table 5 in the Appendix. Perhaps surprisingly, SAH improves with the treatment for those that were born before 1948, while it gets relatively worse for those born after 1978. The decrease in hospitalization is clearly driven by the older cohort (-2 p.p.), while the ER access and Day Hospital services use decrease uniformly for all the sample. The decrease in hospitalization is probably driven by the fact that hospitalization was far more frequent for those that were born before 1948 (12% vs. 6%). Overall the results do not show important differences in the way people react to the reforms, at least according to the organization of the health care system they experienced in their lifetime. It is reassuring that those who can better compare the reformed health system with previous ‘regimes’ are not those that see a deterioration in health status.

4.3 Heterogeneity by age, sex, education

In this section, we explore the heterogeneous effects of the reform according to age, gender and educational attainment, so to have further guidance on the impact of the reform. We then estimate Equation (1) running separate regressions for each group considered.

Heterogeneity by age groups. Dividing the sample in age groups is interesting as it may increase our understanding about the reform. If the reform was effective in improving efficiency, the reduction in health care costs should be differentiated according to the people’s needs, namely it should target those individuals that are less at risk, so to decrease costs but not health status. Since people’s health status and health care use depend crucially on age, this exercise can be helpful for shading light on the way efficiency is reached. We divide the sample in age groups that roughly correspond to education/training age (younger than 25), working age (from age 25 to 64) and pension age (older than 64). Then we also split the working age in two smaller groups: 25-44 years old and 45-64 years old, so to better capture differences in health care use and health status that may be depend on both individuals’ age and career stages.

Results are in table 8 in the Appendix. Overall, the reform’s effect is stronger in the short run as in our previous results and it is clearly decreasing with age for ER access. SAH is not negatively affected by the reform in any age groups considered, if anything it is increasing for those aged 25-44. Young people, less exposed to health problems with respect to old people, experience the sharpest drop in ER access (-4.9 p.p. vs. -3 p.p. or -1.3 p.p. in the short run, while -3 p.p. vs. -1.6

pp. or -0.9 p.p. in the long run). The reduction in ER access by young and potentially healthy individuals is consistent with the aim of the reform, as the cost saving strategy implies a reduction of inappropriate services, presumably higher for individuals that are less at risk. For hospitalization and Day Hospital the differences among the groups are less clearly shaped. The age group that responds mostly to the intervention is composed by people aged 45-64. Again the reform seems to target users (young people are rarely hospitalized), but not those that would be harmed by a reduction in both hospitalization and Day Hospital. In fact those above age 64 are not affected by the treatment, even if they are those that use Day Hospital and hospitalization more.

Heterogeneity by gender. The reform effect is quite similar across genders and coefficients are different because the health care use is different between males and females (see Table 9 in the Appendix). In fact before 1997, the share of males that accessed the ER was 14%, while for female it was 10%. So the estimated reduction is proportional between the two groups ($2/14$ is identical to $1.4/10$, short run results, and $3.5/14$ is identical to $2.5/10$, long run results). For the probability to be hospitalized results show that while males are the group less at risk of hospitalization they are those that experience the stronger decline. In fact before 1997, 8.7 % of males were hospitalized at least once in the last 3 month, while the share for females was 9.6%. So the reduction with respect to hospitalization is not proportional ($1/8.7$ is different from $0.7/9.6$), but the differences are not relevant. Overall, males and females are affected almost equally by the reform and since there is no reason to believe that there should be a difference in the reform's impact according to gender, we consider this exercise as a further confirmation of our identification strategy.

Heterogeneity by education. Individuals with different education (hence cognitive skills and, potentially, income) may react differently to the reforms in the health care system. To explore this issue we divide our sample in three groups according to the highest level of education achieved: compulsory, higher secondary and tertiary education. Results are in Table 10 in the Appendix. The reduction in the ER access is stronger the higher is educational level in the short run, while in the long run these differences attenuate. The reduction is not proportional as the frequency of ER access is higher for less educated people. People with no more than compulsory schooling are those that on average are older (56 years old vs. 43 in the two other categories) and this may explain this finding (older people are those that are less affected by the reform). Also for Day Hospital use, less educated people are the group that experience the weaker reduction.

Education seems to be a factor that interacts with the reform, as the less educated group is the one that modified less the health care services use. In terms of SAH, there is no effect in any of

the groups considered, so the reduction in health care services use and in health status seem to be not related at all.

5. Concluding remarks

This paper provides the first assessment of the Italian pro-competitive reforms in the health care sector of the 1990s based on micro-data. Exploiting the staggered implementation of these reforms across regions we evaluate their impact on both subjective-assessed health (SAH) and on self-reported utilization of health care services by means of a difference-in-differences design. Our headline findings indicate that while SAH was unaffected, the access and utilization of publicly provided health services were diminished. These results, which are robust to a number of sensitivity checks, are consistent with the idea that pre-reform health care services were likely to be over-utilised by patients and that the reforms have increased the overall efficiency of the health care system.

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Appendix

Table 1 – The Introduction of region-specific tariffs

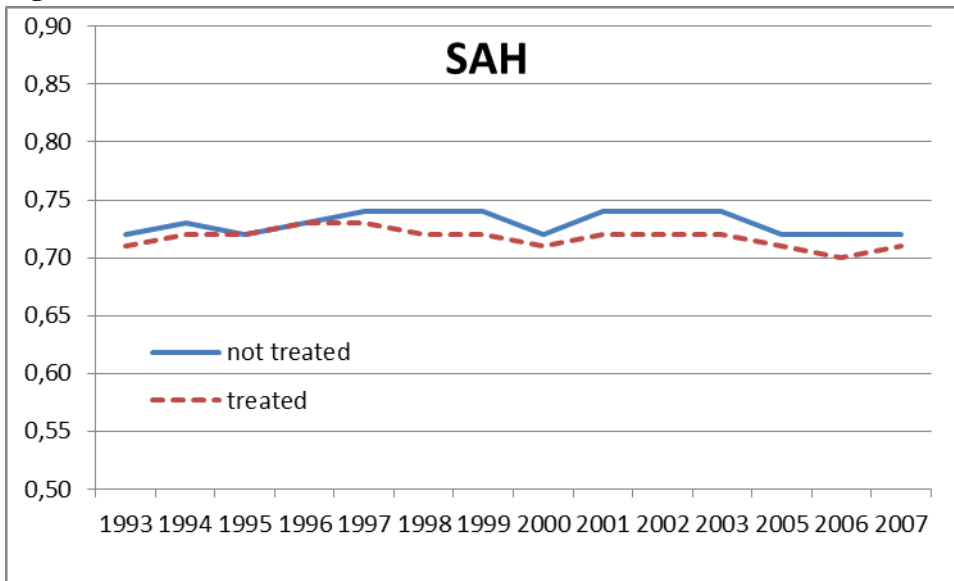
	Year of the reforms
Piedmont	2002
Lombardy	1997
Veneto	1998
Emilia-Romagna	1997
Tuscany	1997
Umbria	1997
Lazio	2005
Sicily	2002

Table 2 – Mean values of the outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Total	No treatment	Treatment	<1997	1997-1999	>1999
Good health	0.72	0.73	0.71	0.72	0.73	0.72
ER (y/n)	0.08	0.09	0.07	0.12	0.06	0.07
Day Hospital (y/n)	0.03	0.03	0.03	0.03	0.02	
Hospitalization (y/n)	0.05	0.06	0.04	0.09	0.04	0.04
Sat docs if hosp (1-4)	3.24	3.21	3.31	3.24	3.22	3.24
Fully satisf by docs if hosp	0.36	0.34	0.42	0.36	0.36	0.36
ALE	79.5	79.2	80.5	78.1	78.9	80.6
IMR	47.1	50.6	35.8	61.5	51.3	37.1
Private insurance ownership	0.25	0.23	0.3	0.23	0.24	0.26
Treatment	0.35			0.00	0.36	0.55

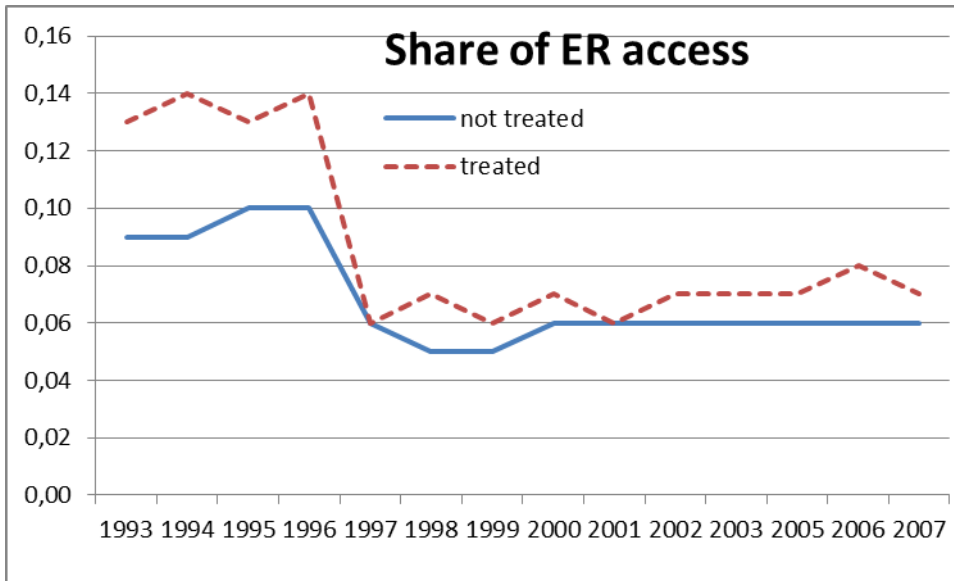
Note: Satisfaction of the service provided by the doctors (in case of hospitalization) is coded as a binary indicator equal to 1 if the individual reported a value of 4, on a 1 to 4 rating scale. The ‘treatment’ category identifies treated regions, in the post reform period. Source: Multiscopo Survey (ISTAT), 1993-2007.

Figure 1 – Self assessed health



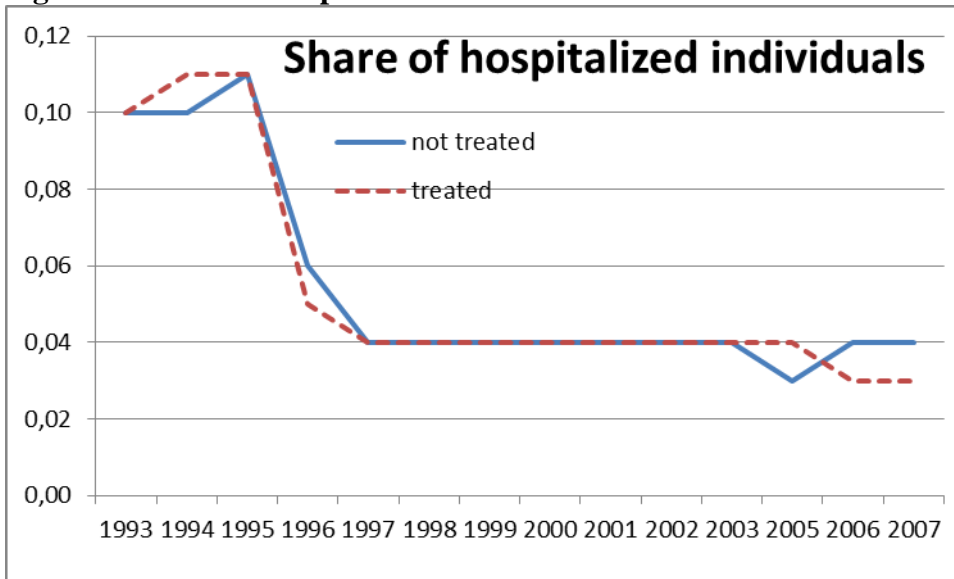
Note: Share of individuals that report a health condition at least equal to 4 on a 1-to-5 rating scale. Treated regions are those in which the reform is implemented after 1997. Source: Multiscopo Survey (ISTAT), 1993-2007.

Figure 2 – Share of individuals that accessed the Emergency Room



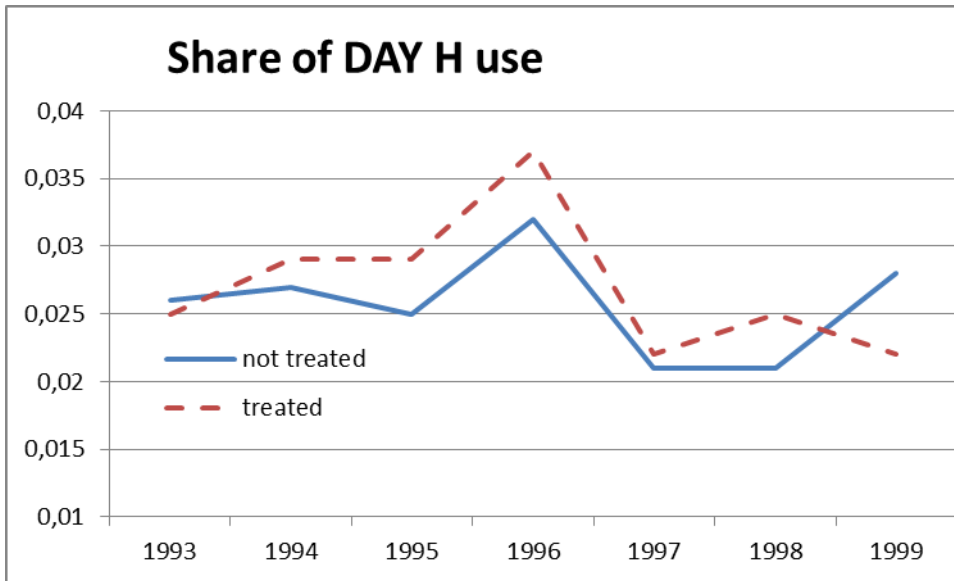
Note: Share of individuals accessed the Emergency Room in the last three months. Treated regions are those in which the reform is implemented after 1997. Source: Multiscopo Survey (ISTAT), 1993-2007.

Figure 3 – Share of hospitalized individuals



Note: Share of individuals that have been hospitalized in the last three months. Treated regions are those in which the reform is implemented after 1997. Source: Multiscopo Survey (ISTAT), 1993-2007.

Figure 4 –Share of individuals that used the Day Hospital service



Note: Share of individuals that used the Day Hospital service in the last three months. Treated regions are those in which the reform is implemented after 1997. Source: Multiscopo Survey (ISTAT), 1993-1999.

Table 3 – Baseline estimates

	(1) SAH	(2) er	(3) dayH	(4) hospitaliz	(5) sat doc
Panel A: 1993-2007					
treatment	-0.002 (0.003)	-0.017*** (0.003)		-0.003* (0.002)	-0.025** (0.012)
Observations	660,326	663,894		665,660	34,726
R-squared	0.253	0.016		0.030	0.066
Panel B: 1993-2007. Piedmont, Lazio and Sicily excluded					
treatment	-0.001 (0.003)	-0.033*** (0.004)		-0.008*** (0.003)	-0.038*** (0.014)
Observations	523,412	525,874		527,273	28,016
R-squared	0.249	0.018		0.031	0.067
Panel C: 1993-1999					
treatment	0.010** (0.004)	-0.030*** (0.004)	-0.003** (0.002)	-0.008*** (0.002)	-0.030 (0.019)
Observations	354,296	355,610	351,700	357,134	23,576
R-squared	0.255	0.021	0.005	0.031	0.068
Panel D: 1993-1999. Piedmont, Lazio and Sicily excluded					
treatment	0.005 (0.004)	-0.031*** (0.005)	-0.004** (0.002)	-0.007** (0.003)	-0.039** (0.020)
Observations	279,975	280,941	278,080	282,149	19,085
R-squared	0.252	0.023	0.005	0.032	0.068

Notes: all estimates control for age and its square, gender and educational level. Region and year fixed effects are also included. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 4 – Estimates with region specific trend

	(1) SAH	(2) er	(3) dayH	(4) hospitaliz	(5) sat doc
Panel A: 1993-2007					
treatment	0.002 (0.004)	-0.014*** (0.003)		-0.004** (0.002)	-0.018 (0.016)
Observations	660,326	663,894		665,660	34,726
R-squared	0.253	0.017		0.030	0.067
Panel b: 1993-1999					
treatment	0.008 (0.007)	-0.020* (0.010)	-0.005* (0.002)	-0.000 (0.004)	-0.014 (0.028)
Observations	354,296	355,610	351,700	357,134	23,576
R-squared	0.255	0.022	0.005	0.032	0.070

Notes: all estimates control for age and its square, gender and educational level. Region and year fixed effects and region-specific trends are also included. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 5 – Objective health status

	(1) SAH	(2) er	(3) dayH	(4) hospitaliz	(5) ALE	(6) IMR
Panel A: 1993-2007						
Reform	-0.001 (0.005)	-0.015** (0.006)		-0.001 (0.003)	0.105* (0.055)	1.700 (2.312)
Observations	266	266		266	266	266
R-squared	0.735	0.859		0.950	0.991	0.824
Panel B: 1993-1999						
Reform	0.008 (0.005)	-0.03*** (0.006)	-0.004** (0.002)	-0.006* (0.003)	0.073 (0.055)	1.451 (2.429)
Observations	133	133	133	133	133	133
R-squared	0.791	0.915	0.607	0.954	0.980	0.859

Notes: all estimates control for region and year fixed effects. Robust standard errors are in parentheses, clustered at the region-treatment level. *** p<0.01, ** p<0.05, * p<0.1

Table 6 – Private health insurance ownership

	(1)	(2)	(3)	(4)
	Health insurance ownership by at least one family member			
	1993-2007		1993-1999	
Reform	0.008* (0.005)	0.003 (0.006)	0.010 (0.007)	-0.019 (0.011)
Region FE * trend	No	yes	no	yes
Observations	293,598	293,598	153,587	153,587
R-squared	0.123	0.123	0.120	0.120

Notes: all estimates control for age and its square, gender and educational level as averages at the family level. Region and year fixed effects are also included. Columns (2) and (4) also controls for region specific trends. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 7 – A cohort analysis

	(1) SAH	(2) er	(3) Day H	(4) hospitaliz	(5) sat doc
Panel A: 1993-2007					
treatment	-0.008** (0.003)	-0.017*** (0.003)		0.003* (0.002)	-0.043*** (0.016)
treatment*before 48	0.015*** (0.005)	0.001 (0.002)		-0.017*** (0.002)	0.031* (0.018)
Observations	660,326	663,894		665,660	34,726
R-squared	0.253	0.016		0.030	0.066
Panel B: 1993-1999					
treatment	-0.003 (0.005)	-0.028*** (0.004)	-0.003* (0.002)	0.000 (0.002)	-0.073*** (0.026)
treatment*before 48	0.029*** (0.006)	-0.004 (0.003)	0.000 (0.002)	-0.020*** (0.003)	0.067*** (0.023)
Observations	354,296	355,610	351,700	357,134	23,576
R-squared	0.255	0.021	0.005	0.032	0.069

Notes: all estimates control for age and its square, gender and educational level. Region and year fixed effects are also included. Before 48 is a dummy variable for those born before 1948. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 4 – Heterogeneous effects of the reform, by age.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Time period: 1993-2007				Time period 1993-1999				
	SAH	er	hospitaliz	sat doc	SAH	er	Day H	hospitaliz	sat doc
age < 25									
treatment	0.000 (0.004)	-0.03*** (0.005)	-0.003 (0.002)	-0.055 (0.037)	0.008 (0.005)	-0.05*** (0.006)	-0.004 (0.003)	-0.003 (0.003)	-0.009 (0.056)
Observations	89,050	89,534	89,741	2,645	52,671	52,905	52,299	53,125	2,059
R-squared	0.015	0.027	0.016	0.060	0.017	0.032	0.003	0.014	0.065
age 25-64									
treatment	-0.002 (0.003)	-0.02*** (0.003)	-0.001 (0.002)	-0.008 (0.016)	0.011** (0.005)	-0.03*** (0.004)	-0.003** (0.002)	-0.01*** (0.002)	-0.050* (0.026)
Observations	439,739	442,133	443,150	19,154	237,300	238,211	235,717	239,145	13,514
R-squared	0.102	0.015	0.018	0.061	0.110	0.021	0.004	0.018	0.060
age > 64									
treatment	-0.007 (0.007)	-0.009** (0.004)	-0.006 (0.004)	-0.05** (0.018)	0.004 (0.008)	-0.013* (0.007)	-0.002 (0.004)	-0.009 (0.006)	-0.025 (0.027)
Observations	131,537	132,227	132,769	12,927	64,325	64,494	63,684	64,864	8,003
R-squared	0.067	0.012	0.030	0.084	0.061	0.017	0.003	0.032	0.098
age 25-44									
treatment	-0.001 (0.003)	-0.02*** (0.004)	-0.002 (0.002)	0.003 (0.023)	0.009* (0.005)	-0.04*** (0.005)	-0.003 (0.002)	-0.006** (0.003)	-0.032 (0.032)
Observations	236,874	238,212	238,695	9,166	129,435	130,005	128,542	130,482	6,515
R-squared	0.028	0.018	0.019	0.058	0.031	0.024	0.003	0.020	0.058
age 45-64									
treatment	-0.004 (0.005)	-0.01*** (0.003)	-0.001 (0.002)	-0.021 (0.020)	0.011 (0.007)	-0.03*** (0.005)	-0.004* (0.002)	-0.01*** (0.003)	-0.07** (0.032)
Observations	202,865	203,921	204,455	9,988	107,865	108,206	107,175	108,663	6,999
R-squared	0.055	0.013	0.020	0.075	0.057	0.017	0.002	0.019	0.073

Notes: all estimates control for age and its square, gender and educational level. Region and year fixed effects are also included. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 9 – Heterogeneous effects of the reform, by gender.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Time period: 1993-2007				Time period: 1993-1999				
	SAH	er	hospitaliz	sat doc	SAH	er	day H	hospitaliz	sat doc
Males									
treatment	-0.006*	-0.02***	-0.004*	-0.04**	0.006	-0.04***	-0.002	-0.010***	-0.06**
	(0.003)	(0.004)	(0.002)	(0.015)	(0.005)	(0.006)	(0.002)	(0.003)	(0.024)
Observations	317,688	319,201	320,023	15,909	170,842	171,375	169,348	172,083	10,826
R-squared	0.227	0.020	0.038	0.069	0.231	0.023	0.007	0.040	0.070
Females									
treatment	0.001	-0.01***	-0.002	-0.014	0.013***	-0.03***	-0.01**	-0.007**	-0.006
	(0.004)	(0.003)	(0.002)	(0.014)	(0.005)	(0.004)	(0.002)	(0.003)	(0.024)
Observations	342,638	344,693	345,637	18,817	183,454	184,235	182,352	185,051	12,750
R-squared	0.265	0.012	0.026	0.067	0.267	0.017	0.003	0.027	0.071

Notes: all estimates control for age and its square and educational level. Region and year fixed effects are also included. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

Table 5 – Heterogeneous effects of the reform, by educational level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1993-2007				1993-1999				
	SAH	er	hospitaliz	sat doc	SAH	er	DayH	hospitaliz	sat doc
Compulsory education:									
treatment	-0.004 (0.004)	-0.01*** (0.003)	-0.003 (0.002)	-0.03** (0.013)	0.008 (0.005)	-0.03*** (0.005)	-0.002 (0.002)	-0.01*** (0.003)	-0.032* (0.017)
Observations	405,330	407,553	408,822	25,515	223,607	224,475	221,757	225,516	17,407
R-squared	0.244	0.015	0.031	0.065	0.244	0.020	0.004	0.032	0.067
Upper secondary education:									
treatment	0.001 (0.004)	-0.02*** (0.004)	-0.004** (0.002)	-0.034 (0.023)	0.009** (0.004)	-0.04*** (0.005)	-0.01** (0.002)	-0.01*** (0.003)	-0.037 (0.041)
Observations	206,355	207,374	207,796	7,529	107,591	107,953	106,961	108,355	5,075
R-squared	0.117	0.015	0.017	0.056	0.117	0.022	0.005	0.018	0.060
Tertiary education:									
treatment	-0.001 (0.008)	-0.02*** (0.005)	-0.003 (0.003)	0.002 (0.046)	0.033*** (0.012)	-0.04*** (0.009)	-0.01** (0.006)	-0.007 (0.005)	0.023 (0.088)
Observations	48,641	48,967	49,042	1,682	23,098	23,182	22,982	23,263	1,094
R-squared	0.107	0.012	0.022	0.091	0.109	0.016	0.009	0.024	0.111

Notes: all estimates control for age and its square and gender. Region and year fixed effects are also included. Robust standard errors are in parentheses, clustered at the year-region level. *** p<0.01, ** p<0.05, * p<0.1

