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Private healthcare expenditure and unmet medical needs: Assessing regional disparities in Italy☆,☆☆

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ABSTRACT

This paper examines the decongestion effect hypothesis by exploring whether higher private healthcare financing is associated with better access to public services, as would be expected if private financing were linked to lower pressure on the public healthcare system. Using data from Italian regions over the period 2017–2022, we consider self-reported unmet needs for specialist visits as an indicator of barriers to access to public services, distinguishing between financial and waiting-time constraints. We estimate a bivariate probit model to analyze the association between regional private healthcare expenditure and unmet specialist visits, controlling for individual socioeconomic characteristics and regional health system features. The findings indicate a positive association, particularly among less affluent individuals. In contrast, higher regional public spending is associated with lower levels of forgone care. Overall, the results do not provide empirical support for the view that greater private financing is linked to better access to public healthcare services. They also raise questions about policy interventions, such as tax incentives for voluntary health insurance, that promote private healthcare financing as a tool to improve the capacity of the public healthcare system to meet patients' needs.

1. Introduction

In recent years, the Italian national health service (*Servizio Sanitario Nazionale –SSN*) has faced growing pressure due to the combined effects of the COVID-19 pandemic, inflation-driven erosion of real resources, chronic underfunding, staff shortages, and population aging, challenging its capacity to deliver timely and universal care. In parallel, private healthcare has continued to expand in both financing and provision (Aracano et al., 2024).

In Italy, this trend is not only demand-driven but also the result of deliberate policy choices, notably the early 1990s reforms.[1] Alongside relatively low public investment, these reforms fostered the growth of voluntary health insurance and private service provision, intensifying the shift toward privately financed care. As a result, the public–private balance has become a central and increasingly polarized policy issue.

Proponents of private-sector expansion in healthcare emphasize its potential decongestion effect. The core argument is that as higher-income individuals opt out of the public system — financing care through out-of-pocket payments (OOP) or voluntary health insurance (VHI) — demand for publicly-financed services declines, thereby freeing up capacity and resources for those who remain reliant on public system.[2]

This claim is grounded in a broader theoretical framework. Besley and Coate (1991), building on earlier contributions by Stiglitz (1974) and Ireland (1990), analyze the expansion of private provision in settings where a public provider coexists, showing how shifting part of demand from the public to the private sector may improve both efficiency and equity in resource allocation. Applied to healthcare, this reasoning has been used to justify policies that promote private financing — such as tax incentives for OOP payments and VHI premia —

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[1] See Section 2.

[2] The effects of expanding private provision and financing on the efficiency and equity of healthcare systems remain contested. Propper and Green (2001) review evidence both supporting and challenging private spending, highlighting potential benefits that extend beyond the decongestion effect, alongside important equity concerns.

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on the grounds that they can improve system performance, despite concerns about their equity implications, as these measures are likely to disproportionately benefit higher-income groups.[3]

However, the decongestion mechanism relies on restrictive assumptions: namely, that public and private services are close substitutes; that those exiting the public system continue to support and finance it; and that private expansion does not crowd out resources or capacity in the public sector. When these conditions do not hold, private-sector growth may instead generate adverse effects. Indeed, a substantial body of literature points in this direction. Private expansion may drain financial and human resources from the public system, exacerbating workforce shortages (Propper, 2000; Propper and Van Reenen, 2010) and undermining access and quality of care (Iversen, 1997; Vaithianathan, 2002; Eckermann et al., 2015). It may also weaken the political support underpinning universal systems (Besley et al., 1999; Costa-Font and Font-Vilalta, 2004). In addition, it can encourage cream-skimming, as private providers tend to select more profitable treatments, leaving to the public sector the most complex patients (Berta et al., 2010; Street et al., 2010). Taken together, these contributions suggest that, rather than relieving pressure on the public system, the expansion of private healthcare financing may increase socioeconomic differences in access to healthcare services.

These competing perspectives highlight the need for empirical investigation of the effects of expanding private healthcare in publicly funded healthcare systems. This is particularly relevant in the Italian context, characterized by decentralized governance and marked regional heterogeneity.

Empirical research in Italy has mainly examined whether private healthcare insurance acts as a substitute for or complement to public healthcare. Fabbri and Monfardini (2016) analyze whether individuals holding duplicate VHI opt out of public services or instead supplement their healthcare consumption.[4] In line with the theoretical predictions of Besley and Coate (1991), their findings support the presence of opt-out behavior: richer and wealthier individuals are more likely to purchase duplicate VHI, increasing their use of private care while reducing reliance on the SSN. Brenna (2025) provides further evidence on the substitution effect, showing that VHI holders are more likely to consult private specialists and undergo privately financed diagnostic examinations, and correspondingly less likely to use public services subject to copayments.[5]

While the literature on the Italian framework provides evidence of substitution between private and public care, it does not assess whether this translates into improved outcomes for patients in the public system. In other words, the decongestion effect remains largely unexplored. More broadly, empirical evidence directly linking private healthcare care financing with the ability of public systems to meet patients' needs is still limited. Existing contributions are scarce and are mostly focused on countries other than Italy. For instance, Yang et al. (2024) provide the first causal evidence for Australia, finding that the decongestion effect is of limited practical significance. Andresciani et al. (2025), using data from 26 European countries, show that higher levels of duplicate VHI coverage are associated with greater unmet medical needs, particularly among lower-income quintiles.

Against this background, the present paper contributes to the literature by examining whether higher regional private healthcare expenditure per capita — capturing both OOP payments and the expenditure covered by VHI schemes — is associated with improved access to healthcare services in the Italian context. We proxy barriers to healthcare access using unmet medical needs for specialist care.[6]

Unmet medical needs refer to situations in which an individual perceives a need for healthcare but does not receive it, or experiences delays in accessing it due to financial constraints, waiting times, or distance/transportation problems — namely barriers to access related to the organization of the healthcare system (Eurostat (2021)).[7] In universal healthcare systems, which formally guarantee access to care for the whole population, unmet medical needs are widely used as an indicator of barriers to healthcare access and as a proxy for limitations in publicly funded service provision. As such, they are widely employed in research and by international institutions in cross-country comparative studies (Allin and Masseria, 2009; Allin et al., 2009; OECD, 2018; Chaupain-Guillot and Guillot, 2015). However, this measure has important limitations. As a self-reported indicator, unmet medical needs may reflect not only objective barriers to care, but also differences in how individuals perceive and report healthcare needs. Recent contributions emphasize the role of social vulnerability, mental health conditions, education, income, and age as correlates of unmet medical needs (Cole and Nguyen, 2020; Hong, 2020; Alemu et al., 2024). More generally, unmet medical needs may partly capture differences in expectations, awareness, and perceived deprivation, in addition to actual barriers to access (Goddard and Smith, 2001; Allin et al., 2010). These features might raise concerns about comparability and measurement validity (Figueras et al., 2023). Nevertheless, unmet medical needs indicators remain a key tool for assessing the extent to which universal healthcare systems succeed — or fail — in translating formal coverage into effective access to care.[8] Indeed, cross-country and regional studies have shown that variations in self-reported unmet medical needs are not only driven by individual socioeconomic characteristics, but are also systematically associated with institutional and organizational features of healthcare systems, including financing arrangements and service availability (Brezzi and Luongo, 2016). In the Italian context, evidence on marked territorial disparities in unmet medical needs further supports their interpretation as a signal of uneven capacity of regional health systems to deliver timely and adequate care. Cavalieri (2013), for example, shows a clear north–south divide in unmet medical needs, with access barriers — especially costs — playing a particularly important role in Southern regions. These geographical disparities persist even after accounting for individual socio-economic and health characteristics. Petrelli et al. (2019) extend the analysis over the period 2004–2015, showing that unmet medical needs increased during the economic crisis, particularly for economic reasons, with the sharpest deterioration observed in Central and, above all, Southern Italy.

Our paper builds on this literature by shifting the focus from documenting territorial and socioeconomic inequalities in unmet medical needs to investigating whether these disparities in access are associated with cross-regional differences in private healthcare financing. Using

[3] For Italy, evidence suggests that these incentives disproportionately benefit higher-income individuals and residents in Northern regions (Marenzi et al., 2021; Brenna, 2018; Di Novi et al., 2018; Ongaro, 2018; Masseria and Giannoni, 2010).

[4] OECD (2023) defines a private health insurance "duplicate" (or "supplementary") if it offers coverage for health services already included under government health insurance, acting as substitute for public healthcare, and "complementary" if it complements the public health insurance by offering services not covered by the latter.

[5] In other countries, findings are mixed: while studies in Australia and Denmark (Cheng, 2014; Doiron and Kettlewell, 2018; Søgaard et al., 2013) suggest substitution effects, evidence from the UK and Spain (Propper, 2000; Besley et al., 1999; Bíró and Hellowell, 2016; Jofre-Bonet, 2000; Costa-Font and Font-Vilalta, 2004; Cantarero-Prieto et al., 2017) remain ambiguous.

[6] While the standard indicator refers to unmet needs for medical examination or treatment more broadly, focusing on specialist services is particularly relevant, as evidence shows that unmet needs are concentrated in areas such as specialist, dental and mental care, where access barriers — especially waiting times and costs — are more pronounced (European Health Observatory (2023)).

[7] This measure is based on standardized questions included in periodically conducted national health surveys and is therefore suitable for comparative studies.

[8] See also on this point Cavalieri (2013).

repeated cross-sectional data covering the 20 Italian regions over the period 2017–2022, we exploit cross-regional and temporal variation in private healthcare expenditure to examine its association with unmet medical needs for specialist visits. Specifically, we estimate a bivariate probit model in which unmet needs due to financial constraints and due to waiting times are modeled jointly. This approach accounts for the possibility that the two forms of unmet needs are driven by correlated unobserved factors. It allows also to estimate their joint occurrence ("double deprivation"), namely the probability of experiencing unmet specialist visits due to both cost and waiting-time barriers simultaneously. All specifications control for a set of individual socioeconomic characteristics, regional healthcare-system features, and year fixed effects.

Our findings indicate that higher private healthcare expenditure at the regional level is positively associated with the likelihood of experiencing unmet needs for specialist visits. This association is more pronounced among economically disadvantaged groups, corresponding to wider inequalities in access. Unmet medical needs for specialist visits are also systematically related to regional healthcare system characteristics. In particular, higher levels of public healthcare expenditure and a greater capacity to ensure an adequate standard of publicly provided services are associated with lower levels of unmet needs for specialist visits.

Overall, these results do not support the decongestion effect argument but rather suggest that policies promoting private healthcare financing through fiscal incentives are unlikely to improve access to services for public-sector patients and may instead exacerbate inequalities in access to care.

The remainder of the paper is structured as follows: Section 2 reviews the institutional context of the Italian national health service; Section 3 presents the data; Section 4 outlines the empirical strategy; Section 5 discusses the results; and Section 6 concludes with policy implications. Appendix includes additional descriptive statistics, multicollinearity diagnostics and the full set of estimation results.

2. Institutional context

The Italian SSN, established in 1978, provides universal coverage to citizens and registered foreign residents and is currently organized into 19 regional health services and two autonomous provinces. The 1978 reform replaced a fragmented system of occupational mutual funds financed through employer and employee contributions with a tax-funded, universalistic model.

A major restructuring took place in the 1990s. The reforms enacted in 1992–93, followed by subsequent measures in 1999 and the 2001 constitutional reform, progressively shifted the system towards a decentralized model.[9] The central government retained a stewardship role, defining the benefits package, allocating resources, and monitoring compliance. Regions were granted extensive responsibilities for the planning, organization, financing, and delivery of healthcare services, including the provision of the Essential Levels of Care (ELC). The latter constitute the set of services and benefits that the national health system is required to guarantee uniformly across the country, either free of charge or subject to co-payments. Regions that fail to ensure financial balance and adequate service provision may be placed under health financial recovery plans (*piani di rientro*).[10]

The 1990s' reforms also introduced elements of quasi-market competition within a Beveridge-type system. In particular, the process of corporatization (*aziendalizzazione*) of public providers and the expansion of the accreditation system fostered a purchaser–provider split and promoted regulated competition between public and private providers (France et al., 2005; Brenna, 2011; Ferroni and Iervolino, 2024). Accredited private providers were increasingly integrated into the publicly funded system and, where contractual agreements are in place, are reimbursed by regional health authorities. By contrast, services delivered by non-accredited private providers are financed directly by households through OOP payments or VHI. Overall, services within the SSN are delivered by a mix of public and contracted private providers with general practitioners acting as gatekeepers to specialist and hospital care.[11] Alongside these supply-side transformations, policy has also supported the expansion of private financing mechanisms, notably through the development of voluntary health insurance encouraged by favorable tax treatment.[12] By 2024, VHI coverage reached an estimated 30% of the Italian population through a combination of occupational schemes and individually purchased policies (Celidoni and Rebba, 2024). Health funds (*fondi sanitari integrativi*) represent the most widespread form of VHI due to their link with occupational schemes. Two main types can be distinguished: Type A funds, which are formally complementary and mainly cover services excluded from the ELC, and Type B funds, which may also finance ELC services and therefore operate in a partially duplicative or substitutive manner. While early fiscal regulation favored Type A funds, subsequent legislative changes progressively relaxed these constraints, allowing Type B funds to expand. As a result, Type B funds have become the dominant component in economic terms (Giannetti et al., 2024). Overall, the regulatory and fiscal framework has contributed to strengthening the role of private actors in both the provision and financing of healthcare, within a system characterized by growing interaction between the public and private sectors.

3. Data

This section describes the data and variables used in the empirical analysis assessing the association between individual-level unmet needs for specialist visits (USV), which constitutes the outcome variable, and regional private healthcare expenditure (PHE) which represents the main regressor of interest. Information on the former is obtained from the *Aspects of Daily Life* (ADL) survey for the period 2017–2022.[13] Conducted by ISTAT, the survey provides repeated cross-sectional data on individuals' socioeconomic characteristics, health status, daily activities, and region of residence.[14] The survey does not have a longitudinal design; instead, each wave constitutes an independent cross-section representative of the resident population. Information on PHE is drawn from *Monitoraggio della spesa sanitaria 2024 – Rapporto n.11* by Italian Ministry of Finance (2024). The report is based on data collected through the Health Insurance Card System, a centralized digital platform that records individuals' use of healthcare services and the corresponding expenditures. Additional regional-level data are drawn from

[9] The regionalization of the healthcare system has led to the adoption of different models and approaches across regions. Some have focused more on hospital services, while others have emphasized prevention and community-based care.

[10] They impose stricter monitoring and corrective measures aimed at restoring fiscal sustainability and compliance with national standards.

[11] In 2023, data from the Italian Ministry of Health indicate that, out of 29,386 registered healthcare facilities, 58% were accredited private entities and 42% were public. This distribution highlights the significant role of private accredited providers within the system, although their importance varies across regions (Ministero della Salute, 2023).

[12] Italian personal income tax rules permit deductions for medical expenses exceeding a certain threshold and for health-insurance premiums paid to qualifying mutual funds, effectively providing fiscal incentives that support private healthcare financing.

[13] The year 2017 is the first year in which information on USV is available in the survey.

[14] In the ADL microdata, Trentino-Alto Adige is coded as a single regional unit, so the autonomous provinces of Trento and Bolzano — which are two separate entities in the SSN — cannot be separately identified. The analysis therefore treats the region as a single territorial unit throughout.

Fig. 1. Share of individuals reporting USV in Italy, 2017 and 2022.
Notes: Red bars report the overall incidence of USV, while blue, orange, and green bars denote USV due to costs, waiting times, and other reasons, respectively. The category "USV due to other reasons" includes barriers related to distance, transportation, opening hours, childcare responsibilities, and work constraints. Since multiple responses were allowed, the components do not sum to the total.
Source: Author's elaboration based on ISTAT-ADL data.

ISTAT *Health for All* database and the report *Monitoraggio dei LEA attraverso il Nuovo Sistema di Garanzia – Relazione 2022,* by Lispi et al. (2024).

3.1. Unmet needs for specialist visits

Self-reported unmet need for specialist visits (*USV*) are derived from the ADL survey.[15] Respondents are asked whether, *in the previous 12 months, they had to forgo any specialist visit despite needing it.*[16] Individuals answering affirmatively are then asked to report the underlying reasons, including costs and long waiting times.[17] The analysis distinguishes between USV due to costs and those due to waiting times, as these reflect conceptually distinct barriers to care. Accordingly, two binary outcome variables are defined: USV_cost and USV_wait.

Descriptively, Fig. 1 shows that overall USV declined only marginally at the national level — from 7.5% in 2017 to 7.0% in 2022 — and points to an important shift in their composition. Between 2017 and 2022, the share of USV due to costs declined, whereas the share attributable to waiting times increased markedly. Part of this shift is plausibly related to the disruption in healthcare provision during and after the pandemic. However, as shown in Table 1, the increase in waiting-time-related barriers had already emerged before 2020, suggesting that the pandemic may have amplified pre-existing access pressures. Besides, Table 1 highlights that the share of individuals reporting both cost- and waiting-time-related barriers declined but remained far from negligible.

Table 1
Distribution of USV due to costs and/or waiting times.
Source: Author's elaboration based on ISTAT-ADL data.

	2017	2019	2022
Due to cost	1949 (60.6%)	1430 (56.4%)	771 (35.8%)
Due to waiting	444 (13.8%)	695 (27.4%)	1056 (48.9%)
Both	822 (25.6%)	411 (16.2%)	329 (15.3%)
Total	3215 (100%)	2536 (100%)	2156 (100%)

Fig. 1 also highlights substantial regional heterogeneity. While waiting-time-related barriers increased in most regions, financial constraints remain comparatively more relevant in Southern ones.

[15] Specialist visits exclude dental care, GP visits, emergency care, and inpatient services.

[16] A similar analysis based on unmet diagnostic examinations — measured through the item *in the previous 12 months, [they] had to forgo any diagnostic examination despite needing them* — yields comparable results, which are not reported here for brevity.

[17] From 2020 onward, "COVID-19" was introduced as a response option; these observations are excluded in order to focus on barriers not explicitly attributed by respondents to the pandemic.

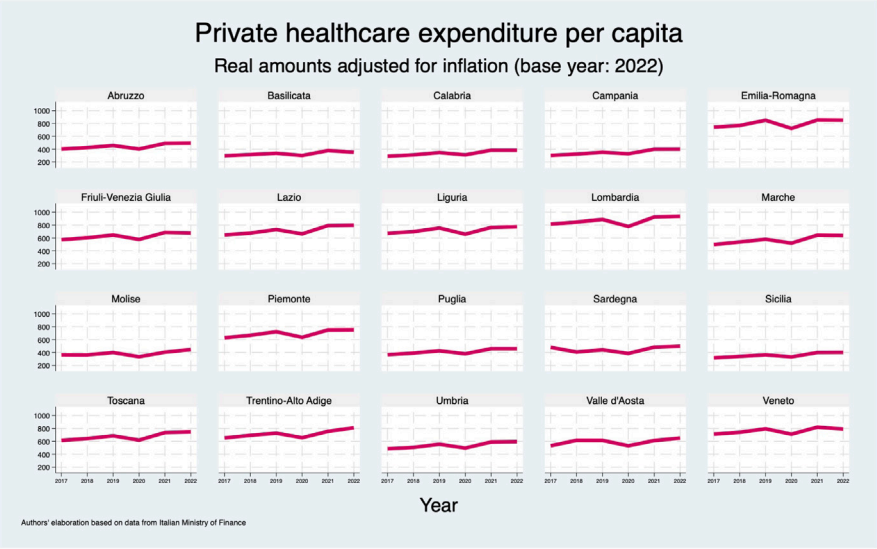


Fig. 2. Trend of PHE in per capita terms across Italian regions (2017–2022).
Source: Author's elaboration based on data from the Italian Ministry of Finance.

3.2. Private healthcare expenditure

In the present study, *PHE* includes both OOP payments and expenditure covered by VHI schemes.[18]

Private healthcare expenditure per capita increased across most Italian regions over the period considered, although with marked territorial heterogeneity. As shown in Fig. 2, the highest per-capita levels are observed in several Centre–North regions, including Emilia-Romagna, Lombardia, Veneto, Lazio and Liguria, whereas lower values are recorded in many Southern regions, such as Calabria, Basilicata and Sicilia.This territorial pattern is consistent with previous evidence documenting a North–South gradient in private healthcare expenditure in Italy (OCPS, 2018). More broadly, it also reflects the role of socioeconomic and demographic factors in shaping regional health inequalities: higher income levels and stronger local economic conditions may increase households' ability to purchase privately financed healthcare services, while population ageing may contribute to higher healthcare needs and greater demand for specialist and diagnostic care (Brenna, 2018; Franzini and Giannoni, 2010). In addition, the higher incidence of private expenditure in Centre–North regions may also be related to the greater diffusion of occupational welfare schemes and supplementary health funds linked to collective agreements and firm-level welfare arrangements, which tend to be more widespread in economically stronger areas of the country (Celidoni and Rebba, 2024). Importantly, the increase in *PHE* does not appear to be only a pandemic-related phenomenon, since real per-capita private expenditure was already rising in most regions before 2020.

A further descriptive comparison is provided in Fig. 3, which reports the indexed trends of private and public healthcare expenditure per capita across regions.[19] In most regions, both private and public expenditure display an upward trend over the period considered, suggesting no clear compensatory pattern in the strict sense. At the same time, private expenditure generally follows a steeper and more volatile trajectory than public expenditure, with a more pronounced slowdown around 2020 and a stronger increase thereafter. Overall, the figure points to a growing role of private expenditure alongside a more gradual increase in public spending.[20]

The expanding relevance of private financing is also reflected in the individual-level data on payment methods for specialist visits. As shown in Fig. 4, between 2017 and 2022 the share of individuals paying entirely out of pocket for specialist visits increased nationally from 38.4% to 42.8%, while the share relying on VHI rose from 3.4% to 4.6%. This shift appears particularly visible in several Centre–North regions, including Lombardia, Piemonte, Emilia-Romagna and Lazio. Taken together, these descriptive patterns point to a progressive strengthening of private financing channels in specialist care.

3.3. Covariates

Beyond PHE, the empirical analysis includes individual and regional controls.

Individual-level information is drawn from the ISTAT ADL survey and is available for all waves considered in the analysis (2017–2022). These variables capture respondents' demographic characteristics, socioeconomic position, and self-reported health conditions. The pooled ADL waves (2017–2022) initially consist of 269,645 individual observations. After excluding observations with missing values, the estimation sample includes 244,283 observations.

Regional-level covariates are matched to individuals on the basis of region of residence and survey year, and are included to capture cross-regional differences in healthcare-system resources, financial capacity, and institutional performance. Information on healthcare supply and public expenditure is obtained from the ISTAT *Health for All* database. Indicators of regional healthcare-system performance and governance are drawn from the Ministry of Health report on compliance with the ELC (Lispi et al., 2024). In Appendix, Table 4 summarizes the variables used in the analysis while Table 5 reports descriptive statistics.

All continuous regressors are standardized to improve numerical stability and comparability of coefficients (Appendix, Table 6). Multicollinearity is not a concern, as all adjusted generalized variance

[18] The available administrative data do not allow us to separately identify the two components; accordingly, the empirical analysis can only evaluate their combined association with unmet needs for specialist visits.

[19] Private healthcare expenditure is drawn from the MEF report, consistent with the main regressor used in the empirical analysis, while public healthcare expenditure is drawn from the Health for All database. For descriptive purposes and to make the relative dynamics of the two series directly comparable, both are indexed to 2017 = 100 within each region.

[20] This is consistent with the evidence reported in the Rapporto Osservasalute (2025), using data from the Health for All database.

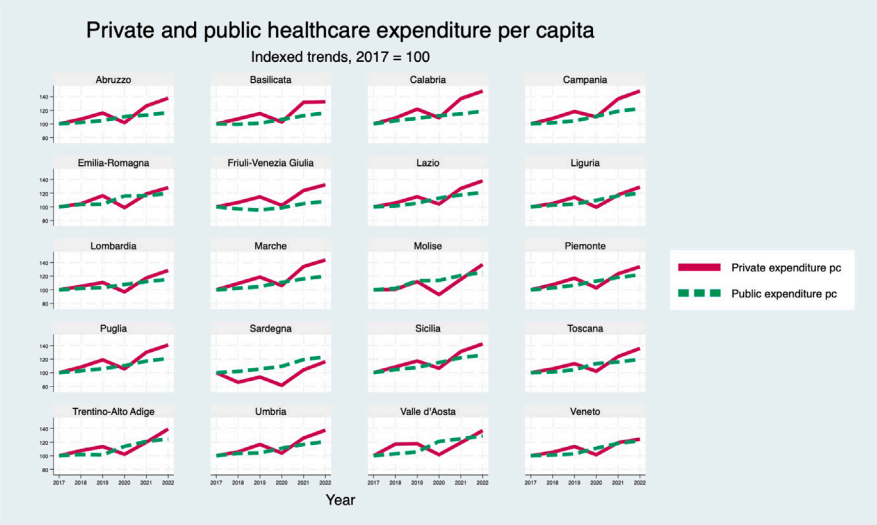


Fig. 3. Indexed trends of private and public healthcare expenditure per capita across Italian regions (2017 = 100).
Source: Authors' elaboration based on MEF and Health for All data.

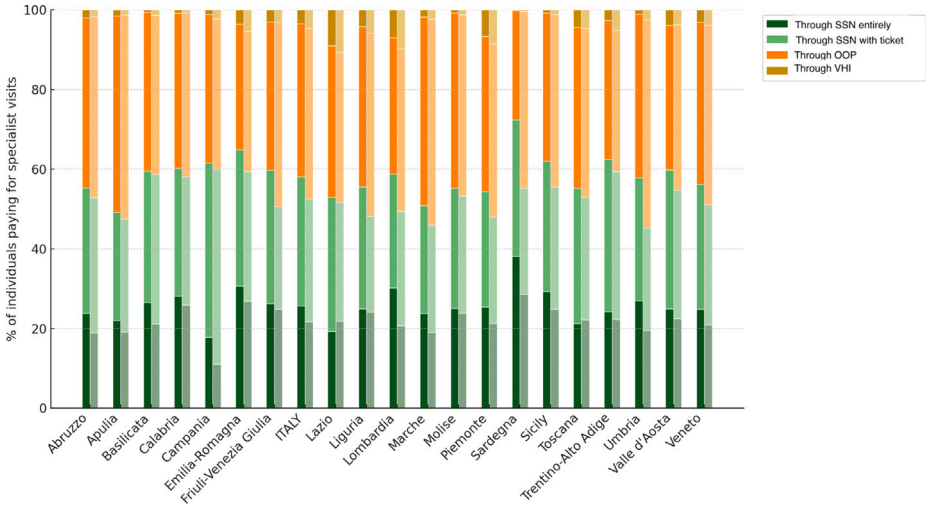


Fig. 4. Payment methods for specialist visits (dark bar: 2017; light bar: 2022).
Source: Author's elaboration based on ISTAT-ADL data.

inflation factors (aGVIF) remain below standard thresholds (Appendix, Tables 7–8).[21]

4. Methodology

To account for the potential correlation between different types of barriers to healthcare access, we implement a bivariate probit model. This approach is appropriate as forgoing care due to financial constraints may not be independent of forgoing care due to waiting times barriers. Ignoring such potential correlation between the error terms of the two equations would lead to inefficient estimates and potentially biased inference if unobserved factors influence both outcomes simultaneously. Specifically, we estimate the following bivariate probit model:

$$\begin{cases} USV\_cost^{*}_{ijt} = \mathbf{X}'_{ijt}\boldsymbol{\beta}_1 + \mathbf{R}'_{jt}\boldsymbol{\beta}_2 + F_t + \epsilon_{ijt} \\ USV\_wait^{*}_{ijt} = \mathbf{X}'_{ijt}\boldsymbol{\gamma}_1 + \mathbf{R}'_{jt}\boldsymbol{\gamma}_2 + F_t + u_{ijt} \end{cases}$$

where $USV\_cost^{*}_{ijt}$ and $USV\_wait^{*}_{ijt}$ denote the latent propensities of a generic respondent i, observed in survey year t and residing in region j, to report unmet specialist visits due to costs and waiting times, respectively.[22] The observed binary outcomes are defined as $USV\_cost_{ijt} = 1$ if $USV\_cost^{*}_{ijt} > 0$ and 0 otherwise, and similarly for USV_wait_{ijt}.

The error terms are assumed to follow a bivariate normal distribution:

$$\begin{pmatrix} \epsilon_{ijt} \\ u_{ijt} \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right)$$

The parameter ρ captures the correlation between the unobserved determinants (error terms) of USV_cost_{ijt} and USV_wait_{ijt}. Testing $H_0 : \rho = 0$ provides evidence on whether the two unmet-need reasons are jointly driven by common latent factors; hence, if $\rho \neq 0$, joint estimation yields more efficient estimates (smaller standard errors and

[21] Fox and Monette (1992) recommended using the aGVIF for categorical predictors with more than two levels. Critical threshold for aGVIF is $\sqrt{10}$.

[22] Since ADL consists of repeated cross-sections, the index i identifies a generic individual within survey wave t and does not refer to the same person observed across multiple years.

Table 2
Bivariate probit: Coefficient signs of individual and RHS regressors.

	USV	
	Cost	Wait
Gender (ref: Male)		
Female	+***	+***
Age (ref: 0–17)		
18–29	+***	+**
30–49	+***	+***
50–65	+***	+***
65+	+***	+**
Education (ref: Primary)		
Secondary/Post-secondary	+***	+***
Tertiary	+	+***
Employment status (ref: Employed)		
Unemployed	+***	–
Retired	–***	–
Not working	–***	–*
Economic conditions (ref: Adequate)		
Excellent	–*	–
Scarce	+***	+***
Absolutely insufficient	+***	+***
Health status (ref: Fair)		
Good/very good	–***	–***
Bad/very bad	+***	+***
MRI scans	–	+
Public beds	+***	+
Specialist NHS doctors	+*	+
General practitioners	+	+
Public health exp. (pc)	–***	–
Private health exp. (pc_{t-1})	+	+**
Health financial recovery plan (ref: No)		
Yes	+**	+
ELC score (hospital area)	–*	/
ELC score (district area)	/	–***
athrho:	+***	
Wald test of $\rho = 0$:	***	
Year FEs:	Yes	
Observations:	244,283	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Symbols "+" and "–" denote sign of the coefficient.
Athrho is the Fisher transformation of the correlation parameter $\rho = 0$ used to facilitate estimation. If significant, it indicates correlated unobserved determinants of unmet need due to cost and waiting times, supporting the bivariate specification.
Clustered standard errors at regional level.

higher statistical power) than estimating two separate probit models, supporting the bivariate specification.

The vector $\mathbf{X}_{ijt}$ includes individual-level covariates capturing demographic characteristics, socioeconomic conditions, and self-reported health status. The vector $\mathbf{R}_{jt}$ includes regional healthcare-system characteristics, selected to capture three broad dimensions that may be associated with the likelihood of experiencing USV: financial resources, supply-side capacity, and institutional performance.[23]

The financing dimension includes PHE, while controlling for regional public healthcare expenditure per capita. To mitigate endogeneity concerns, PHE enters the model with a one-year lag.

Supply-side capacity is proxied by indicators of healthcare inputs and service availability, namely the density of Magnetic Resonance Imaging (MRI) scanners in public hospitals, public hospital beds, general practitioners, and SSN specialist doctors. These variables are intended to capture differences across regions in the structural availability of publicly provided care.

The model also controls for institutional and performance indicators, namely regional scores on the provision of the ELC in the hospital and district areas.[24] Additionally, we include a dummy for regions subject to a healthcare financial recovery plan, reflecting the presence of stricter fiscal supervision and healthcare governance constraints. These variables capture differences in healthcare-system functioning and governance constraints.

We estimate the direct association between the likelihood of reporting USV and the full set of individual and regional level variables. The specification includes year fixed effects (F_t), which absorb common time-specific shocks affecting all regions, including those related to the pandemic period. Standard errors are clustered at the regional level to account for potential correlation in the error terms across individuals within the same region.

We then extend the model by introducing an interaction term between regional *PHE* and individual *Economic condition* to examine whether the association between private healthcare expenditure and USV varies across economic status, thereby investigating the plausibility of the decongestion argument. Specifically, if decongestion mechanisms are at work, higher regional PHE — largely financed by better-off individuals — is expected to be associated with lower pressure on the public healthcare system and, consequently, with improved access for those who rely primarily on public provision. These

[23] As a robustness check, the model was also re-estimated including the net per-capita financial balance of inter-regional healthcare mobility, to account for cross-regional patient flows. The variable is drawn from Agenas (2023). It was never statistically significant, and its inclusion left the main results unchanged. Given its high correlation with other regional healthcare-system characteristics, it is omitted from the baseline specification.

[24] The ELC monitoring framework annually evaluates regional healthcare-system performance through indicators covering different areas of care provision. A score of 60 represents the minimum threshold for adequacy in each area of care.

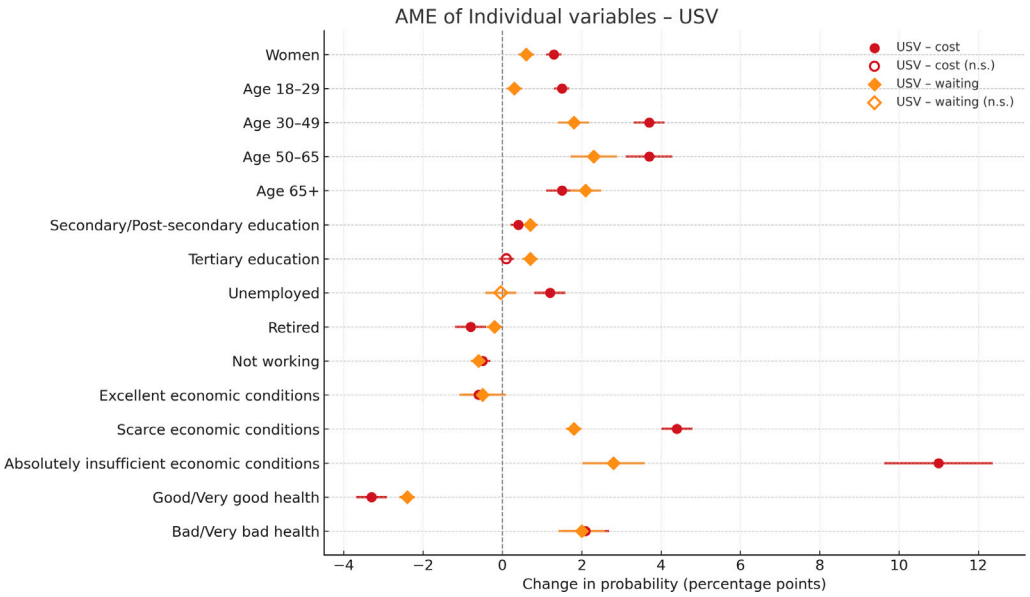


Fig. 5. Average marginal effects of individual regressors.

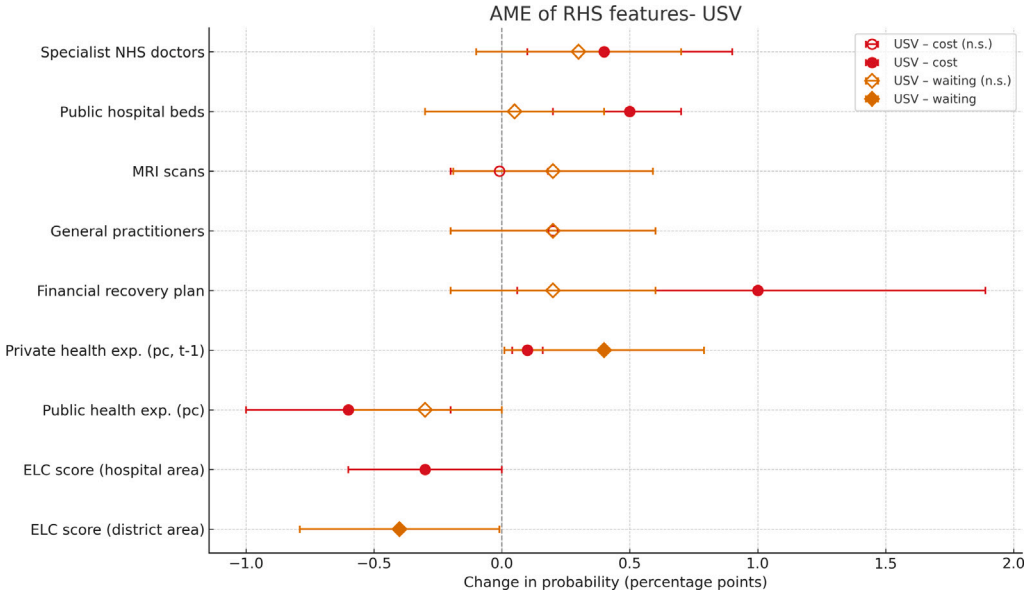


Fig. 6. Average marginal effects of regional healthcare system features.

Table 3
Association between private healthcare expenditure and USV across economic conditions.

Private health exp.$_{pc,\ t-1}$	Pr(USV_cost = 1)	Pr(USV_wait = 1)	Pr(USV_cost = 1 &USV_wait = 1)
	+**	+**	+**
Economic conditions × *Private health exp.*$_{pc,\ t-1}$ (*ref: Adequate*)			
Excellent	−**	+	−
Scarce	+	+*	+*
Absolutely insufficient	+**	+*	+**

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Symbols "+" and "–" denote positive/negative marginal effects.
The first two columns display the univariate probabilities of reporting distinctly USV due to costs/due to waiting times.
The third column show the probability of experiencing both barriers at the same time.

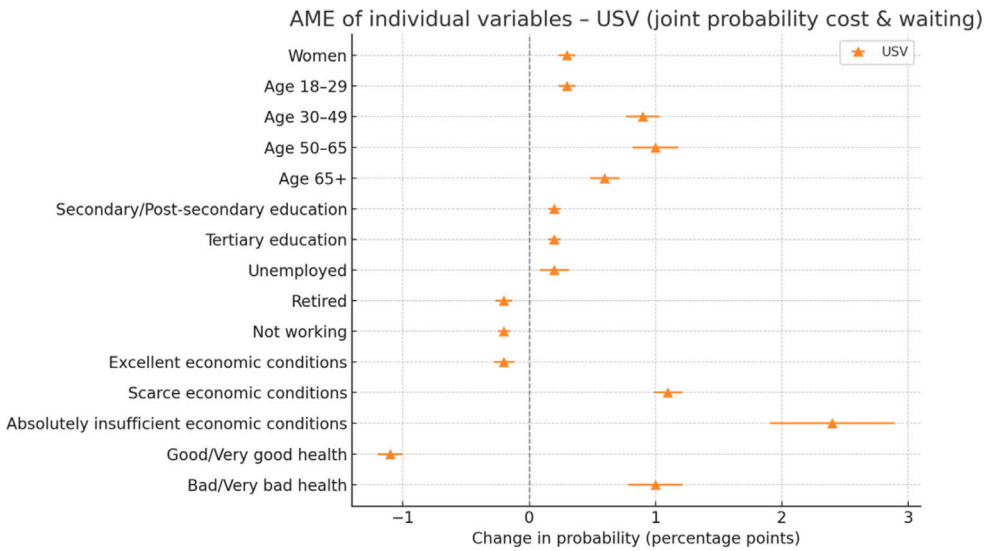


Fig. 7. Bivariate probabilities of "double deprivation" (individual regressors).

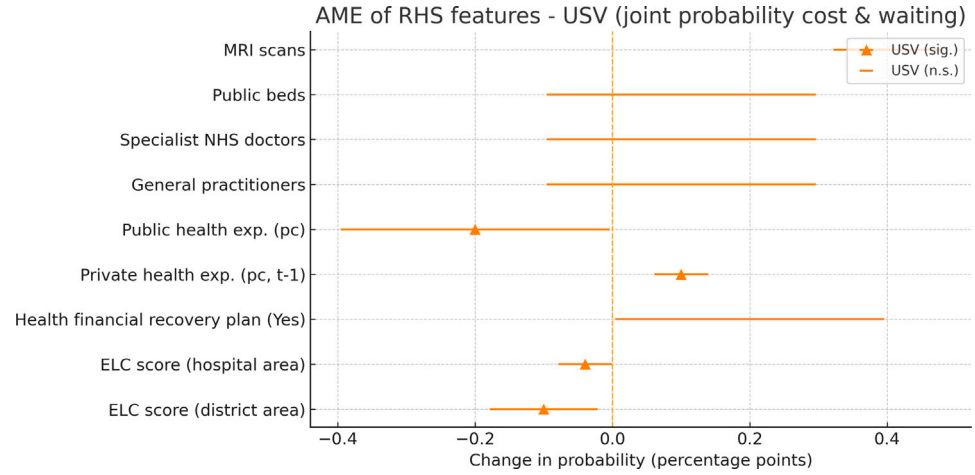


Fig. 8. Bivariate probabilities of "double deprivation" (regional healthcare system regressors).

individuals are plausibly more likely to belong to less affluent groups, as more limited financial resources may constrain access to private healthcare options and, therefore, reduce the possibility of turning to private channels.

5. Results

Table 2 and Figs. 5 to 8 report the results of the bivariate probit model and of the joint probability of simultaneously experiencing cost and waiting-time-related USV ("double deprivation").[25] Since probit coefficients are not directly interpretable in terms of probabilities, in the figures results are presented using average marginal effects.[26] Note that the estimated correlation coefficient ρ is positive and statistically significant, supporting the joint modeling of costs and waiting times barriers.

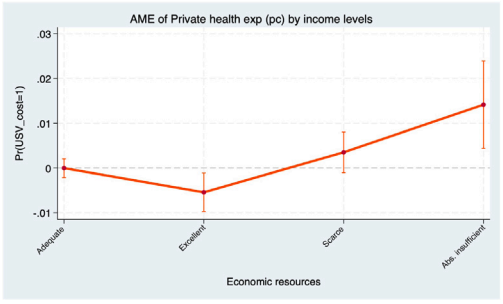
The main finding is a positive association between PHE and USV, although its strength varies considerably across household economic conditions, as reflected in the average marginal effects of the interaction term (Table 3; Fig. 9). For cost-related USV (Table 3, Fig. 9(a)), increases in PHE are associated with negligible or slightly negative changes among individuals reporting adequate economic resources, suggesting some protection against financial barriers. In contrast,

among those reporting absolutely insufficient resources, a one standard-deviation increase in PHE is associated with an approximately 1.4 percentage points (pp) higher probability of USV. A similar gradient emerges for waiting-time-related USV (Table 3, Fig. 9(b)). While PHE is only weakly associated with USV among individuals with more favorable economic conditions, the association is substantially stronger among the most economically disadvantaged: a one standard-deviation increase in PHE is associated with an approximately 0.8 pp higher likelihood of experiencing USV. This pattern is also observed when considering the joint probability of facing both barriers simultaneously (Table 3, Fig. 9(c)). Among people who report absolutely insufficient economic resources, a higher PHE is associated with an approximately 0.5 pp higher probability of experiencing "double deprivation, while the association is negligible between groups with more favorable economic conditions.

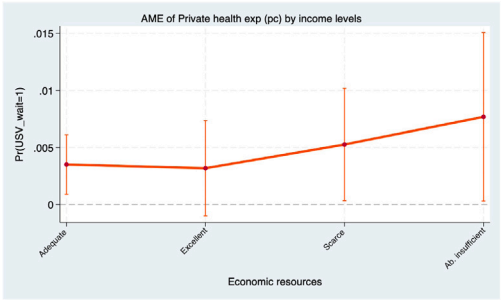
Overall, these findings provide no support for the decongestion effect. Greater regional private healthcare expenditure is associated

[25] Full estimation results are reported in Appendix (Tables 9–10).

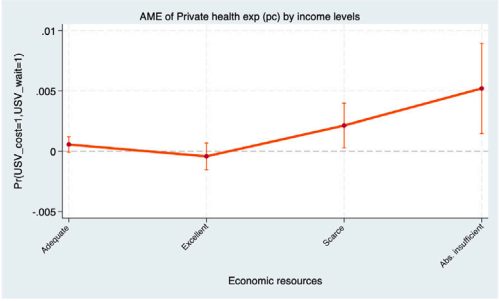
[26] Recall that, in our specification, continuous regressors are standardized, so average marginal effects measure the change in the outcome for a one standard deviation increase in the covariates.



(a) Pr(USV_cost = 1).



(b) Pr(USV_wait = 1).



(c) Pr(USV_cost = 1 & USV_wait = 1).

Fig. 9. Average marginal effects of interaction terms between *Economic conditions* and *PHE*.

with a higher incidence of unmet specialist visits, particularly among less affluent groups. For these groups, the association is especially strong when financial and waiting-time barriers occur simultaneously. We emphasize that our analysis identifies associations rather than causal effects. The observed positive relationship between PHE and self-reported unmet specialist visits is therefore compatible with several, non-mutually exclusive mechanisms, as discussed in the Introduction. In particular, we cannot rule out reverse causality, whereby higher unmet needs may induce greater reliance on privately financed care (Purcel et al., 2023). In that respect, our main and more cautious conclusion is that the evidence—especially the widening gap in self-reported unmet needs for specialist visits between more and less affluent individuals—is not consistent with the observable implication of the decongestion effect argument.[27]

Among other features of the regional healthcare system, some variables emerge as significant. Higher public healthcare expenditure per capita is consistently associated with lower USV, particularly for cost-related barriers, underscoring the protective role of public financing. System performance also matters: higher ELC scores are negatively associated with USV.[28] In addition, regions under health financial recovery plans show higher levels of cost-related USV.

Supply-side indicators — including MRI scanners, public hospital beds, SSN specialists and general practitioners — show mixed and sometimes counterintuitive associations with USV. Although greater public capacity would be expected to ease access, these positive associations may reflect contexts in which larger supply is accompanied by greater service intensity and stronger demand pressure. Consistent with the literature on supplier-induced demand, greater provider availability may increase referrals, follow-up visits, and diagnostic procedures (Roemer, 1961; Fuchs, 1978; Delattre and Dormont, 2003), thereby increasing the intensity of healthcare utilization.[29] This interpretation suggests that expanding healthcare capacity alone may be insufficient to improve access to specialist care.

Turning to individual characteristics, a clear pattern emerges. Conditional on health status, being female, middle-aged, or unemployed is positively associated with USV. Most notably, household economic conditions stand out as the strongest correlate.(see Table 2, Figs. 5, and 7). The gradient by economic status is strong and systematic. Relative to individuals with "adequate" economic resources, those declaring their resources as "absolutely insufficient" exhibit higher probability of USV in both dimensions considered. The largest differential concerns cost barriers: the most economically disadvantaged group is about 11 pp more likely to forgo specialist visits. Differences are also evident for waiting times, at nearly 3 pp. Moreover, the likelihood of experiencing double deprivation rises by more than 2 pp among the most disadvantaged. Taken together, these results indicate that economic vulnerability is not merely one risk factor among many, but the primary divider between full and constrained access to care.

6. Concluding remarks and policy implications

In recent years, the role of private healthcare financing has become increasingly central to the Italian policy debate, particularly in relation

[27] Another possible mechanism relates to what Marmot (2005) refers to as social (relative) deprivation, which may become more pronounced as higher-income individuals increasingly rely on private healthcare and obtain faster and better treatment. We thank the referee for highlighting this possible interpretation of the results.

[28] Since ELC scores are highly correlated, they were included in the estimations one at a time. In the paper, we present one representative specification; the findings obtained from the other combinations of ELC scores are qualitatively similar and are available upon request.

[29] One possible explanation is that additional healthcare resources may be absorbed by low-value care, unnecessary diagnostic procedures, or inefficient care pathways rather than being directed towards patients with greater clinical need. This interpretation is consistent with the overuse–underuse paradox, whereby healthcare systems may simultaneously provide excessive low-value care while failing to deliver necessary high-value care (Hofmann, 2025). Defensive medical practices may further reinforce this process by encouraging additional or precautionary service use despite limited marginal clinical benefit (Zheng et al., 2023).

to the claim that greater private involvement may alleviate pressure on the SSN through a so-called decongestion effect.

This study investigates the association between regional private healthcare expenditure and access to public specialist care across Italian regions over the period 2017–2022.

Using individual-level data on unmet needs for specialist visits as a proxy for access to public healthcare services, we assess the relationship between private healthcare expenditure and unmet needs, controlling for individual socioeconomic characteristics and regional health system features. To jointly account for cost and waiting-time barriers, we rely on a bivariate probit model.

The analysis yields four main insights. First, we find no evidence of a decongestion effect: higher levels of regional private healthcare expenditure are not associated with better access to public specialist services, that is with a decrease in the probability of experiencing unmet needs. Second, unmet specialist visits are strongly patterned by socioeconomic conditions, with financial constraints representing a key driver of forgone care. Third, disparities by economic status are wider in regions characterized by higher levels of private healthcare expenditure: while higher regional private spending is associated with a greater likelihood of reporting unmet specialist visits for all individuals, this relationship is stronger among economically disadvantaged groups and attenuates with economic status. Finally, higher levels of public healthcare expenditure per capita are consistently associated with lower levels of unmet specialist visits, particularly those driven by financial barriers, underscoring the importance of public investment in promoting equitable access.

From a policy perspective, these findings suggest that reducing unmet medical needs for specialist visits requires interventions that directly address socioeconomic inequalities and disparities in access linked to household economic conditions. Policies aimed at expanding private financing are unlikely to achieve this objective and may, under certain conditions, exacerbate existing inequalities.

Two limitations should be acknowledged. First, while self-reported unmet needs are widely used as proxies for access to healthcare, they should be interpreted with caution, as they may capture not only material barriers to care but also individual perceptions, expectations and reporting behavior. Second, the regional data employed do not allow to disaggregate private healthcare expenditure into out-of-pocket payments and voluntary health insurance mediated payments, which may have distinct implications for access. Specifically, unmet needs may be higher in settings where out-of-pocket payments prevail over voluntary health insurance, as the former lack the mutual risk-pooling mechanism inherent in insurance schemes. If (administrative) data were to become available, future research could build on more granular information to disentangle these components and further investigate the relationship between private health expenditure and unmet medical needs.

CRediT authorship contribution statement

Clara Andresciani: Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Debora Di Gioacchino:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Laura Sabani:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Ethics declaration

The author(s) declare(s) that the study does not involve humans nor animal subjects.

Declaration of AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT for editing and proofreading. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of this article.

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Table 4
Variables description and data source.

Variable	Description	Years	Level	Data source
USV_cost	Binary; equals 1 if the individual reports unmet specialist visits due to financial constraints, 0 otherwise.	2017–2022	Individual	ISTAT-ADL
USV_wait	Binary; equals 1 if the individual reports unmet specialist visits due to waiting-time barriers, 0 otherwise.	2017–2022	Individual	ISTAT-ADL
Age	Categorical; age class.	2017–2022	Individual	ISTAT-ADL
Gender	Binary; 0 if male, 1 if female.	2017–2022	Individual	ISTAT-ADL
Education	Categorical; highest level of education attained.	2017–2022	Individual	ISTAT-ADL
Employment status	Categorical; labour-market status.	2017–2022	Individual	ISTAT-ADL
Economic condition	Categorical; self-reported household economic status.	2017–2022	Individual	ISTAT-ADL
Health status	Categorical; self-reported health status.	2017–2022	Individual	ISTAT-ADL
MRI scanners	Continuous; number of MRI scanners in public hospitals per 100,000 inhabitants.	2017–2022	Regional	ISTAT-HFA
Public beds	Continuous; number of ordinary public hospital beds per 100,000 inhabitants.	2017–2022	Regional	ISTAT-HFA
General practitioners	Continuous; number of general practitioners per 100,000 inhabitants.	2017–2022	Regional	ISTAT-HFA
Specialist SSN doctors	Continuous; number of specialist doctors employed by the SSN per 100,000 inhabitants.	2017–2022	Regional	ISTAT-HFA
Public healthcare expenditure (pc)	Continuous; public healthcare expenditure per capita, in euros.	2017–2022	Regional	ISTAT-HFA
Private healthcare expenditure (pc)	Continuous; private healthcare expenditure per capita, in euros.	2017–2022	Regional	Italian Ministry of Finance (2024)
Health financial recovery plan	Binary; equals 1 if region j is subject to a *piano di rientro*, 0 otherwise.	2017–2022	Regional	Lispi et al. (2024)
ELC score – hospital area	Continuous; regional performance score for the provision of ELC in the hospital area.	2017–2022	Regional	Lispi et al. (2024)
ELC score – district area	Continuous; regional performance score for the provision of ELC in the district area.	2017–2022	Regional	Lispi et al. (2024)

Notes: "pc" denotes per capita; MRI = Magnetic Resonance Imaging; ELC = Essential Levels of Care.

Table 5
Descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max
USV_cost	0.04	0.20	0	1
USV_wait	0.03	0.17	0	1
Gender	0.5	0.5	0	1
Age	3.4	1.3	1	5
Education	1.6	0.7	1	3
Employment_status	2.4	1.3	1	4
Economic_conditions	1.7	1.0	1	4
Health_status	1.8	0.5	1	3
MRI_scans	1.8	0.4	0.9	3.1
Public_beds	241.2	43.9	128.8	322.9
Specialist_SSN_doctors	201.3	59.9	121.7	384.4
General_practitioners	71	8.1	55.3	86.9
Public_health_exp_pc	2029.4	187.3	1708	2595
Private_health_exp_pc_t-1	505.8	166.3	237.2	855.2
Health_financial_recovery_plan	0.38	0.48	0	1
ELC_score_hospital_area	75	12.7	40.7	94.7
ELC_score_district_area	73.9	16.2	31.25	98.4
Observations: 244 283				

Table 6
Descriptive statistics of standardized continuous regressors.

	Mean	Std. dev.	Min	Max
MRI_scans	.0014	1	−2.16	3.23
Public_beds	.0003	1	−2.56	1.86
Specialist_SSN_doctors	.003	1	−1.33	3.06
General_practictioners	.0007	1	−1.94	1.98
Public_health_exp_pc	.0045	1	−1.71	3.02
Private_health_exp_pc_t-1	.0007	1	−1.61	2.10
ELC_score_district_area	.0012	1	−2.63	1.51
ELC_score_hospital_area	.0006	1	−2.69	1.55
Observations:		*244 283*		

Table 7
Correlation matrix.

	MRI scans	Public beds	Specialist doct	General doct	Public exp	Private exp	ELC district	ELC hospital
MRI_scans	1.00							
Public_beds	0.30	1.00						
Specialist_doc	0.06	0.02	1.00					
General_doc	0.11	−0.20	0.01	1.00				
Public_exp	0.44	0.29	0.36	−0.29	1.00			
Private_exp	0.24	0.54	−0.13	−0.68	0.37	1.00		
ELC_district	0.10	0.37	−0.04	−0.39	0.12	0.71	1.00	
ELC_hospital	0.08	0.48	0.08	−0.45	0.21	0.71	0.70	1.00

Table 8
aGVIF coefficients.

(a) Cost analysis		(b) Waiting analysis	
Variable	aGVIF	Variable	aGVIF
Age	1.15	Age	1.17
Gender	1.07	Gender	1.07
Employment_status	1.22	Employment_status	1.24
Economic_conditions	1.02	Economic_conditions	1.02
Education	1.07	Education	1.08
Health_status	1.07	Health_status	1.07
MRI_scans	1.29	MRI_scans	1.23
Specialist_SSN_doc	1.25	Specialist_SSN_doc	1.19
General_practitioners	1.93	General_practitioners	1.86
Public_beds	2.00	Public_beds	1.87
Public_health_exp	1.37	Public_health_exp	1.36
Private_health_exp	2.37	Private_health_exp	2.30
ELC_hospital	1.69	ELC_district	1.55
Recovery_plan	2.24	Recovery_plan	2.08

Appendix

Data and descriptive statistics

See Tables 4–6.

Multicollinearity analysis

See Tables 7 and 8.

Full set of estimation results

See Tables 9 and 10.

Table 9
Average marginal effects.

	Pr(USV_cost = 1)	Pr(USV_wait = 1)
Gender (ref: Male)		
Female	0.013***	0.006***
	(0.001)	(0.001)
Age (ref: 0–17)		
18–29	0.015***	0.003***
	(0.001)	(0.001)
30–49	0.037***	0.018***
	(0.002)	(0.002)
50–65	0.037***	0.023***
	(0.003)	(0.003)
65+	0.015***	0.021***
	(0.002)	(0.002)
Education (ref: Primary)		
Secondary/Post-secondary	0.004***	0.007***
	(0.001)	(0.001)
Tertiary	0.001	0.007***
	(0.001)	(0.001)
Employment status (ref: Employed)		
Unemployed	0.012***	−0.0004
	(0.002)	(0.002)
Retired	−0.008***	−0.002**
	(0.002)	(0.001)
Not working	−0.005***	−0.006***
	(0.001)	(0.001)
Economic conditions (ref: Adequate)		
Excellent	−0.006***	−0.005*
	(0.002)	(0.003)
Scarce	0.044***	0.018***
	(0.002)	(0.001)
Absolutely insufficient	0.110***	0.028***
	(0.007)	(0.004)
Health status (ref: Fair)		
Good/Very good	−0.033***	−0.024***
	(0.002)	(0.001)
Bad/Very bad	0.021***	0.020***
	(0.003)	(0.003)
MRI scans	−0.0001	0.002
	(0.001)	(0.001)
Public beds	0.005***	0.0005
	(0.001)	(0.002)
Specialist SSN doctors	0.004*	0.003
	(0.002)	(0.002)
General practitioners	0.002	0.002
	(0.002)	(0.002)
Public health exp. (pc)	−0.006***	−0.003
	(0.002)	(0.002)
Private health exp. (pc, t-1)	0.001**	0.004**
	(0.002)	(0.002)
Health financial recovery plan (ref: No)		
Yes	0.010**	0.002
	(0.005)	(0.001)
ELC score (hospital area)	−0.003**	
	(0.001)	
ELC score (district area)		−0.004**
		(0.002)
Year FE	Yes	
Observations	244,283	

Clustered standard errors at regional level in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10
Average marginal effects on the joint probability.

	Pr(USV_cost = 1 & USV_wait = 1)
Gender (ref: Male)	
Female	0.003***
	(0.0004)
Age (ref: 0–17)	
18–29	0.003***
	(0.0004)
30–49	0.009***
	(0.0008)
50–65	0.010***
	(0.0011)
65+	0.006***
	(0.0007)
Education (ref: Primary)	
Secondary/Post-secondary	0.002***
	(0.0003)
Tertiary	0.002***
	(0.0003)
Employment status (ref: Employed)	
Unemployed	0.002***
	(0.0007)
Retired	−0.002***
	(0.0004)
Not working	−0.002***
	(0.0003)
Economic conditions (ref: Adequate)	
Excellent	−0.002***
	(0.0005)
Scarce	0.011***
	(0.0007)
Absolutely insufficient	0.024***
	(0.003)
Health status (ref: Fair)	
Good/Very good	−0.011***
	(0.0006)
Bad/Very bad	0.010***
	(0.0013)
MRI scans	0.004
	(0.0004)
Public beds	0.001
	(0.001)
Specialist NHS doctors	0.001
	(0.001)
General practitioners	0.001
	(0.001)
Public health exp. (pc)	−0.002***
	(0.001)
Private health exp. (pc, t-1)	0.001**
	(0.002)
Health financial recovery plan (ref: No)	
Yes	0.002
	(0.001)
ELC score (hospital area)	−0.0004**
	(0.0002)
ELC score (district area)	−0.001**
	(0.0004)
Year FE	Yes
Observations	244,283

Clustered standard errors at regional level in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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