Cogent Business & Management

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/oabm20

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To cite this article: Milena Vainieri, Andrea Vandelli & Davide Trinchese (2024) Tricky choices between short or long-term financial sustainability: cost allocation for medical malpractice claims in Italy, Cogent Business & Management, 11:1, 2423894, DOI: 10.1080/23311975.2024.2423894

To link to this article: https://doi.org/10.1080/23311975.2024.2423894

Published online: 09 Nov 2024.

COGENT BUSINESS & MANAGEMENT
2024, VOL. 11, NO. 1, 2423894
https://doi.org/10.1080/23311975.2024.2423894

BANKING & FINANCE | RESEARCH ARTICLE

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Tricky choices between short or long-term financial sustainability: cost allocation for medical malpractice claims in Italy

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ABSTRACT

Financial sustainability is a recurring challenge for public organizations and is closely linked to resource allocation. Medical malpractice claims can significantly impact public healthcare costs, prompting several countries, including Italy, to adopt different strategies for managing these risks. These strategies range from insurance-based systems to self-insurance models. While the former offers greater long-term security, it tends to be more expensive in the short term. Conversely, self-insurance, if properly implemented, can provide both adequate protection and cost savings. However, it also carries the risk of incentivizing opportunistic behavior aimed at achieving short-term financial gains. This study explores the propensity of Italian healthcare organizations to choose between these approaches and the relationship between their choice and short-term financial viability. A quantitative analysis of the relationship between premiums, provisions, and financial indicators, such as ROA and ROS provides empirical evidence of potential opportunistic behavior. Additionally, semi-structured interviews are conducted to validate the interpretations from the statistical analyses. Our findings reveal that many regional administrations have insufficient coverage for risk exposure, which may temporarily improve financial performance but increase the risk of long-term financial instability.

ARTICLE HISTORY
Received 4 June 2024
Revised 20 October 2024
Accepted 27 October 2024

KEYWORDS
Public organizations; cost allocation; financial sustainability; medical malpractice; healthcare management

SUBJECTS
Business, Management, and Accounting; Healthcare Administration and Management; Healthcare Management; Political Economy; Tort; Medical and Healthcare Law

Introduction

In recent years, the incidence of medical malpractice claims has increased dramatically worldwide (Liu et al., 2023; Row et al., 2021; Vetrugno et al., 2023). It is estimated that ~10% of patients globally experience at least one adverse event during medical care (Institute of Medicine (US) Committee on Quality of Health Care in America, 2000; Schwendimann et al., 2018). According to OECD data (OECD et al., 2018), around 15% of hospital expenditures in high-income countries are allocated to addressing preventable medical errors and patient-related injuries. In the United States, more than 250,000 patients per year are affected by adverse events in medical care (Anderson & Abrahamson, 2017), with over 100,000 of these cases resulting in fatalities and substantial compensation payouts (Mello et al., 2010). Traditionally, healthcare organizations have relied on insurance schemes to mitigate claim-related risks (Harrington et al., 2008; Kessler, 2011); however, recent challenges related to the estimation of open claims and the broad discretion granted to courts in quantifying damages have introduced significant uncertainty (Carroll, 2016). This uncertainty has, in turn, led to a sharp rise in insurance premiums and, in some instances, the financial insolvency of insurers. Consequently, many local health authorities have increasingly struggled to manage these rising costs, prompting a shift toward self-insurance risk models, first implemented experimentally and later institutionalized through regulatory measures. Self-insurance risk models, if properly implemented, have the potential to offer both adequate protection and significant cost savings. However, they also carry the inherent risk of fostering opportunistic behaviors, as organizations may be tempted to prioritize short-term financial stability over long-term risk management.

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Specifically, healthcare organizations may refrain from adequately setting aside reserves for self-retained risks, choosing instead to allocate resources in a way that allows them to achieve short-term budgetary balance. This practice, while seemingly beneficial in the immediate term, could lead to financial vulnerabilities and increased exposure to risk in the future.

This study investigates the propensity of Italian healthcare organizations to adopt self-insurance models and the relationship between this choice and short-term financial viability. Of particular interest is how organizations exploit self-retention mechanisms to balance their budgets in the short term, potentially at the expense of long-term sustainability. To gain a deeper understanding of this phenomenon, we complement the analysis of financial statements with qualitative interviews conducted with key policymakers and regional healthcare managers. These interviews provide crucial insights into the decision-making processes behind the adoption of self-insurance models and shed light on whether this approach is driven by strategic risk management or by the necessity to achieve fiscal equilibrium in the short term.

Theoretical framework

The question has long arisen regarding whether public organizations allocate economic resources appropriately to ensure financial sustainability (Gardini & Grossi, 2018; Knox, 1978; Turner et al., 2023; Weinstein, 1990). In the context of public healthcare, misallocations are particularly problematic, as they exacerbate financial sustainability issues due to the inherent scarcity of resources (Santana et al., 2023). In sectors fraught with heightened financial uncertainty, such as medical malpractice, public organizations must adopt strategic financial sustainability practices to balance resource allocation with emerging needs (Sax & Andersen, 2019), thereby ensuring the efficient functioning of the financial system. The absence of sound financial sustainability increases uncertainty, leading to resource misallocation, which can have detrimental effects on long-term economic trajectories (Crockett, 1996). The growing concerns surrounding austerity further intensify the pressure on public organizations to provide stakeholders with a comprehensive understanding of the effectiveness of governmental programs, policies, and practices (Ferry & Murphy, 2018). In response to this pressure, organizations that manage systemic risks in an attempt to avoid instability may foster biased policy decisions (Schinasi, 2004). Relying solely on accrual-based financial balance sheets without considering efficiency metrics or contextual analysis limits the understanding of financial sustainability, as process evaluation is fundamental to strategic decision-making and goal achievement (Papadakis et al., 1998; Sinervo, 2014). This complexity is particularly evident in regional governments where decision-making leaders must deal with multiple actors, rendering financial sustainability decisions multifaceted (Heimstädt & Dobusch, 2018; Navarro-Galera et al., 2021). Cohesion among the internal and external stakeholders is essential for effective decision-making (Brockett et al., 1986; George et al., 2016). The management of medical malpractice claims offers a valuable lens through which to analyze decision-making in public organizations (Brockett et al., 1986), offering strategic insights into financial sustainability in both the short and long term—particularly within the Italian healthcare system, which faces a growing number of claims and rising associated costs. While detailed data on the number of medical errors and claims are not publicly available, judicial decisions and reports from insurance companies and associations allow for a partial estimation of the associated costs (Bertoli et al., 2018; Treglia et al., 2021). Given the opacity of detailed claims data, the most effective method for analyzing the financial position of public organizations is to examine how resources are allocated in balance sheets to cover malpractice claims.

Despite the recognized importance of financial balances in public organizations, few studies have thoroughly examined the role of insurance premiums and provisions for risks and charges in accounting for medical malpractice claims from both an economic and legal perspective (Bertoli & Grembi, 2019; Kilgore et al., 2006; Mello et al., 2020). Hence, in an effort to address this gap in the literature, this study aims to explore the following research question:

RQ: To what extent do regional governments account for insurance premiums and/or provisions for risks and charges in their balance sheets, and how does this practice highlight the economic and legal challenges in ensuring public financial sustainability?

Methodology

Setting

Since the early 2000s, the Italian National Health Service (NHS) has operated under a decentralized model, with complementary responsibilities allocated to the central, regional, and local levels of government. The central government is responsible for setting the overall funding requirements, goals, and priorities of the NHS and ensuring equity access and quality of care across the country. Regional and local health authorities are responsible for the organization and delivery of healthcare services—primary and secondary care, public health, and social services—and directly for the management of their financial resources. At the local level, there are also university teaching hospitals, which are usually highly specialized. Organizations are entitled to a high degree of autonomy in administrative, political, legislative, and fiscal spending (Ricciardi & Tarricone, 2021). This implies that numerous management decisions are made at the local level. In this line, regions and local health organizations must handle any adverse situations arising from their direct administration. In case of adverse events in service provision, public and private health organizations are liable for errors committed directly by their healthcare professionals during practice. For this reason, regions or local health authorities must have insurance coverage or constitute a self-retention risk fund with internal resources (according to Law No. 24/2017). Opting to rely on an insurance company imposes an obligation on regional or local governments to select the best deal available, ensuring the most comprehensive coverage and effectively delegating the management of adverse events to the insurance company. Alternatively, choosing to manage risk internally requires developing malpractice case management skills and expertise comparable to that of insurance companies but with the potential for cost savings. In either case, ensuring financial sustainability over the long term is essential.

Research strategy

To investigate the regional decisions regarding the management of medical malpractice claims, we first conducted a documental analysis focusing on the legal aspects influencing the amount of compensation. With a particular emphasis on the relevant literature, we examined cost allocations for medical malpractice claims in Italian regions.

The primary data source consisted of accounting information from financial statements and assets, which are published annually by the Italian Ministry of Economy and Finance. The statistical analysis was performed using the STATA software.

Regions and healthcare organizations were classified following the approach applied in a recent study (Vainieri & Vandelli, 2023), based on the average cost per provision and premium per capita on population. Four scenarios were identified: (i) Regions with a predominantly insurance-based model, (ii) Regions with a predominantly self-insurance-based model, (iii) Regions with mixed models, and (iv) Regions at potential risk of failing to cover medical malpractice claims.

To ensure the triangulation of data (Yin, 2009), we compared (i) regional classification with various sources of evidence, such as (ii) online documentation related to regional resolutions and laws and (iii) interviews with top management.

Initially, empirical findings were compared with regional resolutions and government acts related to medical malpractice compensation models, which were collected from the regional institutional websites and the legal database DeJure. Through the analysis of legislative acts, the regulatory and decision-making evolution of the different regions was also traced, verifying both the persistence of specific organizational models and the degree of decision-making uniformity or heterogeneity within the regions regarding the adopted system.

In this context, we used qualitative research methods to complement the quantitative data collection, conducting semi-structured interviews (Kallio et al., 2016) with open-ended questions. These interviews provided an in-depth view of how regions and local health authorities managed medical malpractice claims over the years. Managers of five Italian regions discussed their internal organization, regional regulations, staff roles, guidelines, and best practices created and used. The participants were informed of the research's purpose but were not given the interview questions in advance. Each

interview lasted 3 h, and field notes were taken in real-time observation of the situation described. Video recordings were also used to collect data. According to GDPR and best practices, participants provided verbal informed consent to use their statements and video recordings by placing themselves in front of the camera, thus also through a clear affirmative act (Recital 32). The questions do not require ethics committee approval, deal with legal and economic issues coming from financial statements of a public nature, and do not involve participants' or populations' personal data, health data, or health-related data.

Additionally, to further validate the empirical evidence and public regulation acts, the results were presented at a conference on medical malpractice claims in November 2022, entitled 'Self-risk retention in healthcare. Challenges and opportunities five years after the enforcement of Law 24/2017'.

To assess whether a healthcare organization's profitability is influenced by the choice between setting aside or self-insurance, we conducted an empirical analysis using data from the Italian public administration's open dataset and personnel counts from the Ministry of Finance and the ISTAT (Italian National Institute of Statistics) data covering the period 2017–2021. This timeframe allowed for a pre- and post-pandemic evaluation of the healthcare organizations. Hospitals with missing data were excluded from the analysis. The variables used in this study are summarized in Table 1. After a data cleaning process, including the removal of missing data and extreme values (eliminating the top and bottom 10% of observations), we obtained 864 observations. We select return on asset (ROA) and return on sales (ROS) as dependent variables. McCracken et al. (2001) identified ROA as 'the most valid subjective financial measures of hospital performance', while Cleverley (1990) asserted that ROA 'is the fundamental test of financial performance'. Although ROS is commonly used to measure sales profitability, in the context of public hospitals, it serves as both a measure of efficiency and an indicator of profitability (Burkhardt & Wheeler, 2013; Naciti et al., 2022). The sum of provisions and premiums was selected as primary independent liabilities, while premiums represent payments made to insurance companies for coverage against specific risks, such as medical malpractice claims. Higher provisions and premiums indicate a lower risk of delayed payments or defaults, highlighting financial stability and effective risk management practices in healthcare organizations. We also included several control variables: the debt to GDP ratio (to assess whether the healthcare organization's debt level is sustainable relative to the region's GDP), the internal migration rate (to account for patients seeking care outside their region), and the population growth rate (to consider demographic changes in the regions served).

In addition, we controlled for factors that may vary over time, including regions subject to a financial recovery plan (State-specific measures to restore and achieve stability after three years of financial unbalance), region type (distinguishing regions with special status from others), region risk decision (whether regions allocate reserves or secure insurance), firm size, and type of healthcare organization (discerning research hospitals from local health authorities and teaching hospitals). We employed a panel data

Table 1. Variables identification, definitions, and measures.

Variables identification	Acronyms	Definitions and measures
Main variable (dependent variable)		
ROS	ROS	Ratio between operating income and revenues
ROA	ROA	Ratio between operating income and assets
Main variable (independent variable)		
Premiums and provisions	Prem. Prov.	Sum of healthcare organization's premiums and provisions
Control variables		
Debt GDP ratio	debtGDP	Ratio between healthcare organization's total debt and regional GDP
Internal migration rate	Int.Migr	Difference between the number of individuals registering their residence in the healthcare organization's region and the number of individuals deregistering their residence
Population growth rate	Pop.Growth	Ratio of the total net change in population over the year to the average population of the healthcare organization's regions multiplied by one thousand
Recovery plan	Recov. plan	Dummy variable assigns 1 if the healthcare organization region is subject to a recovery plan and 0 otherwise
Region decision	Reg. decision	Dummy variable assigns 1 if the healthcare organization is within a special status region and 0 otherwise
Region type	Reg. type	Dummy variable assigns 1 if the healthcare organization regional system adopted by legislation is self-risk retention and 0 otherwise

analysis using a pooled ordinary least squares (OLS) regression model to explore the relationship between ROA, ROS, and the sum of premiums and provisions. The regressions equations were:

$$\text{ROA} = \alpha + \beta 1\text{Prem.prov.it} + \beta 2\text{debtGDPit} + \beta 3\text{Int.Migr.it} + \beta 4\text{Pop.Growth.it} + \beta 5\text{Rec.planit} + \beta 6\text{Rec.planit} + \beta 7\text{Reg.typeit} + \beta 8\text{Reg.decisionit} + \beta 9\text{Sizeit} + \beta 10\text{Res.hosp.it} + \beta 11\text{Loc.Auth.it} + \epsilon\text{it}$$

$$\text{ROS} = \alpha + \beta 1\text{Prem.prov.it} + \beta 2\text{debtGDPit} + \beta 3\text{Int.Migr.it} + \beta 4\text{Pop.Growth.it} + \beta 5\text{Rec.planit} + \beta 6\text{Rec.planit} + \beta 7\text{Reg.typeit} + \beta 8\text{Reg.decisionit} + \beta 9\text{Sizeit} + \beta 10\text{Res.hosp.it} + \beta 11\text{Loc.Auth.it} + \epsilon\text{it}$$

Results

The analysis of balance sheet data from 2020 to 2022 reveals that most Italian regions fall into two main categories: eight regions predominantly rely on insurance-based models, while seven regions favor self-insurance approaches. Four regions, however, exhibit signs of potential financial unsustainability. Only one region adopts a mixed model, combining elements of both insurance and self-insurance. Notably, some regions have not implemented self-risk retention mechanisms, as evidenced by zero or near-zero values recorded in the provision for self-risk retention. On the other hand, certain regions report minimal insurance premiums per capita, indicating a greater reliance on provisions for risk coverage. Overall, the inclination toward risk management via insurance or provisions varies significantly across regions, with costs ranging from 5 to 30 euros per capita. Table 2 provides a detailed overview of the average premiums and provisions across the different Italian regions.

The regional acts corroborated the empirical findings observed in various regions. Most regions classified in the first scenario, characterized by a predominance of insurance, align with this regulatory categorization. Notably, only one Autonomous Province employs an insurance model devoid of deductibles. In contrast, there exists considerable variability among the remaining regions regarding their selection of self-insurance risks (SIR). Refer to Table 3 for details. Similarly, the preference for total risk self-insurance and the predominance of a self-risk retention system, with insurance intervention reserved for significant claims, have been validated through the documental analysis. Two regions presented divergent systems at the local level, illustrating that claims management models can be decentralized within the regional framework. This decentralization may involve various levels of aggregation based on local health

Table 2. Regional representation of average premiums and provisions based on financial statements for 2020–2022.

	Average premiums 2020–2022 (in euros)	Average provisions 2020–2022 (in euros)	Population 2020	Premiums per capita 2020–2022 (in euros)	Provisions per capita 2020–2022 (in euros)	Regional total per capita 2020–2022 (in euros)
Piedmont	55,625,294	835,493	4,412,292	12.61	0.19	12.80
Valle d'Aosta	1,662,897	0	126,381	13.16	0.00	13.16
Lombardy	79,798,402	69,119,283	10,004,614	7.98	6.91	14.89
Autonomous Province of Bolzano	7,659,401	0	516,644	14.83	0.00	14.83
Autonomous Province of Trento	6,840,922	3,922,778	540,848	12.65	7.25	19.90
Veneto	19,552,154	104,810,165	4,891,287	4.00	21.43	25.43
Friuli Venezia Giulia	6,272,929	0	1,242,157	5.05	0.00	5.05
Liguria	2,305,869	24,557,354	1,600,832	1.44	15.34	16.78
Emilia-Romagna	8,073,250	37,591,833	4,507,081	1.79	8.34	10.13
Tuscany	7,328,578	16,299,177	3,774,506	1.94	4.32	6.26
Umbria	3,833,118	23,327,877	889,838	4.31	26.22	30.53
Marche	8,126,742	6,000,000	1,537,704	5.28	3.90	9.18
Lazio	43,838,763	32,997,227	5,717,187	7.67	5.77	13.44
Abruzzo	20,896,897	3,070,648	1,305,862	16.00	2.35	18.35
Molise	6,204,362	0	305,677	20.30	0.00	20.30
Campania	34,533,957	61,132,601	5,497,647	6.28	11.12	17.40
Apulia	21,749,092	27,704,787	3,918,764	5.55	7.07	12.62
Basilicata	7,557,531	821,096	554,597	13.63	1.48	15.11
Calabria	34,877,417	2,266,667	1,871,055	18.64	1.21	19.85
Sicily	8,530,085	36,895,678	4,792,055	1.78	7.70	9.48
Sardinia	38,780,736	6,835,616	1,634,460	23.73	4.18	27.91
Average	20,192,781	21,818,490	2,840,071	9.46	6.42	15.88

Table 3. Regional models adopted by regulation and level of aggregation.

Region	The system adopted by legislation	Level of aggregation
Piedmont	Insurance premium (SIR 395.000€)	Regional
Valle d'Aosta	Insurance premium (SIR 200.00€)	Regional
Lombardy	Insurance premium (SIR 250.000€)	Local health authorities
Autonomous Province of Bolzano	Insurance premium	Regional
Autonomous Province of Trento	Self-risk retention with insurance for major damages (SIR 500.000€)	Regional
Veneto	Self-risk retention with insurance for major damages (SIR 750.000€)	Regional
Friuli-Venezia Giulia	Self-risk retention with insurance for major damages (SIR 550.000€)	Regional
Liguria	Self-risk retention	Regional
Emilia-Romagna	Self-risk retention	Regional
Tuscany	Self-risk retention	Regional
Umbria	Self-risk retention	Regional
Marche	Self-risk retention or insurance premium (SIR 400.000€)	Local health authorities
Lazio	Self-risk retention or insurance premiums (various SIR or aggregate deductible)	Local health authorities
Abruzzo	Insurance premium (various SIR or aggregate deductible)	Local health authorities
Molise	Insurance premium (aggregate deductible)	Regional
Campania	Self-risk retention or Self-risk retention with insurance for major damages (various SIR)	Local health authorities
Apulia	Self-risk retention	Local health authorities
Basilicata	Insurance premium (SIR 150.000–350.000€)	Local health authorities
Calabria	Insurance premium (self-risk retention for judicial decision)	Regional
Sicily	Self-risk retention	Regional
Sardinia	Insurance premium	Local health authorities/Regional

authorities and university teaching hospitals. In predominantly insured systems, local health authorities are typically insured for major losses, although variability is evident at the local level, with no uniform choice of model leading to contracts with different insurance providers, though AM Trust and Sham appear to dominate the market. The case of the Calabria region is noteworthy. Faced with a desire to insure its risk through a regional insurance policy with a self-insurance retention (SIR) of 100,000 euros and minimal provisions, the region was compelled to self-manage its medical malpractice risks following a judicial appeal to the highest administrative court. This ruling deemed the entire procedure illegitimate due to violations of evaluation criteria.

Furthermore, the regulatory acts indicate that several regions or local health authorities have modified their claims management models over the years to enhance economic sustainability, transitioning to the self-insurance system after prolonged reliance on insurance. For instance, documents indicate objectives such as: '*Achievement of cost savings through direct processing of malpractice claims…*' or '*savings on insurance cost share with effects on the business result for the period*'. Conversely, some regions reverted to insurance systems, even if only for major damages, after initial attempts at self-insurance, exemplified by a local health authority in Sardinia following a regional tender for all local health authorities.

Table 3 summarizes the different models adopted by regulation and level of aggregation.

The empirical and regulatory findings were further validated through interviews, confirming that financial sustainability considerations primarily drove the transition to self-risk retention. A regional head of the health department noted that the decision to adopt self-risk retention occurred ~10 years prior, beginning as an experiment with this model for a single local health authority before extending to the entire region: '*We chose risk retention many years ago because insurance premiums became too expensive. Firstly, we tried only with one hospital, then we extended the model to the entire region*'. This respondent also indicated hiring personnel with specific expertise to manage reserves effectively for future claims, including loss adjusters and statisticians (Mazzi et al., 2024). Other regional health department heads echoed this sentiment, emphasizing a commitment to enhancing staff expertise in clinical and organizational risk management. Lombardy, for instance, developed claims management guidelines and best practices: '*We created a general procedure to standardize the malpractice claims management at the regional level*'. The first regions to implement a model of full risk retention did so in 2013, a decade before these interviews. Despite this considerable timeframe, some regions have encountered challenges in making adequate provisions in recent years: '*Allocating proper provisions is complex. We acknowledge the associated risks and are working on it*'. Consequently, some regions have opted to insure only major damages (over 750,000 euros) or mixed model with self-insurance retention of 250,000 euros.

In addition to insights gathered from documentary analysis and interviews, we conducted pooled OLS regression analysis to examine the relationship between the decision to rely on premiums or provisions

and the efficiency and profitability of healthcare organizations. To ensure the accuracy of our estimates, we used robust standard errors and time-fixed effects to address cross-sectional heteroscedasticity and autocorrelation issues (Barua & Chiesa, 2019; Vogelsang, 2012). Furthermore, since the variance inflation factor analysis was lower than ten, the absence of collinearity was confirmed (Tabachnick et al., 2019).

Table 4 presents the regression analysis results, demonstrating that ROA and ROS are positively associated with the total sum of premiums and provisions. Furthermore, ROA and ROS are negatively correlated with the healthcare organization's debt-to-GDP ratio, suggesting that increased debt diminishes profitability even when considering regional production. The internal migration rate, which reflects the ability to attract patients, indicates that as patients migrate away from the region in search of higher quality of care and patient safety, organizational profitability declines. Conversely, the population growth rate is positively associated with profitability, suggesting that an increasing population correlates with greater profitability for healthcare organizations. Notably, healthcare organizations within regions with special status exhibit higher ROA and ROS. Additionally, findings indicate that healthcare organizations opting for self-risk retention generally demonstrate higher profitability. In contrast, organizations situated in regions under Recovery Plans, characterized by heightened state oversight, tend to exhibit lower ROA and ROS. The size of the healthcare organization appears unrelated to the dependent variables, while research hospitals and local health authorities demonstrate greater profitability than teaching hospitals. To further validate our findings, we conducted additional analyses, including the interaction between the total sum of provisions and insurance premiums alongside firm size. Additionally, we instrumented the lagged values of the independent variable (provisions and premiums) to address potential endogeneity, selection bias, and reverse causality concerns. This instrumentation serves as an effective mechanism as it is correlated with the potentially endogenous variables while exhibiting a low correlation with the dependent variable (Bellemare et al., 2017; Soytas et al., 2019; Trinchese et al., 2024). Results align with our earlier findings, thereby confirming the consistency of our results (for details, see Appendices A and B).

Discussion

The issue of malpractice holds significant relevance in Italy (Vetrugno et al., 2022), with existing studies addressing compulsory insurance for local health authorities (Amaral-Garcia & Grembi, 2014; Vainieri et al., 2015) and clinical risk management (Guzzo et al., 2012). This study contributes to the literature by analyzing policy choices at the local government level and integrating these with empirical evidence derived from financial statements, thus providing a comprehensive view of the governance mechanisms involved. This approach facilitates an understanding of potential shortcomings arising from decisions made at the decentralized level (Bolívar et al., 2014), particularly concerning the appropriate allocation of economic resources to address future claims.

Furthermore, the evidence indicates that not all solutions are conducive to economic sustainability. Specifically, a lack of provisions in risk management models poses a significant risk during settlements within the same accounting cycle, potentially exhausting or exceeding available resources. Conversely, over-allocating funds for malpractice claims may detract, taking such money away from alternative healthcare activities in an economic environment characterized by resource scarcity (Berezowski et al.,

Table 4. Pooled OLS regression analysis.

	ROA				ROS			
	b	*SD*	*t*	$p > \|t\|$	*b*	*SD*	*t*	$p > \|t\|$
Prem. prov.	0.006	0.003	2.07	0.039	0.007	0.003	2.61	0.009
debtGDP	−0.023	0.006	−3.62	0.000	−0.018	0.005	−3.53	0.000
Int.Migr	−0.008	0.002	−3.61	0.000	−0.010	0.002	−4.79	0.000
Pop.Growth	0.004	0.001	2.63	0.009	−0.003	0.001	2.90	0.004
Recov. plan	−0.047	0.010	−4.70	0.000	−0.059	0.010	−5.86	0.000
Reg. type	0.028	0.006	4.64	0.000	0.027	0.005	5.48	0.000
Reg. decision	0.029	0.006	4.62	0.000	0.025	0.006	4.25	0.000
Res. hosp.	0.023	0.011	2.18	0.030	0.029	0.010	2.93	0.003
Loc. Auth.	0.046	0.008	5.90	0.000	0.039	0.007	5.30	0.000
Size	0.012	0.008	1.50	0.133	0.006	0.006	0.99	0.323
Time effect	yes				yes			
Observations	865				865			
R-squared	0.187				0.208			

2023; Pinho & Araújo, 2022). Additionally, mismanagement of public funds could result in legal repercussions from the supervisory body of the state administration, namely the Italian Supreme Audit Institution. The unpredictability of claims (Bielen et al., 2020; De Luca, 2021) complicates the estimation of future settlements, particularly concerning catastrophic claims, even with trained personnel (Capocchi et al., 2018; Musson & Helmreich, 2004). Insurance companies echo similar concerns, often offering premiums for full coverage at prices unsustainable for public health administrations, which cannot be controlled through regulation without violating free market principles. Empirical analysis suggests that healthcare organizations that primarily adopt policies aimed at mitigating medical claims risk—either through higher insurance premiums or provisions—tend to exhibit strong financial performance and maintain substantial reserves. Moreover, regions employing self-risk retention models generally demonstrate improved profitability, which is potentially linked to more effective allocation of economic resources, cost savings on premium payments, and enhanced internal risk management policies. This practice reflects a robust control of long-term financial sustainability. Conversely, regions with self-risk retention regions that exhibit low profitability may adopt this model primarily to achieve cost savings. However, the absence of civil obligations with insurance companies to comply with insurance companies creates a greater risk of financial overdraft, particularly if adequate provisions are not established. Based on documentation and interviews, the primary motivation for regions managing these decisions appears to be short-term financial sustainability, which, however, could participate in long-term instability in the event of future claims. Inadequate economic assessments of provisions heighten the risk of future overdrafts and financial imbalances, especially in cases of unpredictable significant damages. This situation presents formidable challenges to financial sustainability, emphasizing the necessity for a thorough evaluation of this phenomenon. Consequently, most regional models include insurance intervention for significant injuries maintaining the management of less complex claims within the public sector. This model allows local health authorities to retain control over claims, identify critical issues, and enhance patient safety (Candido et al., 2023; Mitchell et al., 2016); while effectively coordinating their clinical risk management centers (Bolcato et al., 2019; Guzzo et al., 2012), and ensuring a proper distribution of economic resources. The self-insurance risk threshold must be carefully evaluated based on the frequency and severity of past claims alongside determinants of risk assessment, such as the number of beds, types of units, and employees count. This system allows for coverage of rare yet potentially devastating cases, particularly in a historical context where the COVID-19 pandemic has drained most healthcare resources.

Additionally, financial imbalances within healthcare organizations raise equity concerns, as individuals may experience varying compensation timelines, influenced not only by judicial discretion but also by the specific healthcare organization involved or the region in which the incident occurred. This disparity reflects horizontal inequalities and an unjust variability in compensation for medical malpractice (Sloan et al., 1990). Finally, the empirical analysis indicates that healthcare organizations investing in insurance premiums or setting aside provisions generally achieve higher profitability, underscoring a clear correlation between proactive risk management and financial sustainability. This relationship is particularly pronounced for the most profitable organizations, which tend to incur less debt, are not in regions under recovery plans, and belong to regions that opt for self-risk retention. Moreover, other factors, such as a region's capacity to attract patients and demographic growth, significantly influence the profitability of healthcare organizations. These dynamics reinforce the imperative for developing risk management strategies that enhance financial sustainability.

Among the limitations of the study, it is important to note that, from an empirical perspective, financial statement items regarding insurance premiums paid and provisions made do not exclusively pertain to healthcare liability to third parties, specifically individuals harmed by malpractice. Rather, these items also encompass insurance systems for damages to employees during their duties and other forms of insurance. Although this limitation is not resolvable through the analysis of supplementary notes even through the analyses of the supplementary notes, the emerging findings, combined with the regulatory choices and interviews, regulatory choices and interviews, offer a comprehensive overview of the economic risks associated with claims in healthcare, thereby adequately assessing the financial sustainability of malpractice litigation in the Italian health care system in both the short or long term adequate.

Future research can focus on expanding interviews to other regions to further validate the decisions made by top management. Indeed, certain regions tend to delegate more decision-making authority to local health authorities, given observable internal differences and a desire to retain risk management responsibilities at the local government level. Additionally, analyses could be extended to compare regions within other countries that employ the Beveridge model, where the central government exerts a significant influence over public administration.

Conclusion

The choice of claims management model is particularly complex and closely tied to the economic sustainability of the healthcare organization, especially in a landscape where estimating the financial implications of malpractice claims is challenging. In the absence of legislation or a Unified State Authority to establish minimum standards for insurance or self-insurance regarding health liability risk, there exists a significant risk that regions will not optimally manage their economic resources. This could result in excessive insurance premiums for policies, leading to high overdrafts or inadequate provisions that do not align with their malpractice risk profiles. To address these challenges, it is crucial to equip regions with adequately trained and competent staff capable of effective risk and claims management. Ongoing training is vital, focusing not only on clinical skills essential for resource allocation, establishing provision funds, and evaluating insurance policies. A multidisciplinary approach is imperative, involving specialists from medicine, law, and economics to ensure comprehensive malpractice claims management. Furthermore, the establishment of standardized procedures through best practices or guidelines could promote uniformity in managing malpractice cases. Even in the absence of national-level regulations, such standards can be developed at the regional level or through collaborative networks. A shared framework for claims management would enable comparability of results at the micro level, facilitating the evaluation of interventions and implementation of necessary procedures in response to identified issues. This standardization could significantly enhance the economic sustainability of the healthcare system, providing reference points for justifiable accounting decisions and fostering more informed choices.

Author contributions

All authors were involved in the conception and design of the paper. Vandelli and Trinchese made the data analysis and drafting of the paper. Vainieri provided the interpretation of the data, revised it critically for intellectual content, and provided the final approval of the version to be published. All authors agree to be accountable for all aspects of the work.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The authors have not declared sponsorship or funding from any funding agency in the public, commercial, or not-for-profit sectors.

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Data availability statement

The data that support this study's findings are available upon request from the corresponding author, Anderea Vandelli. The data come from financial statements published by the Italian Ministry of Economy and Finance. Documentation was extracted from websites, libraries, legal databases, and specific requests to government departments. The integral interviews are not publicly available due to the risks of violating the privacy of research participants.

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Appendix A. Robustness test: ROA

	OLS				IV 2SLS			
	b	*SD*	*t*	*p* > |*t*|	*b*	*SD*	*t*	*p* > |*t*|
prem.prov#Size	0.0008	0.0003	2.34	0.019				
L.prem.prov					0.0141	0.0044	3.23	0.001
DebtGDP	0.0230	0.0057	−4.05	0.000	−0.0203	0.0044	−4.65	0.000
Int.Migr	−0.0083	0.0024	−3.52	0.000	−0.0054	0.0023	−2.40	0.017
Pop.Growth	0.0036	0.0014	2.65	0.008	0.0028	0.0010	2.85	0.004
Recov.plan	−0.0474	0.0091	−5.21	0.000	−0.0465	0.0105	−4.41	0.000
Reg.type	0.0273	0.0059	4.65	0.000	0.0342	0.0099	3.46	0.001
Reg.decision	0.0287	0.0061	4.68	0.000	0.0370	0.0085	4.35	0.000
Res hosp	0.0218	0.0103	2.11	0.035	0.0355	0.0141	2.51	0.012
Loc.Auth	0.0456	0.0077	5.92	0.000	0.0516	0.0078	6.63	0.000
Time effect	Yes							
Observations	865				668			
R-squared	0.186				0.175			

Appendix B. Robustness test: ROS

	OLS				IV 2SLS			
	b	*SD*	*t*	*p* > |*t*|	*b*	*SD*	*t*	*p* > |*t*|
prem.prov#Size	0.0006	0.0003	2.37	0.018				
L.prem.prov					0.0126	0.0036	3.53	0.000
DebtGDP	−0.0190	0.0047	−4.07	0.000	−0.0176	0.0036	−4.90	0.000
Int.Migr	−0.0100	0.0021	−4.70	0.000	−0.0076	0.0019	−4.10	0.000
Pop.Growth	0.0029	0.0010	3.02	0.003	0.0018	0.0008	2.32	0.021
Recov.plan	−0.0573	0.0092	−6.24	0.000	−0.0568	0.0087	−6.56	0.000
Reg.type	0.0260	0.0048	5.46	0.000	0.0325	0.0081	4.01	0.000
Reg.decision	0.0225	0.0053	4.22	0.000	0.0301	0.0070	4.32	0.000
Res hosp	0.0259	0.0093	2.78	0.005	0.0397	0.0116	3.43	0.001
Loc.Auth	0.0385	0.0073	5.29	0.000	0.0444	0.0064	6.96	0.000
Time effect	Yes							
Observations	865				668			
R-squared	0.206				0.189			