curb your premium! evaluating state intervention in medical malpractice insurance

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Curb Your Premium: The Impact of Monitoring Malpractice Claims*

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Abstract

We study a policy aimed at reducing the insurance costs paid by local public healthcare providers. The policy is based on enhanced monitoring of medical malpractice claims by the regional government that rules local providers. In particular, we implement a Difference-in-Differences strategy using Italian data at the provider level from 2001 to 2008 to evaluate the impact of monitoring on medical liability expenditures, measured as insurance premiums and legal expenditures. Our results show that this information-enhancing policy reduces paid premiums. This reduced-form effect might arise by both the higher bargaining power of the demand side or by increased competition on the supply side of the insurance market. Empirical evidence on the post-treatment period supports the competition-channel hypothesis, as the policy reduces the Herfindahl-Hirschman index at the insurance company level by about 30%. Validity tests show that our findings are not driven by differential pre-policy trends between treated and control providers.

JEL codes: I18, G22, K32.
Keywords: Medical Malpractice Premium, Legal Expenditures, Public Healthcare System, Difference in Differences.

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1 Introduction

The last decades' skyrocketing increase of medical liability insurance premiums has moved several Governments to deal with the policy challenge related to medical malpractice expenditures. The majority of the adopted policies is mainly targeted to lower malpractice premiums and to reduce physicians' or hospitals' potentially distorted behaviors in medical practice triggered by the threat of being sued (*i.e.*, negative or positive defensive medicine, (Danzon (2000))). Plenty of works have analyzed the impact of liability reforms on paid premiums in the U.S., a mainly private healthcare system.[1]

We evaluate a policy aimed at curbing medical malpractice expenditures, defined both in terms of paid premiums and of legal expenditures, in a public healthcare system. In particular, we implement a Difference-in-Differences (DD) strategy using Italian data at the public provider level from 2001 to 2008 to assess the impact of a State-level (Regions) monitoring on medical malpractice claims. In this setting, public healthcare providers typically pay a private insurance.[2]

The monitoring policy - hereafter *Claims* - implements a regional monitoring system that collects data on both the number of compensation claims and any legal action related to medical malpractice litigation. This monitoring system allows Regions to collect information on civil and criminal claims against public healthcare providers operating in their jurisdictions. The information is collected from the stage of filing a suit until the end of the process, which can be a settlement, a trial, or a drop of the claim. In order to collect such information, Regions set special grids with a list of fields that need to be filled out by their providers. Each provider has access to the common dataset and can monitor its own data, whereas checking the performance of another healthcare provider belonging to the same system is not allowed. Only the regional administration can access the entire database. These data are not generally released to the public although in a few cases Regions publish reports, which can be either public or classified. Classified reports are prepared for meetings with the insurance companies or for purposes internal to the regional administration (such as for policy planning with the involved structures). Regions can use the collected data to recall the structures outliers in terms of claims and expenditures for malpractice. Overall, *Claims* does not

[1] Exploiting the variety in interventions across U.S. States, several studies estimate the impact of legal reforms on malpractice premiums, malpractice claims frequency, award payments, or defensive medicine, to name the main outcomes of interest. See, among others, Sloan (1985); Williams and Mello (2006); Mello and Kachalia (2010); Danzon et al. (2004); Thorpe (2004); Kilgore et al. (2006); Viscusi and Born (2005). For a review of this literature see, for instance, Mello (2006b) and Kessler (2011). For the assessment of the link between malpractice pressure and treatment decisions, with specific reference to the costs of defensive medicine, see Kessler and McClellan (1996) and Kessler and McClellan (2002), but also Sloan and Shadle (2009). See Avraham (2011) for an updated list of tort reforms related to medical malpractice in U.S. States.

[2] Regions are an administrative level equivalent to States. For a matter of simplicity, in this paper we use *Regions* and *States* interchangeably.

represent a pure risk management system, since it does not monitor errors or near misses, but only claims (which do not always turn out to be based on iatrogenic injuries).

The policy adopted by the Italian Regions is consistent with the fact that, in public systems, the problems related to medical malpractice increasing costs are compounded with those connected to the public management of the healthcare services. In particular, there is an interplay of multiple agency problems when medical malpractice liability insurance is acquired by a public agent from the private market. The public agency in charge of the bargaining with the private insurance company is one layer of government (generally the provider of the healthcare services), which might not have adequate incentives to fully internalize the bargaining and contract costs. Hence, it could lack incentives to acquire information on its own risks exposure, both in terms of claims' frequency and awarded compensations, or it may fail to implement serious programs of risk management, among other things. The reason is simply that another layer of government (typically a higher level) will pay the final bill, as an insurer of last resort. This moral hazard behavior is defined in public economics as a problem of soft budget constraint.

The insurer of last resort might try to cope with this framework by increasing the available information on medical malpractice cases involving its healthcare providers. This approach, which could be linked to a process of budget hardening, should work as an incentive on the basis of a *I-know-that-you-know-that-I-know-that-you-know* game between the State and the healthcare providers on the one hand, and the State and private insurers on the other hand. Its rationale lays in making both the State and its counterparts more informed, which could lead, for instance, to more efficient contracts and policies. This is particularly important when liability insurance contracts need to follow the procedure of public procurement auctions, as often the case when the public sector buys services on the private market. Within a system where each public provider can contract out its risk to the private sector, an increase in available information on malpractice could, for instance, have a positive impact on the public procurement procedure by reducing the contractual power of the incumbent insurer.

The policy adopted by Italian Regions is just an example out of the set of adoptable measures to cope with malpractice premiums in public systems. Yet, the special feature of the Italian case, besides the within-country variation, is that, differently from other public systems, a higher control of the State over medical liability issues did not come together with a shift in the malpractice liability system. For instance, starting in the Nineties, the UK opted for a model in which a kind of public insurance scheme with the National Health Service Litigation Authority (NHSLA), that pools malpractice risks through the Clinical Negligence Scheme for Trusts (CNST), has been associated to an enterprise fault liability system (Fenn et al. (2010)).[3] Also under such a different scheme the importance of monitoring the providers, acquiring information from them, and setting appropriate

[3]Notice that the Italian NHS was modeled on the British NHS (France and Taroni (2005)).

incentives to them in order to reduce their risk exposure have been among the main policy priorities (Towse and Danzon (1999); Fenn et al. (2004)).

All in all, the monitoring policy might be a good tool to curb medical malpractice expenditures through two channels. First, the monitored healthcare providers might be able to define more competitive public auctions and might increase their contracting power by using the collected information. There is some evidence that insurance companies in Italy tend to make an overvaluation of medical accidents, which leads them to set aside higher amounts of reserves than they need (Taroni et al. (2008)).[4] If healthcare providers become aware of their real risk exposure, that information can be used in case insurance companies try to inflate insurance premiums in order to set a high level of reserves. We can try to assess indirectly the value of this first channel evaluating the impact of the policy on the amount of paid premiums.[5] The richness of our data allows us to shed more light on these channels. We have information for a set of auctions of medical malpractice insurance contracts from 2008 to 2011, through which we recovered data on the use of open calls and on a Herfindahl-Hirschman index of the reference market. Unfortunately, these insurance market data are only available in the post-treatment period that is why we cannot investigate the channels of the policy by means of our baseline DD strategy. However, we can compare treated vs control units in the post-treatment period in order to evaluate whether enhanced monitoring and information also lead to lower market concentration. Second, although the purpose of monitoring is not to detect medical errors, it can provide incentives for healthcare providers to present higher standards of care. To a certain extent, better healthcare structures should receive less medical claims. Nevertheless, this might be a weak argument in case higher standard practitioners are more targeted by claims for the very reason they perform a higher number of treatments or are presented more serious and complicated cases. An indirect way to control for this second channel is to evaluate the impact of the monitoring system on legal expenditures, which provides an approximation for requests of compensation.

Our main results from the DD estimators show that the monitoring policy has a robust impact on paid premiums. As for legal expenditures, the impact is lower and not robust for different specifications. Providers operating in Regions adopting a monitoring policy on malpractice claims paid overall around 20% less than providers operating in Regions that did not adopt such a policy. The

[4] As described by Baker (2005b), "the insurer must set "reserves" which are equal to the amount needed to pay future claims under any policies it sells and then must set aside assets to offset those reserves". While analyzing the case of Texas, Black et al. (2008) found that medical malpractice insurers made an undervaluation of their initial expense reserves, even though costs were rising during the analyzed period.

[5] It would be interesting to assess the policy impact also on the type of services delivered or on health consequences for the resident population in terms of risk exposure (*e.g.*, Fenn et al. (2012) look at patients' exposure to hospital-acquired infections). Unfortunately data at the provider level for the entire period considered are not publicly available at the national level.

range of the savings is estimated below 15% when only Local Healthcare Units are considered. The drop in legal expenditures associated to monitoring is generally not statistically significant. The findings are robust for the introduction of covariates which could potentially explain the different trends in both premiums and legal expenditures among healthcare structures and Regions. Results are also robust for placebo test for the plausibility of the (untestable) DD assumption of a common trend between the treated and the control groups, and for robustness checks run on subsets of structures. Descriptive cross-section post-treatment evidence relate the estimated impact of acquiring more information by the providers to a decrease in the concentration in the regional market for malpractice insurance and to a higher use of open procedure when contracting out the coverage.

The paper proceeds as follows. Section 2 lays out the institutional framework and Section 3 our econometric strategy. Section 4 describes our dataset. Section 5 discusses the empirical results and Section 6 concludes.

2 Institutional Framework

2.1 The Italian Healthcare System

The Italian National Health System (NHS) provides universal coverage to citizens.[6] The current organization and management of the Italian NHS is carried out at three levels: at the central level, by the national State; at the regional level, by each Region; within each Region, by population-based local health units (LHUs) (*Aziende Sanitarie Locali*), "independent" hospitals (IHs) (*Aziende Ospedaliere*), research hospitals (RHs) (*Istituti di Ricovero e Cura a Carattere Scientifico*) and, in cases where a medical school is present, by teaching hospitals (THs) (*Policlinici Universitari* and *Aziende Ospedaliere Universitarie*) (France and Taroni (2005); Fiorentini et al. (2008); Lo Scalzo et al. (2009)).

The 19 regional governments and the 2 autonomous provinces (*Provincia Autonoma di Trento* and *Provincia Autonoma di Bolzano*) are in charge of the healthcare budget and its management, relying on their own revenues and transfers from the national government. Regions are accountable for ensuring, among other things, the delivery of healthcare, the allocation of resources to the healthcare providers, and the release of licenses to public and private healthcare providers within their system (CERGAS, 2010). Besides this, they are free to regulate and finance healthcare services in addition to the required minimum (national) standards of healthcare (LEA) (*Livelli Essenziali di Assistenza*), set by the Central state and for which they receive financial support through a nation-wide equalizing fund (Fiorentini et al. (2008)). Finally, they can implement different healthcare

[6]Healthcare is mainly provided by public entities and citizens are not allowed to opt out from the system and seek private healthcare only.

management schemes, which led several authors to consider 21 healthcare systems in Italy.[7] Each regional healthcare system is organized in LHUs, IHs, RHs, THs, and private institutions. LHUs are population-based healthcare organizations that provide primary medical services and coordinate non-emergency admissions to hospitals in their geographical area. LHUs provide medical services through hospitals they own and manage, IHs, RHs, and THs. The IHs and THs are essentially structured like the British National Health System's Trusts (Anessi Pessina et al. (2004)). Patients are covered by health plans provided by LHUs according to their place of residence, even though they can also choose to receive hospital care from a hospital that does not belong neither to their LHU area nor to their Region of residence. As a consequence, a proxy for the healthcare system quality can be provided by the *mobility rates*: *internal mobility*, when migration takes place within the Region of residence; and *external mobility*, when migration involves healthcare providers outside the Region of residence. Healthcare structures in Northern Regions are generally considered to provide higher quality healthcare than their equivalents in the South. For example, Fabbri and Robone (2010) show that, in 2001, the proportion of patients searching for hospital care outside their LHUs of residence (*exit rate*) was higher for poorer (*i.e.*, Southern) Regions, with variations according to the type of care (more severe for cancer and complex surgery).

2.2 Legal Elements and the Insurance Market

Italy possesses no specific statute law to regulate the physician-patient relationship, although attempts have been made. Therefore, the physician-patient relationship is regulated mostly by case law similarly as in the U.S. and, specifically, through the jurisprudence developed by the Court of Cassation (the higher court for civil and criminal jurisdictions). The duties of a medical care provider (staff member, public or private hospital employee or independent practitioner) towards the patient are interpreted as contractual obligations as far as liability is concerned. Tort law liability rules (*responsabilità aquiliana*) are in fact not applicable to medical malpractice cases: doctors's and hospitals' liability is formally regulated by contract law.[8]

[7]The current decentralized structure of the Italian Health System is the product of several reforms which, starting in the Nineties, tried to make the regional governments more fiscally responsible, coping with soft-budget constraint problems between Regions and the Central State (Bordignon and Turati (2009)) on one side, and to make the overall mainly public system more competitive and efficient on the other side. These reforms introduced managerialism, fiscal tools for decentralization and quasi-market mechanisms (Fattore (1999); Jommi et al. (2001); France et al. (2005)). In the aftermath of these reforms, the number of IH and TH increased while the number of LHU decreased as Regions were trying to reshape their own healthcare governance, especially in those realities characterized by a stronger preference for competition (CERGAS, 2004).

[8]The main implication, in liability terms, is related to: 1) burden of proof, which is on the defendant (physician or hospital) (Art. 1218 of the Civil Code); 2) standard level of care, which should consider the specificities of the professional activity (Art. 1176 of the Civil Code); 3) employee's liability (Art. 2236 of the Civil Code); and 4) statute of limitations, currently ten years, rather than the standard five years for compensation claims not originated from a contract. For further

Victims of malpractice can seek compensation not only through civil justice but also through the criminal system, suing either the physician or the hospital or both. As a matter of fact, criminal courts can decide over the compensation due to medical liability even when the main indictment is criminal (*i.e.*, minor or major personal injury) (Garoupa and Grembi (2010)). Public healthcare providers (LHUs, IHs, RHs, THs, and hospitals directly managed by LHUs) are not legally obliged to insure for medical malpractice themselves, but they must provide insurance for their medical personnel. The insurance covers professional liability against third-parties.[9] According to the data released by the Italian Association of Insurance Companies (ANIA (2010)), during the period 2000-2008 there were between 13 and 14 compensation requests for every 100 physicians, with an average paid damage of 39,779 euros (2005 data) and an increasing trend between 1995 and 2004.[10] The ratio between the number of filed suits and the number of compensation requests seems to be quite low (significantly lower than 20%), although evidence on this index is available for a limited number of regions (Amaral-Garcia and Grembi (2011)).

Like all public agencies in Italy, public providers are not allowed to access the market to select an insurer at their discretion: they need to open a call for tenders (public procurement auctions) in order to contract out the coverage. The insurers operating in the Italian market for medical malpractice are private companies, either national or international. These insurance companies cover healthcare providers mainly on the basis of a yearly premium calculated as an adjustable percentage of the annual gross payroll of the public entity (MoH (2006)). While the insurance premiums have substantially increased, with a shift from *occurrence-based* liability insurance coverage to *claims-made* liability, their calculation does not generally contain any reference to other activity-related statistics.[11] We could think of, among others, the number of beds, the average recovery length, the average number of surgeries, or the number of wards, to name only a few. Moreover, experience rating is not considered in Italy when setting medical malpractice liability premiums, similarly to what happens in several other countries. Starting in the end of the Nineties, Italian hospitals began to detect a degree of uneasiness in finding full and affordable coverage for medical liability from the private market. For instance, Buzzacchi and Gracis (2008) summarize the *status quo* of insurance

details, see Garoupa and Grembi (2010), Scarso and Foglia (2011), and Amaral-Garcia (2011).

[9] According to the national collective agreement for physicians signed on February 2005, the insurance needs to provide a coverage up to 1,549,370.68 euros per medical accident, and up to 1,032,913.80 euros per person.

[10] Calculations by Amaral-Garcia and Grembi (2011), using ANIA (2010) data. There are no national data available on the number of paid claims. Just to have a reference indicator - even though plain comparisons should not be made given the differences in sampling groups and healthcare systems- in Texas, total claims averaged about 20 per 100 physicians in 2002 (Black et al. (2005)). In Florida, in 2003, the median payment per paid claim was equal to 150,000 dollars (the mean was 300,000 dollars) (Vidmar et al. (2005)).

[11] In the former case, the insurance covers all accidents occurring in the policy year. In the latter case, the insurance covers only those claims that are filed in the policy year. See Mello (2006). This is a *de facto* transfer of risks since the consequences of medical malpractice injuries can become apparent even after several years.

coverage for LHUs and IHs from 2003 to 2006: out of the 308 collected calls for bids, the authors report successful bids only in 55 cases. A failure in a total of 53 cases was found: in 40 calls there was a lack of bidders or a lack of qualified bids; in 13 cases, there was a new call for bids opened within one year after the previous award. For the remaining 200 cases there was no information on the outcome of the call.

In most cases, the lack of further information is not due to the absence of bidders but to a shift to alternative schemes of contracting, only feasible once an open call has not worked out. These schemes provide a higher degree of contractual power to the providers against a lower level of competition among insurers (*procedure ristrette* or *procedure d'urgenza*), which are directly invited. So that, for instance, the providers can have incentives to classify the bids as inadmissible and then invite only a few insurers to the bargaining process. Often the bargaining does not receive any publicity and this is why we cannot infer anything from the 200 bids with no results reported by Buzzacchi and Gracis (2008). As they state, a low degree of competition in the calls' process and a scarcity of appropriate information monitoring the public agents' side is the only arguable conclusion.[12]

Probably related to the low level of transparency affecting the process followed by the structures when contracting out insurance coverage, between 2001 and 2008, 8 Regions out of 21 implemented monitoring systems on medical malpractice claims. Thirteen Regions never adopted any policy during the observation period, one Region was under the monitoring policy before 2001 (*Provincia Autonoma di Trento*, since 1997), and the main variation for the monitoring policy is due to 7 Regions. In Table 1 the timing of the policies and the Regions involved are specified. Two Regions, Piemonte (since 2004) and Friuli Venezia Giulia (since 2006), adopted also a form of public insurance (self-insurance at the regional level) for their structures up to a compensation limit (500,000 euros), which counts as a deductible on the private market for medical malpractice insurance. The contracting out of coverage higher than the set limit is managed directly by the Region and not by the structures.

Table 1- Institutional details- here

3 Evaluation Framework

3.1 Econometric Strategy

To identify the effect, if any, of the treatment (*Claims*) , we use a Difference-in-Differences (DD) estimator that exploits the regional changes taking place at different points in time, as already adopted

[12]The Italian Antitrust Authority came to the same finding analyzing the overall market of contracts between the private and the public sector, see AGCM(1997) and (2009).

in the literature (Autor et al. (2006); Acemoglu et al. (2011)). Define Y_{irt} as paid malpractice premiums or legal expenditures by provider i, delivering healthcare in Region r, at time t. We estimate the following equation:

$$Y_{irt} = \gamma_i + \lambda_t + \delta Post_t * Claims_r + X_{it}^{'}\beta + Z_{rt}^{'}\omega + \varepsilon_{irt} \quad (1)$$

where γ_i is a vector of healthcare provider intercepts and λ_t is a vector of year dummies, so that we control for both healthcare structure specific trends and time aggregated shocks. $Post_t$ is a dummy equal to 1 if $t \geq t^*$ and 0 otherwise and $Claims$ is equal to 1 for Regions adopting monitoring. In this setting, t^* is equal to the adoption year of *Claims*. δ represents the DD estimator and it can be written according to the following standard equation

$$\begin{aligned}\delta = &\{E[Y_{irt}|Claims_r = 1, Post_t \geq t^*] - E[Y_{irt}|Claims_r = 1, Post_t < t^*]\} \\ &- \{E[Y_{irt}|Claims_r = 0, Post_t \geq t^*] - E[Y_{irt}|Claims_r = 0, Post_t < t^*]\}\end{aligned}$$

In our model we take into account two vectors of control variables per healthcare unit -$X_{it}^{'}$- and Regions -$Z_{rt}^{'}$- which, according to the literature on malpractice, could have some impact on the trend of malpractice premiums and on legal expenditures as well (*e.g.* Thorpe (2004)).[13] $X_{it}^{'}$ groups structural characteristics of the healthcare providers. These include: 1) a set of dummies for the type of the healthcare provider (LHUs, IHs, THs and RHs), since different healthcare structures tend to have different management and organizational arrangements, which might affect insurance management and their bargaining power; 2) the amount of medical personnel payroll, given that medical liability insurance companies operating in Italy tend to set premiums according to a percentage of the gross payroll; 3) two indexes to consider patients' mobility that healthcare providers need to manage. These indexes control for qualitative differences, which could affect the number of medical errors or the probability of filing claims. Hence, we use: a) the ratio of revenues due to medical care provided to residents of other LHUs within the same Region (*entry rate*), being higher revenues potentially associated with higher quality; b) the ratio of expenditures due to services that resident patients received from other public healthcare structures within the same Regions (*exit rate*).[14] The latter is an approximation of poor quality. For example, if patients perceive that the hospitals managed directly by the LHU of their residency provide low quality care, they might decide to abandon the assigned healthcare providers. Mobility can be seen as a "defensive strategy" in the face of poor quality (Fabbri and Robone (2010)).

[13] For an accurate description of the variables see Table A6 in the Appendix.

[14] We did not use mobility rates *from* and *to* out-of-Region healthcare structures because the reliability of the data is not very accurate for these cases. Generally, those financial transfers are done among Regions and not healthcare structures, which means that they can be made even two years after the healthcare delivery. Therefore, the financial values of the the out-of-Region mobility item are severely underestimated. See Anessi Pessina (2011).

Z'_{rt} includes four regressors available at the regional level, which allow to control for the socio-economic characteristics of the Regions in which public healthcare providers operate. It includes: 1) a weighted measure for the resident population per LHU, calculated as the number of regional residents divided by the number of LHUs operating within the Region. Although an approximation, this variable provides an assessment of the patients' set for which the LHUs have to buy or provide medical services either directly (in their own hospitals) or through other healthcare structures (other LHUs' hospitals, or IHs, THs, and RHs). Therefore, this variable is a proxy for both dimensions and activity levels of LHUs; 2) a litigation rate index, calculated as the total number of regional ordinary civil proceedings filed in First-Instance Courts weighted per 1,000 residents. It is important to include this variable because it can be a direct driver of legal expenditures and compensation requests, which are the main focus of the monitoring policy; 3) the average duration of First Instance cases resolution, because it is a proxy for the efficiency of the civil justice system and, generally, medical malpractice cases tend to have a higher than average duration with consequences mainly on the insurer reserves; and 4) the regional GDP, to control for territorial differences in economic conditions of both the patients and the providers (partially funded by regional taxes).

Overall, we are expecting that structures operating in Regions adopting *Claims* will experience lower levels of expenditures for malpractice premiums. The effects on the legal expenditures should be analogous, if monitoring is able to provide incentives to adopt risk management measures and to improve the quality of the services supplied by those working under *Claims*.

3.2 Validity Test

To test the robustness of the DD assumption of a common trend between treated and control Regions, we propose the implementation of a validity test. The basic intuition of the DD approach relies on the assumption that, but for the treatment, changes in the outcome variable over time would have been exactly the same in both treatment and control groups (Bertrand et al. (2004)). Suppose that, in our setting, healthcare providers operating in treated Regions were paying higher premiums and legal expenses than healthcare providers in the control group. Additionally, consider that this was the reason why treated Regions adopted the policies. Then, the assumption specified above would not hold. Validity tests help verifying the possibility that the treatment is induced by the outcome variable (*i.e.*, endogeneity of the intervention variable). Additionally, our estimates of the reform's effects could also capture a trend triggered by the operational context characteristics or some anticipation adjustments (*i.e.*, the private insurer behavior). If this was the case, the estimated effect would not reflect the true effect of the treatment. For instance, if public healthcare providers were not able to get insurance in the first place (*i.e.*, availability crisis) this would generate a decrease in paid premiums. As a consequence, we would have a decreasing trend in paid premiums, but it could not be attributed to our treatment.

Hence, we run a placebo test using a fake measure of the treatment year using the following model:

$$Y_{irt} = \gamma_i + \lambda_t + \delta Post_t\_fake * Claims_r + X_{it}^{'}\beta + Z_{rt}^{'}\omega + \varepsilon_{irt}$$

where $Post_t\_fake$ is equal to 1 when providers operate in Regions adopting *Claims* and $Post\_fake \geq t\_fake$ with $t\_fake = mean(t^* - 2001)$.[15] If the "fake" treatment coefficient is significant, the regional policy cannot be regarded as responsible for whatever impact we might detect estimating equation (1). Indeed, a significant "fake" treatment coefficient means that it is something happening before the treatment year that triggered the trend.[16]

4 Data and Descriptive Statistics

We collected data from the Ministry of Health (MoH), the Italian National Institute of Statistics (Istat), and the Ministry of Justice (MoJ), from 2001 to 2008.[17] The Ministry of Health releases the annual balance sheets of each LHU, IH, RH, and TH. From this source we obtain the two outcomes of interest (Y_{irt}): paid insurance premiums and legal expenditures. Paid insurance premiums are a proxy for medical malpractice liability premiums, since the share of the latter is not specified in the former aggregate measure. However, since 2008, public healthcare providers need to declare the amount of paid medical liability premiums, distinguishing them from other types of insurance that the healthcare provider might have bought, such as a fire insurance. A check on 2008 data shows that medical liability premium counts, on average, for 80% of the total paid insurance premiums. All in all, the aggregate measure can be regarded as a good proxy for paid medical malpractice premiums.

Legal expenditures are an aggregate measure as well, which includes essentially costs due to litigation and are available only until 2007. Wages paid to lawyers working at healthcare facilities and expenses with legal counseling are not part of legal expenditures.[18] Therefore, this variable can be considered as a proxy for costs related to claims.

Figure 1 shows the per capita increase in paid premiums at the regional level from 2001 to 2008. All Regions are distributed in the upper part of the diagonal (the 45 degree line) which points to the

[15] See Table 9 for the fake year specification.

[16] We consider the possibility to run a Granger causality test, using years before the policy adoption and years after. This approach would imply loosing several Regions from the check given the available years for the data. See Table 1 for the institutional details, and the data description section.

[17] Financial data before 2001 are available but, unfortunately, the organization of the Balance sheet changed in 2001. Therefore, it is impossible to reconstruct the series. 2008 is the last available financial year in October 2011.

[18] It is not possible to know the wage that healthcare providers pay to their lawyers because the financial data provides one aggregated item on which other professionals are also included (namely engineers and architects).

fact that the vast majority of Regions experienced significant increases. On average, paid premiums rose approximately 120%. In 2001 residents in Valle d'Aosta were paying the highest per capita premium, around 10 euros, while in 2008 residents in Abruzzo were among those paying the most, with a per capita bill higher than 15 euro (2009 values).

Figure 1: Paid Premium per capita variation (2001-2008) - here

Our final dataset is an unbalanced panel, with a minimum of 225 public healthcare structures to a maximum of 282. LHUs are the most represented type of healthcare provider in the sample, followed by IHs, THs, and RHs (Table 2). The changes in the observed number of structures is due to mergers among them or the creation of new structures during the analyzed period.

Table 2: Healthcare Structures Types - here

THs are paying, on average, higher premiums than the other healthcare structures. One possibility might be that these higher premiums reflect their risk exposure related to, among other things, the interns. However, given the lack of experience rating characterizing the sector, it is more probable that the numbers are due to the higher amounts of TH payrolls, THs having more medical staff or more senior physicians. As shown in Table 3, LHUs registered higher increase rates: in 2001, LHUs paid on average 893,000 euros in premiums while in 2008 this amount was equal to 2,353,000 euros (2009 euros). A similar trend is detectable for legal expenditures (Table 4).

Table 3: Average Premium per Type of Healthcare Structure - here

Table 4: Average Legal Expenditures per Type of Healthcare Structure - here

In Table 5 the number of healthcare structures affected by the monitoring policy (the treated) is shown. RHs are observed from 2003, since in that year a new legislation was enforced concerning the regulation and organization of these healthcare providers and their data are available after that date. In 2001 and 2002 only 1 LHU worked under the policy, the only LHU operating in *Provincia di Trento*.

Table 5: Total Number of Healthcare Structures (Treated *vs*. Control) - here

According to the descriptive evidence, paid premiums increased for all the healthcare providers in both the treated and non-treated samples. Table 6 shows the average paid premiums and legal expenditures for the treatment and control groups. Overall, paid premiums of the treated increased on average 102.5% compared to the 142.2% increase in the control group. The increase in legal expenditures is astonishing for the non-treated, up to 244.3% compared to 67.1% for the treated under *Claims*.

If we consider the trend according to the type of healthcare structure (Table A1, in the Appendix), the percentage increase in premiums from 2001 until 2008 is higher for the non-treated than for the treated groups, but for THs. The percentage increase for LHUs was equal to 182% for the control group and 143.4% for the treated group. With respect to IHs, premiums increased 138.9% for the non-treated and 82% for the treated group. However, we can see that THs suffered a higher increase in premiums in the treated (74.8%) than in the control group (36.4%). We can make the same calculation for RHs (only from 2003 until 2008): the difference between control and treated groups is considerably high, with and increase of 55.3% for the treated and 193.6% for the control group.

Legal expenditures also show some differences between control and treated Regions, according to the type of healthcare structure (Table A2, in the Appendix). The percentage increase overtime was, similarly to what we described previously for premiums, higher for the control than for the treated groups (with the exception of THs that present a lower percentage increase for the control group).[19] However, the difference in the percentages are considerably higher for the control group. From 2001 until 2007, control LHUs show a 300% increase in average legal expenditures, while this increase was only equal to 63.1% for treated LHUs. The difference is even higher for IHs (428.6% and 63.3% increase for the control and the treated, respectively). The smallest difference between treated and control groups is presented by RHs although for this type of healthcare structure the percentage increase was higher for the treated (78.2%) than for the control group (58.6%). Non-treated RHs suffered a 476.2% increase in legal expenditures from 2003 until 2007, while this increase was equal to 157.9% for treated RHs.

Table 6: Average Premiums and Legal Expenditures (Treated *vs*. Control) - here

Finally, the graphical analysis to show the trend of the dependent variables before and after the treatment (visual check for the common trend assumption) is not so straightforward given that Regions adopted the policy in different years during the period of observation. We decide to provide two sets of graphs, a first showing a DD traditional graphical representation (Figures 2 and 3) and a second grouping graphical analyses more consistent with the institutional case we are dealing with (see Autor et al. (2006)) (Figures 4 and 5). According to the former, we plotted the values for paid premiums and legal expenditures distinguishing between the treated and the control providers as in Figures 2 and 3. It is apparent that the trends of the treated and the control are diverging starting from a certain point in time. However, the visual effect could be explained in a twofold way: 1) the effect is due to the providers of those Regions treated before the lines started diverging, because the treatment effect took time to be detectable; or 2) the effect is due to the providers of those Regions

[19] Notice that, as stated previously, legal expenditures are available only until 2007.

that will be treated after the lines start diverging, because there is a violation of the identifying assumption of common trend.

Figure 2 and 3: Premiums and Legal Expenditures of Treated and Control - here

The traditional DD graphical analysis does not allow to clearly disentangle between the two explanations. Hence, we show graphical evidences only for the treated referred to the years immediately before and after the implementation of the policy. In Figures 4 and 5 we consider 2 years before the treatment and 2 years after, setting the year of adoption equal to 0. The trends seem to show evidence that introducing monitoring on malpractice claims decreases paid malpractice premiums (Figure 4). An analogous trend is associated to the legal expenditures (Figure 5).

Figure 4 and 5: Premiums and Legal Expenditures of the Treated - here

5 Empirical Results

5.1 The Impact of Monitoring on Paid Premiums and Legal Expenditures

We run the models specified in Sections 3.1 and 3.2 distinguishing between the entire sample and the sample considering LHUs only. The split is due to the fact that the *exit rate* index is meaningful only for LHUs, since it will be the LHU of the patient residency that will pay for the medical care delivered to her by a provider other than its own hospitals. In Tables 7 and 8, we show the results of the model described in Section 3.1 for both paid premiums and legal expenditures. We present 4 regressions for the entire sample and 5 for the LHUs sample, adding controls in a stepwise way to show the robustness of the treatment's estimate. Regressions (4) and (9) include *litigation rates* and *duration* and, as such, they refer to samples containing observations until 2007, given the availability of *litigation rate* and *duration* only up to that year. Regression (8) includes *exit rate* only for the LHUs. Model (4) is our preferred specification when all sample is considered, whereas Model (8) is the preferred specification for the LHUs sample since both represent the most complete version of equation 1 for the entire period. All regressions include years and healthcare structures fixed effects, which means that we are controlling for unobserved heterogeneity among the healthcare structures and external shocks, which have equally affected all the structures.[20]

Tables 7-8: Regressions Results - here

The impact of $Post * Claims$ (δ) on premiums is assessed in a range between -20% (Table 7, Model 3) and -23% (Table 7, Model 4) in the complete dataset, and between -11% and -16% in the

[20] We address the autocorrelation problem of DD (Bertrand et al. (2004)) by clustering the errors.

dataset of LHUs. Among the regional controls, the duration of civil proceedings and the healthcare provider potential population have no significant impact[21] on paid premiums although their sign is the expected one. Among the structures controls, it is confirmed that a crucial role is played by the gross payroll which exerts a positive and significant impact of paid premiums, as expected. The coefficient of the financial variables represent elasticities, therefore an increase of 10% of the gross payroll is associated to an increase of 6.4% in paid premiums (Model (3)). Mobility rates are not significant (but for *entry rate* in Model (9)) even if their sign is consistent with our a priori when the outcome of interest is paid insurance: negative for *entry rate* (Table 7, Models (3), (4), (7), (8), and (9)) - which stands for good quality - and positive for *exit rate* (Table 7, Models (8) and (9))- which stands for bad quality.

There are no significant effects on legal expenditures, but for Models (1) and (2) of Table 8. Besides the fact that actually no improvement in the quality of the services can be linked to the reform as we measure such improvement through the legal expenditures, another reason for these poor results could be linked to the fact that data for legal expenditures are only available until 2007. The signs of the qualitative indexes (*entry* and *exit rate*) are reverted (Table 8, Models (3), (4), (7), (8), and (9)) compared to those for paid premiums. *Entry* and *exit rate* seem to capture here the activity levels with better providers (*e.g.*, more patients to treat) having to cope with presumably more claims, than structures that are abandoned by their registered patients. However, the coefficient is significant at 5% only when the LHUs sub-sample is considered (Table 8, Model (9)).

Results from the validity tests shown in Tables 9 and 10 confirm the robustness of the coefficients in Tables 7 and 8. Table 9 presents the results of the validity test when the outcome of interest is paid premiums and reveals that $Post\_fake * Claims$ is not significant.[22] The finding is confirmed also by the results of Table 10 which provides the coefficients for the impact of $Post\_fake * Claims$ on paid legal expenditures.

Tables 9 and 10: Regressions Results of the Validity Test - here

As a further robustness check we run equation (1) (Section 3.1) on a subset of regional providers, dropping those which merged with other providers during the period.[23] The rationale of this check is quite intuitive. Since several mergers took place, it could be that we detect a significant decrease in the paid premiums triggered by the new organizational scheme due to the mergers. In other words, we could expect a drop in the transaction costs associated to the contracting out of malpractice insurance and consequent rise of the bargaining power of the new, bigger providers. It is also true that mergers might not be the consequence of rational business planning, but rather the byproduct of

[21] The coefficient of healthcare provider potential population is statistically significant in Model 5, but only at 10%.

[22] Except in Model (4), but only at 10%.

[23] The validity tests for these robustness checks can be found in the Appendix.

budget constraints or political issues. In this case, and considering the time lag in moving from one management scheme to another within the public sector, the augmented contractual capacity could be counterbalanced by an inefficient transition period (*e.g.*, more dispersion of the information, staff replacements).

Tables 11 and 12 show the results only on structures not taking part in a merger. The impact of the policy is again assessed mainly on paid premiums in a range between -25% (Model (3)) and -27% (Model (4)) for the entire dataset and between -15% (Model (8)) and -20% (Model (9)) if we consider LHUs only. These results seem to address a sort of distress associated to the mergers, more than an improvement in the efficiency of the system. *Claims* has a slightly significant impact on legal expenditures but only for the regressions on the entire dataset and in Models (1) to (3) (Table 12).

Tables 11 and 12: Regressions Results for No Merged Structures- here

5.2 The Channels of the Policy

In the previous section, we detected a reduced form effect of -20% (-11% on LHUs) on paid premiums. We interpret this as an increase in the surplus of the public providers from the insurance contract, triggered by the enhanced monitoring and information due to the analyzed policy. This surplus gain might arise from two different channels, which often move jointly. First, on the demand for insurance side, it might be due to an increase in the bargaining power of the providers. Second, on the supply side of the insurance market, it might be related to a raised interest of more competitors aware that the position of the incumbent insurer is weaker as a consequence of the higher level of information available to the providers.

In order to assess the channels through which the estimated policy can exert its effects we use data on calls for bids of medical liability insurance contracts for the years 2008-2011 released by the Italian Authority for the Surveillance on Public Procurements (*Autorità per la Vigilanza sui Contratti Pubblici di Lavori, Servizi e Forniture*-AVCP).[24] The AVCP collects data on auctions involving public entities whenever the value of the auction concerns contracts above or equal to 150,000 euros. Due to data limitations we are not able to test the DD model on these data but we can at least provide descriptive cross-section post treatment evidence that Regions implementing monitoring end up having less concentrated markets for medical liability and tend to opt for types of auctions which potentially advantage more competition (*i.e.*, open calls).

Table 13 shows the distribution of the auctions according to their closing year. For each insurance contract we have the identity of the insurer/insurers (*e.g.*, they cover different part of the

[24] We kept also auctions related to brokers services.

contract), the type of auction (*e.g.*, open calls), and both the starting value of the contract and its final price. The price variables are not very informative given the absence of price-related variables such as the number of providers covered by the insurance, the length of the contract, or the amount of deductibles if any.

Table 13: Medical Liability Insurance Contracts (2008-2011) - here

Hence, we decide to focus on two outcomes: the chosen type of auction and the identity of the bidders. First, we generate a dummy variable *Open Calls* equal to 1 if the type of the auction is open and 0 otherwise (*e.g.*, calls based on invitation, closed calls, etc.). We then use a logit model to estimate, at the auction-level (c), the probability of choosing open calls in Region r as a function of

$$\textit{Open Calls}_{cr} = \lambda Claims_r + \alpha_{t1} + \gamma_{t2} + \varepsilon_{cr} \tag{2}$$

where α_{t1} and γ_{t2} represent the year of the call opening and the year of the call closing with at least a winner, and $Claims$ is equal to 1 for Regions adopting monitoring. It is not possible to control for any further relevant independent variables at the regional level given the considered period.

Second, we generate a simple Herfindahl-Hirschmann (HH) index, which is a concentration index quite used in the analysis run by Antitrust Authorities (*e.g.*, U.S. Department of Justice and FTC 2010). The HH index is calculated by summing the squares of the individual firms market shares, and thus gives proportionately greater weight to the larger market shares. The higher the index (*i.e.*, the concentration) the lower the competition in the market of interest.

Typically the index is written as $HH_r = \Sigma_n s_n^2$, where s_n represents the quota of the insurer n in Region r, so that we have a HH index for each regional market for medical liability insurance. To derive it using auction-level information, we count the number of winning insurers in each Region in every year and construct the quota of the market for insurer n in Region r as the ratio between that insurer and the total number of insurers operating in Region r. Overall, we counted a maximum of 50 insurers, both national (*e.g.*, *Generali*) and international (*e.g.*, *Lloyd's*). The way to interpret the index is consistent with any other HH index: the higher the index the lower the competition level (*i.e.*, the higher the analyzed market concentration). We explain the variation in the HH index according to the following equation:

$$HH_{crt2} = \sigma Claims_r + \alpha_{t1} + \gamma_{t2} + \theta OpenCalls_{cr} + \varepsilon_{crt2} \tag{3}$$

where, as before, α_{t1} and γ_{t2} represent the year of the call opening and the year of the call closing, $Claims$ is equal to 1 for Regions (r) adopting monitoring, and *Open Calls* controls for the type of auction, which could affect the competitive level of the market. In Table 14 average descriptive statistics for both the *Open Calls* dummy and the HH index are reported.

Table 14: Descriptive Statistics for Open Calls and HH Index - here

We estimate the two equations on the cross section of available auctions, dropping those referring to providers operating in Toscana, given its switch to a public insurance scheme for malpractice starting in 2010. λ and its robust standard error in the logit model are respectively equal to +1.68 and 0.32 (significance level at 1%). This means that the probability of selecting open calls is higher for providers operating under the policy. We derived marginal effects (average partial effects) for every year and, on average for the overall period, it appears that the probability of selecting open calls given that monitoring is in place is around 0.30 higher.[25]

σ is equal to -0.05 and it is statistically significant at 1% level (S.E. -0.009). This means that there is a decrease of 31% in the HH index for providers switching from not operating under monitoring to operate under the policy, with an increase of the competition level.

6 Conclusion

We showed that State initiatives to cope with multiple agency problems in the medical malpractice insurance market can be effective, even without any change either in the liability system or the insurance management schemes (*e.g.*, from private to public insurance). To perform our analysis, we evaluated the impact of a monitoring policy of malpractice claims on medical malpractice paid premiums and legal expenditures at the healthcare provider level, in a mainly public healthcare system. Such impact runs along two processes: on the one hand, improving the amount of available information on malpractice (at least on the legal side) seems to generate more convenient insurance contracts-paid premiums. Several rationales can explain this relationship, among which an increased ability of local healthcare providers to extract the rent from the private bidders, with a raise, for instance, in the public procurement quality indexes (*e.g.*, more competition, more transparency) and a reduction of the contractual power of the incumbent insurer. Additionally, it might be also due to more appropriately defined reserves within the contractual relationship between the healthcare provider (now more aware of its risk exposure) and the private insurer. Legal expenditures - linked to the burden of litigation - seem to have decreased for healthcare structures subject to the monitoring treatment, although not in a significant way. The result could again be due to the fact that legal expenditures might not be an appropriate measure for the quality of the healthcare service delivered by each structure, being often the case that higher quality providers, dealing with higher risk patients, need to cope with more frequent claims than their lower quality equivalents. Notwithstanding data limitations, we present evidences on a 2008-2011 dataset with auction-level

[25]The effects have been calculated using *mfx* (STATA 11) and setting the year dummies equal to 1 or zero depending from the considered year. So we have that in 2008 (both opening and closing year), the effect of $Claims$ is equal to 0.12 (S.E. 0.05), in 2009 to 0.37 (S.E. 0.07), in 2010 to 0.37 (S.E. 0.07), in 2011 to 0.35 (S.E. 0.06).

information to show the relationship between the monitoring policy and the increase in the level of competition in the market faced by the providers under the policy.

7 Tables and Figures

Table 1: Institutional Details

Regions	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Abruzzo								
Basilicata								
Bolzano								
Calabria								
Campania								
Emilia Romagna			C	C	C	C	C	C
Friuli Venezia Giulia						C	C	C
Lazio							C	C
Liguria								
Lombardia				C	C	C	C	C
Marche								
Molise								
Piemonte								C
Puglia							C	C
Sardegna								
Sicilia								
Toscana					C	C	C	C
Trento	C	C	C	C	C	C	C	C
Umbria								
Valle d'Aosta								
Veneto								

Note: C = monitoring (*Claims*). Source: AGENAS (2009).

With the exception of Table 1 and Figure 1 all the remaining tables and figures do not include information from Friuli Venezia Giulia and Piemonte.

Table 2: Healthcare Structures Types

Type	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
LHU	155	169	169	168	168	152	143	138
IH	47	63	60	57	58	58	58	58
TH	23	27	27	28	37	37	39	37
RH	0	0	18	20	19	18	19	19
Total	**225**	**259**	**274**	**273**	**282**	**265**	**259**	**252**

Note: LHU: *Local Health Units*; IH: *Independent Hospitals*; TH: *Teaching Hospitals*; and RH: *Research Hospitals*. RHs do not present data for 2001 and 2002 because they started operating, as we know them today, in 2003 as a consequence of the Legislative Decree n.88/2003.

Table 3: Average Premium per Type of Healthcare Structure

Type	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
LHUs	893	992	1,292	1,597	1,781	2,003	2,178	2,353
IHs	1,026	1,026	1,232	1,514	1,623	1,762	1,925	1,921
THs	1,508	1,561	1,825	2,383	2,389	2,430	2,110	2,346
RHs	.	.	550	643	866	972	1,087	1,003
Total	986	1,060	1,283	1,598	1,767	1,940	2,031	2,151

Note: Values are in 1,000 euros deflated at 2009. LHUs: *Local Health Units*; IHs: *Independent Hospitals*; THs: *Teaching Hospitals*; and RHs: *Research Hospitals*. RHs do not present data for 2001 and 2002 because they started operating, as we know them today, in 2003 as a consequence of the Legislative Decree n.88/2003.

Table 4: Average Legal Expenditures per Type of Healthcare Structure

Type	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
LHUs	163	183	287	349	503	487	499
IHs	85	125	151	290	232	193	201
THs	112	115	118	182	287	173	202
RHs	.	.	62	152	191	100	216
Total	140	162	226	304	400	355	374

Note: Values are in 1,000 euros deflated at 2009. LHU: *Local Health Units*; IH: *Independent Hospitals*; TH: *Teaching Hospitals*; and RH: *Research Hospitals*. RHs do not present data for 2001 and 2002 because they started operating, as we know them today, in 2003 as a consequence of the Legislative Decree n.88/2003. Legal Expenditures are available until 2007 only.

Table 5: Total Number of Healthcare Structures (Treated *vs*. Control)

		2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
LHU	*Non-Treated*	154	168	155	141	129	113	86	81
	Treated	1	1	14	27	39	39	57	57
IH	*Non-Treated*	47	63	59	33	33	33	29	29
	Treated	0	0	1	24	25	25	29	29
TH	*Non-Treated*	23	27	23	18	24	24	21	19
	Treated	0	0	4	10	13	13	18	18
RH	*Non-Treated*	0	0	17	14	13	12	8	8
	Treated	0	0	1	6	6	6	11	11
Total	*Non-Treated*	224	258	254	206	199	182	144	137
	Treated	1	1	20	67	83	83	115	115

Note: Treated using *Post*Claims*. The total number of healthcare structures suffered some changes, namely due to mergers.

Table 6: Average Premiums and Legal Expenditures (Treated vs. Control)

Year	***Premiums***		***Legal Expenditures***	
	Non-Treated	*Treated*	*Non-Treated*	*Treated*
2001	810	1,173	140	140
2002	844	1,343	164	158
2003	1,011	1,638	252	192
2004	1,288	2,003	310	297
2005	1,505	2,112	481	287
2006	1,713	2,209	396	304
2007	1,765	2,363	482	234
2008	1,962	2,375	.	.
Sample Average	**1,369**	**1,911**	**324**	**232**

Note: Values are in 1,000 euros deflated at 2009. Legal Expenditures are only available until 2007.

Table 7: The Impact on Paid Premiums

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post*Claims	-0.24***	-0.22***	-0.22***	-0.26***	-0.20***	-0.13***	-0.13***	-0.12**	-0.17***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Ln(GDP)	-0.49	-0.67	-0.04	1.94	-0.52	0.01	1.02	1.06	2.32
	(1.81)	(1.68)	(1.66)	(1.91)	(1.76)	(1.67)	(1.61)	(1.66)	(1.72)
IH	0.04	1.49	0.97	3.80					
	(4.38)	(3.99)	(4.48)	(4.09)					
TH	-0.80	0.92	0.79	4.61					
	(3.00)	(2.67)	(2.82)	(4.29)					
RH	-2.24	0.34	-0.95	4.04					
	(4.71)	(4.17)	(2.92)	(4.41)					
Ln(Av_LHU_Pop)	0.13	0.14	0.15	-0.01	0.23*	0.12	0.10	0.10	0.19
	(0.10)	(0.10)	(0.10)	(0.11)	(0.13)	(0.11)	(0.11)	(0.11)	(0.30)
Ln(WageHealth)		0.61**	0.64**	1.13***		0.95***	0.97***	0.99***	0.92***
		(0.28)	(0.29)	(0.32)		(0.16)	(0.16)	(0.17)	(0.16)
Entry_Rate			-0.20	-0.19			-0.24	-0.34	-0.44*
			(0.15)	(0.16)			(0.17)	(0.22)	(0.25)
Litigation Rate				0.05					0.04
				(0.05)					(0.05)
Duration				0.00					0.00
				(0.00)					(0.00)
Exit_Rate								0.10	0.07
								(0.23)	(0.26)
Observations	2,036	2,036	1,929	1,553	1,237	1,237	1,167	1,144	871
R-squared	0.84	0.85	0.86	0.86	0.84	0.86	0.87	0.87	0.87
Adj Rsq	0.82	0.82	0.83	0.83	0.81	0.83	0.85	0.85	0.84

Notes: Dependent variable is *Ln(Premiums)*. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 8: The Impact on Legal Expenditures

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post*Claims	-0.21*	-0.22*	-0.20	-0.15	-0.19	-0.22	-0.21	-0.22	-0.17
	(0.12)	(0.12)	(0.12)	(0.12)	(0.18)	(0.18)	(0.19)	(0.19)	(0.19)
Ln(GDP)	-5.79*	-6.02*	-5.38	-4.35	-5.74	-6.01	-5.76	-6.31	-5.63
	(3.26)	(3.26)	(3.43)	(3.42)	(3.96)	(3.96)	(4.16)	(4.24)	(4.33)
IH	-3.88*	-1.93	14.26	8.97					
	(2.29)	(2.30)	(10.16)	(5.76)					
TH	-3.87*	-3.57	-0.94	18.59*					
	(2.29)	(2.30)	(2.57)	(11.16)					
RH	-3.62***	6.39**	-2.14	16.02					
	(1.09)	(2.60)	(3.30)	(13.40)					
Ln(Av_LHU_Pop)	-0.08	-0.07	-0.05	-0.00	-0.38	-0.27	-0.24	-0.26	0.24
	(0.16)	(0.16)	(0.17)	(0.17)	(0.60)	(0.62)	(0.63)	(0.62)	(0.74)
Ln(WageHealth)		-0.24	-0.31	-0.24		-0.31	-0.34	-0.41	-0.31
		(0.23)	(0.23)	(0.23)		(0.27)	(0.26)	(0.25)	(0.26)
Entry_Rate			0.04	0.09			0.14	0.39	0.53**
			(0.18)	(0.18)			(0.23)	(0.24)	(0.23)
Litigation Rate				-0.00					-0.08
				(0.08)					(0.11)
Duration				-0.00					-0.00*
				(0.00)					(0.00)
Exit_Rate								-0.37	-0.25
								(0.49)	(0.48)
Observations	1,629	1,629	1,533	1,404	990	990	923	901	783
R-squared	0.75	0.75	0.75	0.75	0.77	0.77	0.76	0.77	0.77
Adj Rsq	0.69	0.69	0.69	0.69	0.72	0.72	0.71	0.71	0.71

Notes: Dependent variable is *Ln(LegalExpenditures)*. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 9: The Impact on Paid Premiums: Validity Test

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post_Fake*Claims	-0.06	-0.06	-0.07	-0.14*	-0.04	-0.01	-0.02	-0.00	-0.05
	(0.08)	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)	(0.08)
Ln(GDP)	-0.30	-0.49	0.25	3.33	-0.61	-0.08	0.99	0.98	2.57
	(1.75)	(1.66)	(1.64)	(2.05)	(1.77)	(1.67)	(1.60)	(1.64)	(1.81)
IH	-0.51	1.01	0.21	6.76					
	(4.25)	(3.96)	(4.41)	(4.44)					
TH	-1.11	0.73	0.40	7.80*					
	(2.91)	(2.72)	(2.79)	(4.58)					
RH	-2.73	-0.05	-1.39	7.11					
	(4.57)	(4.18)	(2.92)	(4.58)					
Ln(Av_LHU_Pop)	0.13	0.14	0.15	-0.05	0.18	0.08	0.07	0.08	-0.14
	(0.09)	(0.10)	(0.10)	(0.12)	(0.12)	(0.11)	(0.10)	(0.10)	(0.33)
Ln(WageHealth)		0.63**	0.65**	1.20***		0.99***	1.01***	1.03***	0.98***
		(0.28)	(0.29)	(0.31)		(0.16)	(0.15)	(0.16)	(0.16)
Entry_Rate			-0.21	-0.18			-0.25	-0.36*	-0.44*
			(0.15)	(0.16)			(0.17)	(0.21)	(0.26)
Litigation Rate				0.06					0.04
				(0.05)					(0.05)
Duration				0.00					0.00
				(0.00)					(0.00)
Exit_Rate								0.08	0.05
								(0.23)	(0.26)
Observations	2,036	2,036	1,929	1,553	1,237	1,237	1,167	1,144	871
R-squared	0.84	0.85	0.86	0.86	0.84	0.85	0.87	0.87	0.87
Adj Rsq	0.81	0.82	0.83	0.83	0.81	0.83	0.84	0.85	0.83

Notes: Dependent variable is *Ln(Premiums)*. *Post_Fake*Claims* is equal to one if Region is equal to: Lombardia and $year >= 2002$; Lazio and $year >= 2004$; Puglia and $year >= 2004$; Toscana and $year >= 2003$; or Region is equal to Emilia Romagna or Trento. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 10: The Impact on Legal Expenditures: Validity Test

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post_Fake*Claims	-0.10	-0.10	-0.08	-0.01	-0.03	-0.03	-0.01	-0.02	0.07
	(0.14)	(0.14)	(0.15)	(0.15)	(0.18)	(0.18)	(0.19)	(0.20)	(0.21)
Ln(GDP)	-4.80	-4.94	-4.41	-3.99	-5.50	-5.66	-5.54	-6.00	-6.18
	(3.39)	(3.38)	(3.56)	(3.68)	(4.24)	(4.23)	(4.43)	(4.51)	(4.80)
IH	-3.23	-1.25	11.44	8.30					
	(2.41)	(2.41)	(10.52)	(6.19)					
TH	-3.22	-2.89	-1.43	17.34					
	(2.41)	(2.41)	(2.70)	(11.95)					
RH	-3.23***	5.44**	-2.66	14.72					
	(1.20)	(2.64)	(3.48)	(14.40)					
Ln(Av_LHU_Pop)	-0.12	-0.11	-0.09	-0.02	-0.74	-0.71	-0.64	-0.68	-0.07
	(0.16)	(0.16)	(0.16)	(0.16)	(0.52)	(0.53)	(0.54)	(0.53)	(0.63)
Ln(WageHealth)		-0.16	-0.24	-0.18		-0.20	-0.24	-0.31	-0.23
		(0.24)	(0.23)	(0.23)		(0.26)	(0.25)	(0.24)	(0.25)
Entry_Rate			0.04	0.08			0.13	0.38	0.49**
			(0.18)	(0.18)			(0.22)	(0.23)	(0.22)
Litigation Rate				-0.00					-0.07
				(0.08)					(0.11)
Duration				-0.00					-0.00*
				(0.00)					(0.00)
Exit_Rate								-0.39	-0.28
								(0.50)	(0.49)
Observations	1,629	1,629	1,533	1,404	990	990	923	901	783
R-squared	0.74	0.74	0.75	0.75	0.77	0.77	0.76	0.76	0.77
Adj Rsq	0.69	0.69	0.68	0.69	0.72	0.72	0.71	0.71	0.71

Notes: Dependent variable is *Ln(LegalExpenditures)*. *Post_Fake*Claims* is equal to one if Region is equal to: Lombardia and $year >= 2002$; Lazio and $year >= 2004$; Puglia and $year >= 2004$; Toscana and $year >= 2003$; or Region is equal to Emilia Romagna or Trento. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 11: The Impact on Paid Premiums - No Merged Structures

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post*Claims	-0.27***	-0.25***	-0.25***	-0.31***	-0.23***	-0.16***	-0.16***	-0.16***	-0.23***
	(0.07)	(0.06)	(0.06)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)	(0.06)
Ln(GDP)	0.02	-0.23	0.10	1.82	-0.21	0.21	0.72	0.71	2.66
	(1.85)	(1.69)	(1.70)	(2.00)	(1.82)	(1.70)	(1.72)	(1.77)	(1.79)
IH	-0.49	0.29	-0.73	2.55					
	(5.23)	(4.77)	(1.57)	(2.54)					
TH	-1.37	-0.48	-0.49	4.85					
	(5.58)	(5.04)	(1.31)	(4.48)					
RH	-4.32	-1.92	-2.44**	1.09					
	(5.92)	(3.59)	(1.18)	(1.16)					
Ln(Av_LHU_Pop)	0.22***	0.22***	0.24***	0.08	0.23	0.10	0.08	0.08	0.29
	(0.06)	(0.07)	(0.07)	(0.07)	(0.14)	(0.11)	(0.11)	(0.11)	(0.33)
Ln(WageHealth)		0.62**	0.63**	1.12***		0.99***	0.98***	1.01***	0.92***
		(0.28)	(0.29)	(0.33)		(0.18)	(0.17)	(0.17)	(0.17)
Entry_Rate			-0.24	-0.24			-0.30	-0.39*	-0.51**
			(0.16)	(0.18)			(0.18)	(0.22)	(0.26)
Litigation Rate				0.06					0.05
				(0.05)					(0.05)
Duration				0.00					-0.00
				(0.00)					(0.00)
Exit_Rate								0.32	0.29
								(0.29)	(0.33)
Observations	1,768	1,768	1,691	1,325	991	991	950	933	669
R-squared	0.84	0.85	0.85	0.86	0.83	0.85	0.86	0.86	0.86
Adj Rsq	0.81	0.82	0.82	0.83	0.81	0.83	0.83	0.84	0.83

Notes: Dependent variable is *Ln(Premiums)*. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 12: The Impact on Legal Expenditures - No Merged Structures

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post*Claims	-0.24*	-0.25**	-0.23*	-0.19	-0.22	-0.26	-0.25	-0.25	-0.19
	(0.12)	(0.12)	(0.12)	(0.12)	(0.18)	(0.19)	(0.19)	(0.19)	(0.20)
Ln(GDP)	-6.61**	-6.91**	-6.42*	-5.59	-5.96	-6.29	-6.36	-6.54	-5.72
	(3.35)	(3.35)	(3.46)	(3.43)	(4.12)	(4.11)	(4.20)	(4.27)	(4.45)
IH	29.98**	31.44**	13.18*	6.27					
	(14.52)	(14.50)	(7.24)	(4.08)					
TH	20.35*	21.24**	12.94*	-7.80**					
	(10.76)	(10.12)	(7.25)	(3.66)					
RH	27.09*	31.81**	10.15	-7.35**					
	(14.52)	(14.51)	(7.87)	(2.89)					
Ln(Av_LHU_Pop)	-0.21**	-0.19**	-0.17*	-0.12	-0.31	-0.14	-0.17	-0.19	0.41
	(0.09)	(0.10)	(0.10)	(0.12)	(0.62)	(0.63)	(0.64)	(0.63)	(0.82)
Ln(WageHealth)		-0.34*	-0.38*	-0.31		-0.47**	-0.45**	-0.51**	-0.38*
		(0.21)	(0.21)	(0.21)		(0.21)	(0.21)	(0.22)	(0.22)
Entry_Rate			0.09	0.15			0.13	0.45*	0.61***
			(0.19)	(0.19)			(0.26)	(0.24)	(0.23)
Litigation Rate				-0.01					-0.13
				(0.09)					(0.12)
Duration				-0.00					-0.00*
				(0.00)					(0.00)
Exit_Rate								-0.51	-0.41
								(0.64)	(0.64)
Observations	1,400	1,400	1,332	1,203	776	776	737	721	603
R-squared	0.73	0.73	0.73	0.73	0.75	0.75	0.75	0.75	0.75
Adj Rsq	0.67	0.67	0.67	0.67	0.70	0.70	0.69	0.69	0.68

Notes: Dependent variable is *Ln(LegalExpenditures)*. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 13: Calls for Bids for Insurance Coverage

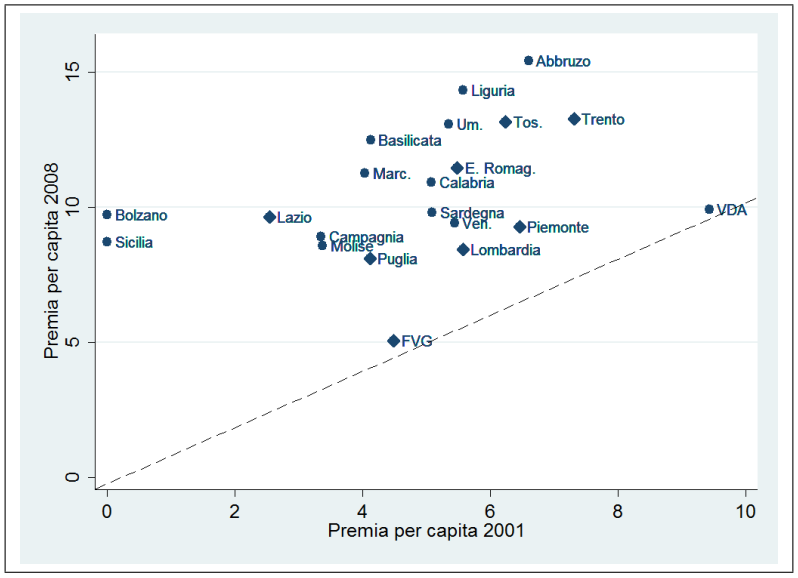
Region	***2008***	***2009***	***2010***	***2011***
Abruzzo	1	2	13	4
Basilicata	1	1	0	1
Calabria	1	0	2	0
Campania	0	0	0	2
Emilia Romagna	0	0	1	0
Lazio	5	6	0	4
Liguria	2	1	1	4
Lombardia	17	19	24	11
Marche	1	0	3	2
Molise	3	1	2	1
Puglia	1	1	5	3
Sardegna	2	0	10	5
Sicilia	9	8	9	23
Toscana	0	0	1	0
Trento	2	3	0	0
Valle d'Aosta	0	1	2	0
Veneto	14	11	8	22
Total	59	54	81	82

Table 14: Average Open Calls and HH Index (Treated vs. Control)

Year	***Open Calls***		***HH Index***	
	Non-Treated	*Treated*	*Non-Treated*	*Treated*
2008	0.82	1	0.16	0.13
2009	0.32	0.86	0.16	0.13
2010	0.47	0.70	0.17	0.09
2011	0.54	0.76	0.16	0.10
Average	0.54	0.83	0.16	0.11

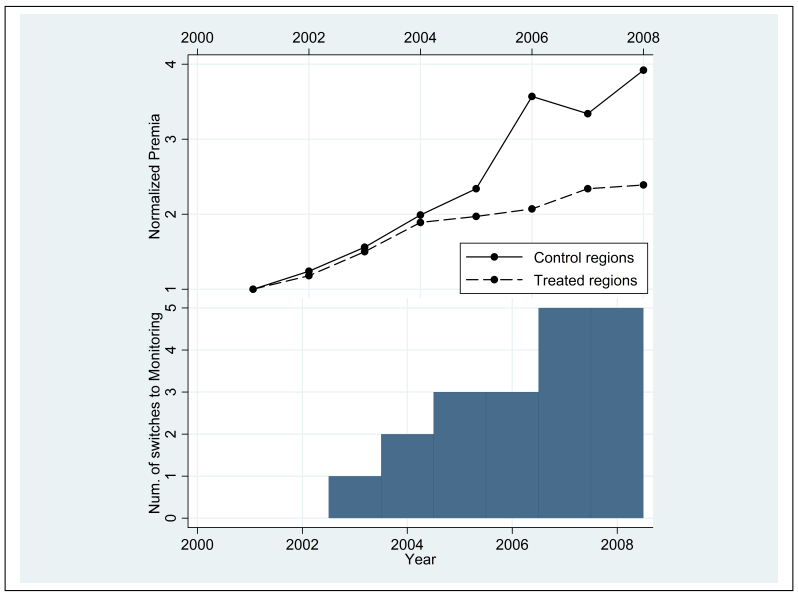
Note: Years are the closing dates.

Figure 1: Paid Premium per capita (variation 2001-2008)



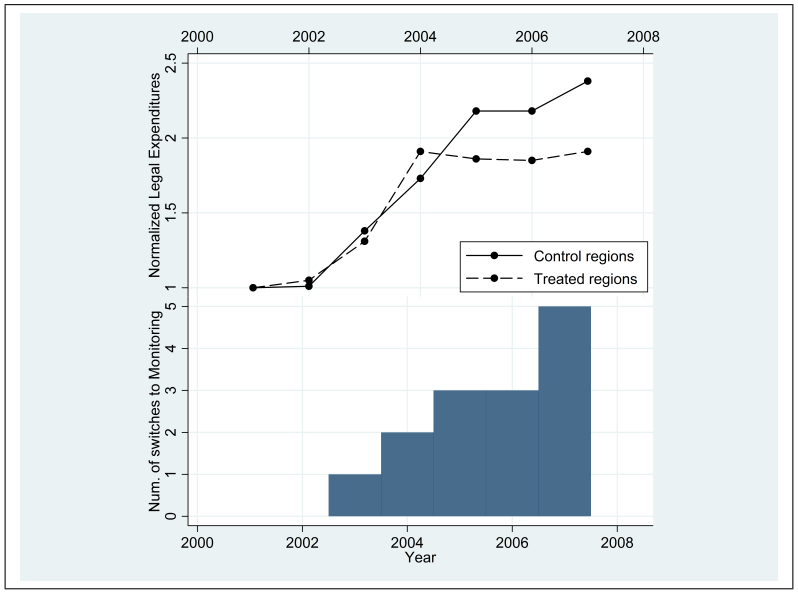
NOTE: Per capita paid premium variation from 2001 to 2008. Treated Regions (*i.e.*, that adopted a monitoring system) with diamond symbol; control Regions with circle symbol. Dotted-line is the 45 degree line.

Figure 2: Premiums: Treated *vs.* Control



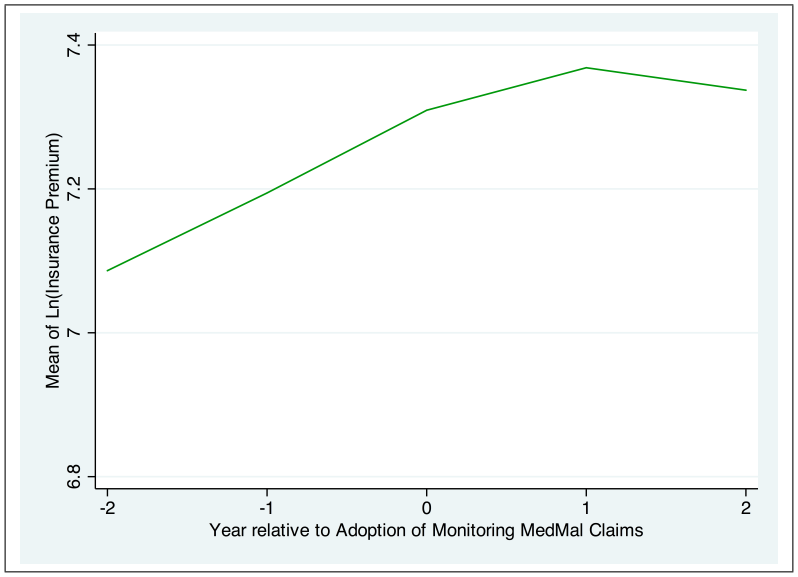
NOTE: "Num. of switches to Monitoring" represents the total number of Regions adopting a monitoring system. Trento is not included as it implemented the monitoring system in 1997.

Figure 3: Legal Expenditures: Treated *vs.* Control



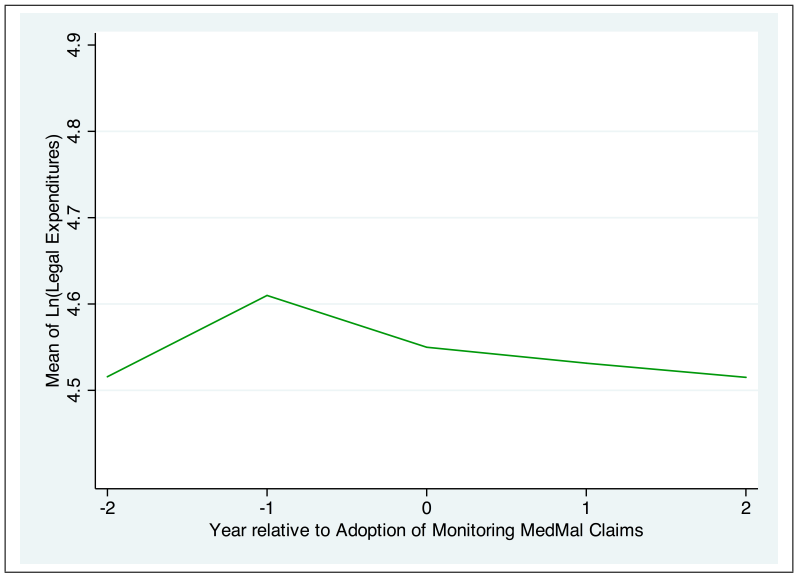
NOTE: "Num. of switches to Monitoring" represents the total number of Regions adopting a monitoring system. Trento is not included as it implemented the monitoring system in 1997. Legal expenditures are only available until 2007.

Figure 4: Paid Premium of Treated



NOTE: Year relative to the adoption of the policy equal to 0 represents the year of the policy adoption.

Figure 5: Paid Legal Expenditures of Treated



NOTE: Year relative to the adoption of the policy equal to 0 represents the year of the policy adoption.

Appendix

Table A1: Average Premium per Type of Healthcare Structure (Treated *vs*. Control)

		2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
LHU	*Non-Treated*	795	886	1,108	1,348	1,603	1,901	1,998	2,242
	Treated	1,031	1,163	1,588	2,010	2,075	2,146	2,448	2,509
IH	*Non-Treated*	612	547	698	861	1,072	1,153	1,369	1,462
	Treated	1,307	1,520	1,842	2,191	2,174	2,372	2,480	2,380
TH	*Non-Treated*	1,532	1,309	1,576	2,464	2,102	2,142	1,804	2,089
	Treated	1,498	1,735	1,996	2,322	2,692	2,733	2,466	2,618
RH	*Non-Treated*	.	.	218	294	392	476	599	640
	Treated	.	.	816	921	1,210	1,287	1,442	1,267

Note: Values are in 1,000 euros deflated at 2009. LHUs: *Local Health Units*; IHs: *Independent Hospitals*; THs: *Teaching Hospitals*; and RHs: *Research Hospitals*. RHs do not present data for 2001 and 2002 because they started operating, as we know them today, in 2003 as a consequence of the Legislative Decree n.88/2003. Legal Expenditures are available until 2007 only.

Table A2: Average Legal Expenditures per Type of Healthcare Structure (Treated *vs*. Control)

		2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
LHU	*Non-Treated*	159	189	318	396	613	536	636
	Treated	168	173	239	278	314	415	274
IH	*Non-Treated*	42	99	130	166	286	175	222
	Treated	109	151	175	424	175	212	178
TH	*Non-Treated*	140	119	151	158	209	191	222
	Treated	101	112	95	201	375	154	180
RH	*Non-Treated*	.	.	21	60	58	27	121
	Treated	.	.	95	225	294	144	245

Note: Values are in 1,000 euros deflated at 2009. LHUs: *Local Health Units*; IHs: *Independent Hospitals*; THs: *Teaching Hospitals*; and RHs: *Research Hospitals*. RHs do not present data for 2001 and 2002 because they started operating, as we know them today, in 2003 as a consequence of the Legislative Decree n.88/2003. Legal Expenditures are available until 2007 only. Legal Expenditures are available until 2007 only.

Table A3: The Impact on Paid Premiums - No Merged Structures: Validity Test

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post_Fake*Claims	-0.02	-0.01	-0.01	-0.09	0.02	0.06	0.07	0.09	0.05
	(0.08)	(0.07)	(0.07)	(0.09)	(0.08)	(0.07)	(0.07)	(0.07)	(0.09)
Ln(GDP)	0.08	-0.24	0.13	3.30	-0.56	-0.37	0.09	0.03	2.17
	(1.72)	(1.62)	(1.63)	(2.32)	(1.79)	(1.62)	(1.64)	(1.68)	(2.03)
IH	-0.71	0.24	-0.87	4.54					
	(4.87)	(4.57)	(1.51)	(2.93)					
TH	-1.49	-0.42	-0.65	8.23					
	(5.20)	(4.84)	(1.25)	(5.13)					
RH	-4.49	-1.81	-2.43**	2.10					
	(5.52)	(3.55)	(1.23)	(1.38)					
Ln(Av_LHU_Pop)	0.22***	0.23***	0.24***	0.04	0.18	0.06	0.03	0.04	-0.06
	(0.06)	(0.06)	(0.07)	(0.08)	(0.12)	(0.10)	(0.10)	(0.10)	(0.34)
Ln(WageHealth)		0.64**	0.65**	1.21***		1.05***	1.03***	1.06***	1.02***
		(0.29)	(0.29)	(0.32)		(0.18)	(0.16)	(0.17)	(0.17)
Entry_Rate			-0.28*	-0.25			-0.35*	-0.46**	-0.56**
			(0.16)	(0.18)			(0.18)	(0.21)	(0.25)
Litigation Rate				0.07					0.05
				(0.05)					(0.05)
Duration				0.00					-0.00
				(0.00)					(0.00)
Exit_Rate								0.27	0.26
								(0.29)	(0.33)
Observations	1,768	1,768	1,691	1,325	991	991	950	933	669
R-squared	0.83	0.84	0.85	0.85	0.83	0.85	0.86	0.86	0.85
Adj Rsq	0.81	0.82	0.82	0.82	0.80	0.83	0.83	0.83	0.82

Notes: Dependent variable is *Ln(Premiums)*. *Post_Fake*Claims* is equal to one if Region is equal to: Lombardia and $year >= 2002$; Lazio and $year >= 2004$; Puglia and $year >= 2004$; Toscana and $year >= 2003$; or if Region is equal to Emilia Romagna or Trento. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A4: The Impact on Legal Expenditures - No Merged Structures: Validity Test

	All sample				Only LHU				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post_Fake*Claims	-0.19	-0.19	-0.18	-0.12	-0.16	-0.17	-0.14	-0.18	-0.06
	(0.15)	(0.15)	(0.15)	(0.16)	(0.20)	(0.20)	(0.21)	(0.21)	(0.24)
Ln(GDP)	-4.40	-4.58	-4.19	-3.94	-4.36	-4.52	-4.93	-4.67	-4.95
	(3.48)	(3.47)	(3.60)	(3.77)	(4.59)	(4.59)	(4.68)	(4.73)	(5.27)
IH	20.58	5.11*	8.49	4.35					
	(15.07)	(2.71)	(7.54)	(4.43)					
TH	13.30	3.47***	8.40	3.32*					
	(11.12)	(0.50)	(7.57)	(1.94)					
RH	17.68	5.46**	5.45	-5.96*					
	(15.04)	(2.70)	(8.27)	(3.14)					
Ln(Av_LHU_Pop)	-0.27***	-0.26***	-0.24***	-0.16	-0.64	-0.57	-0.58	-0.60	0.13
	(0.08)	(0.08)	(0.09)	(0.10)	(0.55)	(0.56)	(0.56)	(0.55)	(0.73)
Ln(WageHealth)		-0.26	-0.30	-0.24		-0.36*	-0.34	-0.41*	-0.29
		(0.21)	(0.21)	(0.21)		(0.20)	(0.21)	(0.21)	(0.23)
Entry_Rate			0.11	0.16			0.15	0.50**	0.61***
			(0.19)	(0.19)			(0.25)	(0.23)	(0.21)
Litigation Rate				-0.01					-0.13
				(0.09)					(0.12)
Duration				-0.00					-0.00*
				(0.00)					(0.00)
Exit_Rate								-0.62	-0.48
								(0.62)	(0.61)
Observations	1,400	1,400	1,332	1,203	776	776	737	721	603
R-squared	0.73	0.73	0.73	0.73	0.75	0.75	0.74	0.75	0.74
Adj Rsq	0.67	0.68	0.67	0.67	0.70	0.70	0.69	0.69	0.68

Notes: Dependent variable is *Ln(LegalExpenditures)*. *Post_Fake*Claims* is equal to one if Region is equal to: Lombardia and $year >= 2002$; Lazio and $year >= 2004$; Puglia and $year >= 2004$; Toscana and $year >= 2003$; or if Region is equal to Emilia Romagna or Trento. All regressions include healthcare provider and year fixed effects. Robust standard errors clustered at the healthcare provider level in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

A6: Variables Description

Variable	Type	Definition	Source
Claims	Dummy	Equal 1 for those Regions in which a monitoring policy on claims was active, 0 otherwise	AGENAS
Premium	Continuous (1,000€)	Paid Insurance premium per healthcare unit	MoH
Leg_Exp	Continuous (1,000€)	Legal expenditures per healthcare unit	MoH
Gdp	Continuous (€)	Regional GDP	Istat
WageHealth	Continuous (1,000€)	Total wages of healthcare personnel per healthcare unit	MoH
Av_LHU_Pop	Continuous	Resident population averaged by the number of LHUs (in the Region)	Health for All-Italia
Litigation Rate	Continuous	Ordinary civil proceedings filed in First-Instance Courts per 1,000 inhab. in the Region (excludes cases assigned to special divisions: labor, social security, family law and bankruptcy)	Istat (with data from the MoJ)
Duration	Continuous	Mean duration of ordinary civil proceedings filed in First Instance Courts in days (estimated)	Istat (with data from the MoJ)
LHU	Dummy	Equal 1 if the unit is a Local Health Unit, 0 otherwise	MoH
IH	Dummy	Equal 1 if the unit is an Independent Hospital, 0 otherwise	MoH
TH	Dummy	Equal 1 if the unit is a Teaching IH, 0 otherwise	MoH
RH	Dummy	Equal 1 if the unit is a Research Hospital, 0 otherwise	MoH
Entry_Rate	Continuous [0,1]	(Revenues from public entities intra-Region)/(Total revenues from healthcare)	MoH
Exit Rate	Continuous [0,1]	(Total costs with ambulatory and hospital care with public intra-Regional entities) /(Ambulatory costs + Healthcare costs)	MoH

Notes: All monetary variables are in 2009 prices. *MoH* - Ministry of Health; *Istat* - Italian National Institute of Statistics; *AGENAS* - National Agency for Regional Healthcare Services; *MoJ* - Ministry of Justice.

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