Inter-regional patient mobility in decentralised Spain: Explaining regional budget imbalances

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Abstract
Inter-regional patient mobility represents both a resource and a challenge for the organization and financing of health systems, particularly in decentralised countries. We use cross-sectional time series regression analysis to test the determinants of imbalances in regional funds to finance inter-regional patient mobility for the 17 Spanish regions for the period 2014–2020. The findings indicate that highly specialised health centres and bilateral agreements partly explain the budget imbalance from inter-regional patient referrals, while local tourism partly explains the budget imbalance from non-referred patient mobility. Developing effective national schemes to compensate net patient recipient regions would be fundamental to addressing territorial imbalances.

KEYWORDS
balance of payments, bilateral agreements, cross-border patient mobility, decentralisation, healthcare, national health system

Highlights
Inter-regional patient mobility contests effective coverage in decentralised National Health Systems
Specialised health centres and local tourism are key to explaining imbalances
1 | INTRODUCTION

Inter-regional patient mobility—that is, the movement of patients between regions within a country\(^1\) - represents both a challenge and a resource for health systems. On the one hand, it calls into question the organization and financing of health provision, which is often conceived as responding to the health needs of a specific, bounded territory. On the other hand, inter-regional patient mobility may be a solution to capacity or size constraints of health systems (especially in remote or border areas, or in relation to highly specialised treatments), fostering economies of scale and more efficient service provision.

The literature has mainly focused on cross-border patient mobility (cross-border movements between countries),\(^2\)\(^-\)\(^4\) a topic that has gained great attention among scholars and policymakers in Europe after the ratification of Directive 2011/24/EU on patients’ rights in cross-border healthcare.\(^5\) In and beyond Europe, scholars have studied why patients move to receive healthcare abroad (a phenomenon more generally known as ‘transnational medical mobility’, or ‘transnational medical tourism’).\(^6\)\(^,\)\(^7\) However, we must also pay attention to patient mobility taking place within national borders, which is crucial for decentralised health systems. Socioeconomic inequalities may prevent vulnerable populations from facing costs related to health referrals to another region\(^5\); therefore, guaranteeing inter-regional patient mobility is a matter of health equity across the national territory.

Moreover, hospital specialisation within a country is influential in attracting inter-regional patients and retaining patients from other regions.\(^8\) Hence, developing appropriate financial and coordination arrangements is key to responding to patient mobility across regional systems in and beyond Europe.\(^5\)\(^,\)\(^9\)\(^-\)\(^12\) At the same time, the decentralisation of health systems can produce budget imbalances between regions due to different administrative and political competencies and socioeconomic levels,\(^13\) which can be further exacerbated by inter-regional patient mobility. There is also evidence on spatial patient flows regarding outpatient services, which highlights the relevance of accessibility to explain inter-regional patient flows.\(^14\)

The literature on spatial determinants of healthcare accessibility,\(^15\)\(^-\)\(^17\) especially with a focus on hospital services, has highlighted the relevance of quality-driven mobility. Patients tend to move from poorer to richer regions, and from those with less to more technological advances, while patients satisfied with the quality of healthcare received in their region do not move to receive treatments. However, this stream of research has mainly focused on systems which guarantee free patient choice across their territory (and to a large extent on the case of Italy), something that is not necessarily the case for other decentralised systems. Therefore, we need to examine what factors might explain the budgetary imbalances of regions for providing public healthcare to mobile patients seeking hospital and outpatient services.

Moving beyond the pros and cons of inter-regional patient mobility, our paper focuses on how it impacts budget equilibriums across regions in decentralised health systems and the factors explaining regions’ positive or negative balance of payments in relation to it. To this end, we focus on inter-regional patient mobility regarding primary, hospital and highly specialised services in Spain (for referred and non-referred patients). In the Spanish decentralised and tax-funded health system (Sistema Nacional de Salud [SNS] by its Spanish acronym), the central government –via the Ministry of Health– regulates the right to healthcare and the basic arrangements of coordination and financing.\(^18\)\(^-\)\(^20\) The 17 regional governments have significant powers in configuring, managing, and (partially) financing their regional health services. Importantly, they are responsible for the provision of services to their resident population.
Starting with seven regions in the mid-1980s, the decentralisation process culminated in 2002, consolidating the SNS as a multilevel governance structure. Recognising the potential challenges of healthcare decentralisation (territorial health inequalities, regional imbalances), the SNS Cohesion and Quality Act 16/2003 stipulated, among other things, the right to healthcare for Spanish citizens regardless of their region of residence. To this end, the Health Cohesion Fund (Fondo de Cohesión Sanitaria [FCS] by its Spanish acronym) was introduced as a tool for the financial compensation of regions for the cost of treatments provided to patients referred from other regions (referred patients). It is important to note that patients’ freedom of choice of health providers across regions is not possible in the Spanish public health system. The possibility of receiving public health treatments in another region is subject to referral from the person’s competent regional health system (residence-based).

Between 2008 and 2012, the FCS was endowed with an annual budget of between 80 and 100 million euros. To complement its operation, the Health Care Guarantee Fund (Fondo de Garantía Asistencial [FOGA] by its Spanish acronym) was created under Royal Decree-Law 16/2012 to compensate regions for the treatments provided to patients who, for whatever reason, needed healthcare during a stay in another region (non-referred patients). In sum, the FCS is designed to compensate regions for treating referred patients (e.g., Region A sends resident X to Region C to get a coronary bypass). In contrast, the FOGA is designed to compensate regions for treating non-referred patients who temporarily move to another region, such as local tourists (e.g., Region A treats residents from Region B while on summer holidays).

Importantly, the 2012 Decree-Law modified these funds from ‘budgetary’ (direct financing from the Ministry of Health to net receiving regions via the General State budget) to ‘extra-budgetary’ ones (no financing via the General State budget, with the Ministry of Health limiting itself to managing the compensation system). As a result, the resources allocated to these funds have drastically reduced over the last decade: 36 million euros in 2013, 22 million in 2014, 2 million in 2015, 0 in 2016, and some 3.7 million euros since 2017.

Nevertheless, every year, more than 4 million people in Spain (i.e., around 10% of the population) receive healthcare in a region other than the one in which they reside. How does the lack of an appropriate national compensation fund generate creditors and debtors within the Spanish decentralised system? What factors may explain regions’ positive/negative balance of payment in relation to inter-regional patient mobility?

To answer these questions, we use secondary data from the central and regional Spanish Ministries of Health and the National Institute of Statistics to describe the budgetary imbalances due to inter-regional patient mobility and understand these imbalances’ determinants, differentiating between referred and non-referred inter-regional patients. Specifically, we use time-series cross-section regression analyses (TSCS) to test hypotheses derived from the literature and answer the research questions, using the 17 Spanish regions as the unit of analysis for the period 2014–2020.

To our knowledge, only a few studies have examined inter-regional patient mobility in Spain. Cantarero studied the period before the completion of healthcare decentralisation, while Blázquez-Fernández et al. did not include any years after the defunding of the FCS. On the contrary, Perna et al. focused on the different institutional arrangements developed in the country to respond to patient mobility. The novelty of our paper is the study of inter-regional patient mobility in a period where there is no effective national scheme to compensate net patient recipient regions, allowing us to show which regions are mobility funds’ net emitters and net receivers and to examine the drivers of those budgetary (im)balances (surpluses or deficits). With no effective national scheme to compensate for inter-regional patient mobility, patient-net-receiving regions with budgetary deficits are the clear losers in terms of fiscal costs. These regions witness adverse effects on their economies, introducing a fiscal risk factor that hinders or disincentivizes the enforcement of effective coverage across the entire national territory, particularly for those requiring medical attention in a region where they do not reside. The implications of this study go beyond Spain and could be relevant for countries with decentralised public health governance, especially those with budgetary issues. The results call for coordination and proper financing to guarantee effective health coverage in decentralised health systems.
The paper proceeds as follows. The next section reviews existing literature on patient mobility to develop our theory-based hypotheses. Section 3 describes the research design, procedures, and measurements. The hypotheses are tested in Section 4, which reports the TSCS regression analyses. The fifth section discusses our main contributions and potential implications for health policy in decentralised or multilevel systems. The article ends with a conclusion and policy recommendations.

2 | PATIENT MOBILITY IN A DECENTRALIZED HEALTH SYSTEM: DRIVERS IN THE LITERATURE AND HYPOTHESES

Four primary drivers of patient mobility can be identified in the literature: regulatory issues (e.g., financial incentives, highly-specialised centres, horizontal cooperation agreements), service availability (e.g., a low endowment of beds, waiting times, distance to hospitals), macroeconomic factors (e.g., income, healthcare expenditure), and individual characteristics (e.g., the severity of illness or proximity to health infrastructures, which are not the object of this study). As drivers of patient mobility, we expect these factors to drive regional health systems’ budget imbalances: a net increase in inter-regional patient mobility will directly produce imbalances for regional health services.

Starting with the regulatory dimension, specialized centres are usually created to address problems of scale (treatments that need to be designed for a large population to work effectively and efficiently) and the rising costs of introducing new health technologies and expensive drug treatments. Intuitively, their existence in a decentralized health system will foster inter-regional patient mobility from regions without specialized centres to regions hosting them. However, territorial inequality in distributing these highly specialized resources might be problematic, as previous studies point out. In Italy, patient freedom choice and regulated tariffs increase the flow of patients from Southern regions to Central-Northern ones, worsening the traditional North-South cleavage in the Italian health system. Likewise, Brekke et al. examine patient mobility between regions differing in healthcare technology, pointing out how those regions with the more expensive technology provide better healthcare quality, thus serving as a magnet for inter-regional patients living in regions with less efficient technology.

In Spain, 84% of highly-specialized centres (the so-called Centros, Servicios y Unidades de Referencia [CSUR] by its Spanish acronym) are located in 4 of the 17 regions, reflecting and strengthening pre-existing funding inequalities in the Spanish SNS. Due to the influx of patients from all parts of the country into CSUR, we expect regions with a higher number of highly specialised centres to be net receivers of funds from inter-regional referred patients. We can break down the FCS total aggregate into three Annexes to see the positive and negative balances in inpatient care (Annex I), outpatient procedures (Annex II), and CSUR (Annex III) for referred inter-regional patient mobility. As the FCS’s annexe III provides for coverage and compensation for patients referred explicitly to these centres, we hypothesize that.

H1 The relationship between the number of CSUR and the balance of the FCS’s annexe III is positive. The presence of highly specialised centres partly explains the positive balance of mobility funds in net-receiving regions.

Existing institutional arrangements between health systems, such as bilateral agreements, may also foster patient mobility. These agreements provide a framework for the healthcare services inter-regional patients can enjoy in a particular region (healthcare entitlement and coverage, reimbursement mechanisms, etc.), a phenomenon often referred to as ‘institutionalised patient mobility’. Similar to specialised health centres, bilateral agreements might also solve capacity or size constraints of regional health systems, thus fostering economies of scale in healthcare provision.

Currently, in Spain we can reconstruct the existence of more than 50 protocols, conventions and agreements on horizontal healthcare cooperation among the 17 regions, although the economic crisis of the early 2010s greatly reduced the signature of new agreements. Horizontal collaboration has been essential for coordinating healthcare
provision, particularly between bordering regions. These agreements should facilitate inter-regional patient mobility in the absence of an efficient coordination mechanism at the state level. Funding comes from the region of origin of mobile patients, and health care is provided by the region of destination. We expect bilateral agreements to reduce the credit of patient-receiving regions (annexes I and II of the FCS, which compensate inpatient and outpatient care for referred patients) because funds are going to be provided by patient-emitters regions. Therefore,

**H2** The relationship between the number of bilateral agreements signed and the balance of FCS’s annexes I and II is negative. The signing of bilateral agreements on inter-regional patient mobility partly explains the negative balance of mobility funds in regions with more agreements.

Beyond referred patient mobility, however, healthcare services in decentralised systems are usually expected to provide treatments to those individuals who may be in need of unplanned care when staying in a different region than the one of residence for whatever purpose (e.g. work, leisure). From this perspective, intra-national mobility motivated by reasons other than healthcare may also affect regional health resources. We use local net tourism as a proxy of intra-national population mobility. Intuitively, regions receiving a larger number of local tourists would also be more likely to have higher budgetary imbalances in providing healthcare for potential patients on a temporary stay in their territory. This phenomenon is well known in relation to international tourism and lifestyle migration.34,35 The pioneer regional cross-border hospital of Puigcerdà, a Spanish locality on the border with France, serves as an example of the relevance of considering the inflow of tourists for budgetary imbalances.1 Cerdagne in France is populated with around 15,000 inhabitants. At the same time, in high season, the total population goes up to 130,000 people.30 The medical facilities on the French side are limited, so in 1996, bilateral agreements facilitated treating patients in Puigcerdà, Spain. Even with bilateral agreements, “the hospital was not remunerated for 52% of the costs of services provided to French patients”.1,36

Transposing these insights into our study on inter-regional mobility, local net migration should also be considered a potential determinant of budgetary imbalances for inter-regional patients. In 2020, 58% of the annual overnight stays in a Spanish region other than their residence were concentrated in just four regions (Andalusia, Castile and Leon, Valencia and Castile-La Mancha). These regions would have a larger part of non-referred patients than other regions, and they should be compensated with the FOGA. Valencia’s Health Counsellor argues that the Central government owes 926 million euros for treating mobile patients (the vast majority—more than 840 million euros—for treating Spanish residents from other regions). 23.1 million euros pertain to referred patients (who must be compensated by FCS), and 744.4 million euros relate to non-referred patients who received hospital or primary care services (who must be compensated by FOGA).37 We, therefore, expect receiving regions of local tourism to be net receivers of funds from inter-regional non-referred patients.

**H3** The relationship between the number of overnight stays by local tourists and the balance of FOGA settlements is positive. Net local tourism partly explains the positive balance of net recipient regions of non-referred patient balances.

Moving to the question of service availability and quality, research is ambiguous in its explanatory power on patient mobility. On the one hand, decentralised health systems with free patient mobility might result in a long-run reduction of voluntary inter-regional mobility due to quality levelling-up across regions.38 In other words, free patient choice pushes regions to level up healthcare quality. On the other hand, it might lead to an increase in mobility due to unequal supply factors across regions (e.g., availability of services, faster and better-quality healthcare).39 Empirical evidence from Spain and Italy shows that a low endowment of hospital beds and staff (i.e., nurses and physicians) is a critical driver of patient mobility.23,39 The higher the quality gap between regional healthcare providers, the larger the number of patients who seek inter-regional healthcare.8,40 We expect regions with high levels of satisfaction with the health service, hospital beds, and low waiting times to be magnets for inter-regional patients. On the contrary, regions
that are relatively well off and provide good services will have less patient mobility among their residents because they already received quality healthcare from their regional health service provider.15

Regarding macroeconomic factors, Brekke et al. show that as income disparities across countries increase, the cross-border inequality in health provision increases, fostering patient mobility.10 Budget constraints also affect patient mobility. Beraldo et al. argue that austerity policies reduce social expenditure-induced inter-regional patient mobility to receive adequate care.61 Patients living in regions with cost-containment policies increased their healthcare costs and opportunities,42 and more affluent and patient-net-receiving regions see a reduction in their healthcare opportunities due to an excessive influx of patients (residents plus visitors). Richer regions and those with more technological advances attract patients from poorer regions.16 We expect regions with high levels of health expenditure and high-income levels to be magnets of inter-regional patients.

3 | RESEARCH DESIGN AND MEASUREMENTS

3.1 | Procedure

The variables of the model have been chosen according to the existing literature and the information provided in semi-structured interviews we carried out with 11 key informants of the Spanish health system in the framework of the research project ‘Articulation of specialised health care for mobile patients between Autonomous Regions in a decentralised National Health System’ (Health Ministry, Health Departments of Regions, national patients’ associations, health area of the Spanish Ombudsman) (see more details in the Appendix (Tables A1)).

We conduct a time-series cross-section regression analysis to test the impact of the highly specialised centres CSUR, bilateral agreements, and tourism on the budgetary balances of the two funds dedicated to inter-regional patient mobility in the decentralised Spanish health system. First, we test the explanatory power of the CSUR with the part of the FCS designed to finance referred inter-regional patient mobility to specialised health centres (annex III). Secondly, we test the explanatory power of bilateral agreements with the part of the FCS designed to finance referred inter-regional patient mobility for inpatient and outpatient care (annexes I and II). Third, we test the explanatory power of tourism with the FOGA, which is dedicated to compensating treatments for non-referred patients. Finally, we test the explanatory power of the three variables for the total budgetary balance of both funds (FCS and FOGA) destined to finance inter-regional patient mobility in Spain. We examine the entire data availability period, allowing us to review from 2014 to 2020.

Following the literature, we also incorporate five controls reflecting additional drivers of patient mobility and, hence, budget imbalances. The controls allow us to include more potential explanatory variables into the model and ensure that the relationship between the variables is not fraudulent.43 Panels of cross-sectional and time series data generally exhibit contemporaneous correlations between units (regions) and unit levels of heteroscedasticity, producing incorrect standard errors in linear least squares regressions. Following Beck and Katz,44 panel standard errors are corrected using the pces function of Bailey and Katz45 in the R statistical program. Least squares standard errors are fixed with an estimator of the covariance matrix of the estimated parameters, which Beck and Katz44 call panel-corrected standard errors. We incorporated a series of additional sensitivity tests based on the discussion by Wilson and Butler on the potential limitations of time-series cross-section regression analysis. This allows us to check if the estimation results are robust to alternative specifications.46

3.2 | Operationalisation

The dependent variable of the paper is the balance of settlements of the FCS and FOGA funds. The balance of payment provides information on whether the regions are net senders (negative balances) or net receivers (positive balances) of patient mobility funds. The net sender regions have a lower healthcare expenditure for treating fewer inter-regional
patients than the expenditure incurred by the other regions in treating their residents (i.e. the negative balance is the equivalent of the debt owed to other regions). Conversely, the net receiving regions spend more on treating inter-regional patients than the other regions spend on treating their residents (i.e. the positive balance is a credit owed to them by other regions). The three explanatory variables are (1) the current number of highly specialised health centres, CSUR; the number of bilateral agreements signed on horizontal healthcare cooperation for patient mobility; (3) the number of annual overnight stays of residents in Spain in a region other than that of their residence (i.e., local net tourism). Table 1 describes the indicators used in the analysis to operationalise the dependent variable, the three explanatory and control variables. Each indicator is defined, along with the data availability and source of data. The summary statistics of the indicators used are provided in the Appendix (Table A2).

4 | RESULTS

4.1 | Debtor and creditor regions in Spain: Crossing the budgetary (im)balances patient mobility funds

By crossing the balances of the FCS and FOGA funds in a scatterplot (Figure 1), we can create a simple typology of regional budgetary (im)balances to identify debtor and creditor regions and regions with mixed results in both funds. Wherein Figure 1, the X-axis shows the balance in the FCS fund for referred patients, and the Y-axis shows the balance in the FOGA fund for non-referred patients. Quadrant I shows the net creditor regions with positive balances in both funds (Valencia, Cantabria and Andalusia). Quadrant II includes regions that are debtors in the FCS (negative balance) but creditors in FOGA (positive balance) (Castile and Leon, Castile-La Mancha, Galicia, Balearic Islands, La Rioja, Murcia, Navarre and Extremadura). Quadrant III shows net debtor regions with negative balances in both funds (Aragon, Canary Islands, Asturias and Basque Country). Finally, quadrant IV indicates regions that are debtors in FOGA (negative balance) and creditors in FCS (positive balance) (Catalonia and Madrid).

If we look at the relationship between the FCS’s Annex III balance and the number of CSURs, Madrid and Catalonia are the Spanish regions with the highest number of CSURs on the budget balance for inter-regional mobility funds. Most regions have less than seven CSURs, and except for Cantabria, all of them have a negative balance in the FCS Annex III fund destined for referred patients treated in CSURs.

Regions with the highest number of bilateral agreements have negative balances in the FCS Annex I and II funds (Castille and Leon, and Aragon stand out from the rest of the Spanish regions). However, regions with the lowest number of bilateral agreements do not necessarily have a positive balance in their FCS Annex I and II Funds (Murcia and Andalusia have only one bilateral agreement—the lowest of Spanish regions - but are debtors of funds destined for referred patients).

Examining the connection between the FOGA balance and local tourism reveals that Valencia, Andalusia, and Castile and Leon appear to be the ones with the highest effect of local tourism on budget balance for inter-regional mobility funds. On the contrary, Madrid and the Basque Country are the ones with the lowest local tourism and negative balance in the FOGA fund.

Considering this heterogeneous picture, and to understand the drivers of regional budget imbalances related to patient mobility, the following section tests the hypothesis developed above.

4.2 | Explaining the regional budgetary (im)balances for referred inter-regional patient mobility: The FCS fund

First, we conduct a TSCS regression analysis between the number of CSUR and Annex III of the FCS’s budgetary (im)balances in each region (model 1 in Table 2). As predicted, regions with more CSUR in their territories tend to


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<th>Indicator</th>
<th>Description</th>
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| Budgetary balance       | Presents the positive and negative balances of the FCS and FOGA, making it possible to identify the regions that are net senders (negative data) and net receivers (positive balances) of settlements. This dependent variable is operationalised with three indicators: Annex III FCS balance (to measure referred patient mobility towards highly specialised centres) Annex I and II FCS balance (to measure referred patient mobility for inpatient care and outpatient procedures), and the FOGA balance (to measure non-referred patient mobility) | 2014–2020   | Ministry of health, consumer affairs and social welfare
government of the Canary Islands, regional government of Andalusia, ministry of health, consumer affairs and social welfare |
| CSUR                    | Number of CSUR (national health system reference centres, services and units) in a region for the respective reference year                                                                                                         | 2014–2020   | Ministry of health, consumer affairs and social welfare government of the Canary Islands, regional government of Andalusia, ministry of health, consumer affairs and social welfare |
| Bilateral agreements    | Number of health cooperation agreements and conventions in place on inter-regional patient mobility for the reference year                                                                                              | 2014–2020   | Autonomous region reports of the NHS for the year 2016; agreements processed by the senate and published in the BOCG-senate (2014–2020); autonomous community reports of the institute of public law (2000–2018). |
| Net local tourism       | Number of annual overnight stays of residents in Spain in regions other than the one of residence. Thousands of overnight stays.                                                                                                                                                | 2015–2020   | National institute of statistics. Resident tourism survey               |
| Public health expenditure| Regional public health expenditure per inhabitant covered by the public health system. Population included in the individual health card database.                                                                                                                            | 2014–2020   | Ministry of health, consumer affairs and social welfare. Key indicators of the national health system. |
| Satisfaction with the SNS| Degree of citizen satisfaction with the functioning of the public health system. Average of the satisfaction ratings on a Likert scale from 1 ("very dissatisfied") to 10 ("totally satisfied"). For the calculation of the values of this indicator, the values "don't know" and "no answer" have not been considered.                              | 2014–2019   | Ministry of health, consumer affairs and social welfare. Key indicators of the national health system. |
| Beds per inhabitant     | Hospital beds in operation per 1000 inhabitants: The annual average of the beds in service is considered, regardless of their degree of use or occupancy.                                                                                                                  | 2014–2020   | Ministry of health, consumer affairs and social welfare. Key indicators of the national health system. |
| Waiting time            | Average time, expressed in days that patients have been waiting for the first consultation in specialised care, from the date of entry into the register to the end date of the study period                                                                 | 2014–2020   | Ministry of health, consumer affairs and social welfare. Key indicators of the national health system. |
have a greater probability of being net recipients of intra-regional patients referred for highly specialised care and, therefore, more positive FCS balances (creditors). This translates to regions providing services that are expected to be compensated by the patients’ regions of residence. We then incorporate the control variables expected to impact the balance of the regions: health expenditure, satisfaction with the public health system, hospital beds per capita, GDP per capita and waiting list for specialised care (model 2 in Table 2). After controlling for all these relevant variables, the number of CSURs maintains their degree of significance and explanatory power. Holding everything else constant, each CSUR implies an increase of approximately 148,816 euros in the balance of the region’s Annex III of the FCS (i.e., for every CSUR, a region becomes indebted for treating referred inter-regional patients in about 150 thousand euros).

Second, we test the effect of bilateral agreements on budgetary balances of Annex I and II of the FCS (model 3 in Table 2). The number of bilateral agreements shows a negative and statistically significant relationship with this fund’s balance at the 0.05 level. Therefore, and as predicted, bilateral agreements reduce the budgetary balance of regions. This could be explained by the fact that some existing bilateral agreements establish alternative sources for

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<th>Indicator</th>
<th>Description</th>
<th>Years</th>
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<tr>
<td></td>
<td>deflator data are used to transform current values into constant values.</td>
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<td>Bank</td>
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Note: 2014 FOGA data refer to FOGA pharmacy and do not include FOGA primary care.

Abbreviations: CSUR, Centros, Servicios y Unidades de Referencia; FCS, Fondo de Cohesión Sanitaria; FOGA, Fondo de Garantía Asistencial; GDP, Gross Domeric Product; NHS, National Health Systems; SNS, Sistema Nacional de Salud.

FIGURE 1 2020 Regional budgetary balances of inter-regional patient mobility funds.
### Table 2: Time-series cross-section regression analysis with panel-corrected standard errors to explain the regional budgetary (im)balance of 17 regions between 2014 and 2020.

<table>
<thead>
<tr>
<th></th>
<th>FCS balance—Annex III</th>
<th>FCS balance—Annex I &amp; II</th>
<th>FOGA balance</th>
<th>Total balance (FCS + FOGA)</th>
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<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
<td>CSUR</td>
<td>173,163*</td>
<td>148,816*</td>
<td></td>
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<td></td>
<td>(20,449)</td>
<td>(20,593)</td>
<td></td>
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<td></td>
<td>(23,662)</td>
<td>(49,732)</td>
<td></td>
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<tr>
<td>Net tourism</td>
<td></td>
<td></td>
<td>244.72*</td>
<td>216.69*</td>
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<td></td>
<td></td>
<td></td>
<td>(19.69)</td>
<td>(13.18)</td>
</tr>
<tr>
<td>Health expenditure</td>
<td>-5416**</td>
<td>-17,126*</td>
<td></td>
<td>10,390</td>
</tr>
<tr>
<td></td>
<td>(1243)</td>
<td>(5454)</td>
<td></td>
<td>(2154)</td>
</tr>
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<td>Satisfaction with NHS</td>
<td>1,190,020</td>
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<td>2,465,479</td>
<td>4,314,185</td>
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<tr>
<td></td>
<td>(460,962)</td>
<td>(1,108,068)</td>
<td>(1,520,097)</td>
<td>(1,844,595)</td>
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<td>Hospital beds per capita</td>
<td>-324,200</td>
<td>1,312,359</td>
<td>1,000,472</td>
<td>5,218,926</td>
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<tr>
<td></td>
<td>(308,718)</td>
<td>(1,002,287)</td>
<td>(1,083,335)</td>
<td>(1,840,813)</td>
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<td>GDP per capita</td>
<td>227,746**</td>
<td>902,815*</td>
<td>-1,245,276*</td>
<td>-227,786</td>
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<td></td>
<td>(55,351)</td>
<td>(82,990)</td>
<td>(63,472)</td>
<td>(147,594)</td>
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<td>Healthcare waiting list</td>
<td>-2444</td>
<td>37,294</td>
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<td>(7900)</td>
<td>(13,371)</td>
<td>(17,739)</td>
<td>(22,077)</td>
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<td>Intercept</td>
<td>-2,404,524*</td>
<td>-6,213,005</td>
<td>1,885,427</td>
<td>-5,137,679*</td>
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<tr>
<td></td>
<td>(170,916)</td>
<td>(2,551,841)</td>
<td>(138,019)</td>
<td>(8,921,451)</td>
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**Note:** CRUZ-MARTINEZ et al. 2019.
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<th></th>
<th>FCS balance—Annex III</th>
<th>FCS balance—Annex I &amp; II</th>
<th>FOGA balance</th>
<th>Total balance (FCS &amp; FOGA)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
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<tr>
<td>(R)</td>
<td>0.821</td>
<td>0.866</td>
<td>0.182</td>
<td>0.695</td>
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<tr>
<td>(R^2)</td>
<td>0.675</td>
<td>0.750</td>
<td>0.033</td>
<td>0.483</td>
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<tr>
<td>Adjusted (R^2)</td>
<td>0.672</td>
<td>0.733</td>
<td>0.025</td>
<td>0.447</td>
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<tr>
<td>F-statistic</td>
<td>242.726</td>
<td>43.578</td>
<td>4.020</td>
<td>13.524</td>
</tr>
<tr>
<td>(N \times T)</td>
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<td>94</td>
<td>119</td>
<td>94</td>
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</tbody>
</table>

**Note:** Panel-corrected standard errors are in parenthesis. F-statistic is significant at the 0.01 level in all models except for model 3 (0.05 level).

Abbreviations: CSUR, Centros, Servicios y Unidades de Referencia; FCS, Fondo de Cohesión Sanitaria; FOGA, Fondo de Garantía Asistencial; GDP, Gross Domestic Product; NHS, National Health Systems.

* Significant at the 0.01 level.

** Significant at the 0.05 level.
compensating the budgetary imbalances between regions without the need to resort to the FCS (see the discussion below for more details). After incorporating the control variables, the effect of bilateral agreements persists (model 4 in Table 2). Holding everything else constant, each bilateral agreement reduces the balance of the region’s Annex I and II FCS by 313,223 euros.

The region’s income level and health expenditure are also significant determinants. As the level of regional income increases, so does the credit of the net patient-receiving regions. In a certain way, high-income regions act as a magnet for patients referred from other regions. Strangely, health expenditure has a significant negative relationship with Annexes I, II and III of the FCS budgetary balance. Therefore, regions with high levels of health expenditure tend to have more net outflows of inter-regional mobility funds. Regions with the highest levels of health expenditure are mainly located in the north and have high numbers of bilateral agreements, which might explain the higher net outflows of inter-regional mobility funds.

4.3 Explaining the regional budgetary (im)balances for non-referred inter-regional patient mobility: The FOGA fund

The analytical procedure to test the determinants of the FOGA budgetary balance is very similar to the previous one. The only difference is the substitution of the CSUR/bilateral agreements for net local tourism. The bivariate TSCS regression analysis confirms that as the net number of overnight stays of tourists in a region increases, so does its positive balance in the FOGA fund (model 5 in Table 2). In other words, regions with higher tourism inflows tend to have a higher credit from non-referred inter-regional patients, which means that net tourist-sending regions end up owing them a higher balance in the FOGA fund.

After incorporating the control variables, income level (at the 0.01 level) and health expenditure (at the 0.1 level) are the only statistically significant control variables. However, the relationship between these indicators and the FOGA imbalance is inverse to that shown with the FCS in models 1-4. Regions with higher health expenditure attract a higher share of funds related to non-referred inter-regional patient mobility, and regions with higher income levels act as net emitters. Once again, net tourism keeps its degree of significance and explanatory power after including all variables in the model. Holding everything else constant, every one-thousand overnight stays implies an increase of approximately 217 euros in the balance of the region’s FOGA fund.

4.4 Explaining the total regional budgetary (im)balances of inter-regional patient mobility

Finally, we test the explanatory power of the independent and control variables for the total budgetary balances from inter-regional patient mobility (i.e., considering the total joint balance of the FCS and FOGA funds). In sum, highly specialised centres CSUR and net local tourism are significant drivers of the budget surplus, while bilateral agreements act as surplus reducers. Regions with a higher number of CSUR and overnight stays tend to have a credit because of the higher expenses derived from treating inter-regional patients referred to the highly-specialised centres located in their territory or non-referred patients needing treatment while staying in a region different from the one of residence. Bilateral agreements smooth those credits and tend to be more prevalent in patient-sending regions.

About 67.5% of the variance in the budgetary balance of the FCS’s Annex III. 3.3% of the variance in the budgetary balance of the FCS’s Annex I and II, 20% of the variance in the FOGA, and 50% of the variance in the total balance from inter-regional patient mobility can be explained by the respective bivariate models with CSUR (model 1), bilateral agreements (model 3), net tourism (model 5) and the total balance of both funds (model 7), respectively (See Table 2).
4.5 | Robustness checks to alternative specifications: Sensitivity of time-series cross-section analyses

Following Wilson and Butler, we checked if the estimation results might be driven by the unobserved heterogeneity of Spanish regions and the sluggishness of regional budgetary balances. We also tested whether there could be reverse causality problems.

We conducted a fixed-effect model (FEM), and we see a change of sign in the CSUR (H1) and the tourism (H3) coefficient. There is also a change in sign in bilateral agreements (H2), but it loses its significance. This suggests that there were unobserved factors at the regional level that were confounding the relationship in the ordinary least-squares model or that there is a more complex dynamic between variables than initially thought. We see a large number of regions changing signs in the longitudinal variation within regions, which might be altering the coefficient in the original TSCS model. It is not hard to see why the FEM model shows a different sign. Therefore, to clarify our results we must specify that the positive and statistically significant effect of the CSURs in the FCS Annex III fund and of tourism in the FOGA is driven primarily by the cross-sectional variation in the data. However, also following Wilson and Butler, we must place some caution with the results of the FEM due to the fact we only have seven points for each case and a small N (this could be affecting the within results).

We lagged the dependent variable to account for the persistence of budgetary balances. The results suggest that past values of the dependent variable (in our case, budgetary balances) have a predictive power for its current value. This can be interpreted as evidence of persistence or “sluggishness” over time. In all models, with or without controls, the lagged dependent variable has a positive coefficient of 1 and is statistically significant. Now, in all models, the three explanatory variables, CSUR (H1), bilateral agreements (H2) and tourism (H3), are significant as well (bilateral agreement at the 0.1 level in the model without controls). Therefore, the fact that the three explanatory variables are also statistically significant implies that, in addition to the past values of the budgetary balances, the factors captured by our explanatory variable influence the current budgetary balance. This indicates a dynamic interplay between the history of the budgetary balances and the CSUR, bilateral agreements and local tourism.

We accounted for dynamic changes using lagged regressors. Lagged independent variables were statistically significant, and their sign and power remained similar to those in the TSCS models. This establishes a temporal precedence, which is crucial for making causal inferences. Changes in our explanatory variables precede changes in the dependent variable, supporting a directional influence from the explanatory to the budgetary balances. Only in the model with lagged bilateral agreement, the relationship was not statistically significant, although this was corrected in the model with controls. Therefore, we have evidence to reject the reverse causality problems.

5 | DISCUSSION

5.1 | Highly-specialised centres

We confirmed the first hypothesis as highly specialised centres are a significant determinant of budgetary imbalances in the fund destined to finance referred inter-regional patient mobility. Regions with a higher concentration of these centres tend to have higher health expenditures to treat referred inter-regional patients than the remaining regions. While inpatient referrals have declined considerably since 2000, referrals linked to treatment provided in CSUR have increased significantly over the last two decades. Referrals to CSUR were 67 times higher in 2019 than in 2010 (22,325 vs. 330). Therefore, the significant impact of inter-regional patient mobility for specialised treatments on regions’ mobility funds imbalances can be easily understood.

It is not by chance that, in January 2021, the Joint Committee for Relations with the Court of Auditors of the Spanish Congress passed a resolution urging the government to allocate sufficient funds in the national budget to
compensate for the activities of the CSUR. This recommendation is in line with what the literature suggests. Brekke et al. highlighted the importance of implementing an appropriate transfer payment scheme to compensate sub-national regions for inter-regional patient mobility. Berki stressed the importance of a central institution coordinating the financing and the information and communication technologies to enable patients’ real usage of their mobile healthcare rights.9

CSURs are then a challenge and a resource of inter-regional patient mobility for decentralised health systems. Our results call into question the organization of CSURs and their concentration in a limited number of regions. Regions with a higher number of CSURs and positive budget balance might benefit from higher capacity and quality of specialised health provision at the expense of patient-sending regions, increasing regional inequality in the health system. However, due to the lack of a coordinated financing scheme and the extrabudgetary nature of the FCS since 2012, regions with CSURs have become indebted for treating referred inter-regional patients. Therefore, by fostering economies of scale without an adequate national scheme to fund inter-regional patient mobility, the Spanish health system is hurting the budget of regions with highly specialised centres. If not solved and adequately financed, this might disincentivise regions to propose the establishment of CSURs in their territories, particularly those who are now net-emitters of referred patients. In this case, it might be a ‘strategic’ economical choice of sending regions not to establish CSUR itself. This could be solved by adequately financing the FCS fund, which would transfer funds to net-receiving referred patients treated in the CSURs. Because compensation is incomplete, there might be externalities in the supply of medical services, resulting in lower quality compared to a more equal system.

5.2 Bilateral agreements

Our findings confirm hypothesis 2. Regions with more bilateral agreements in force tend to have negative balances in the FCS. The five regions with a higher debit in the total FCS fund for referred inter-regional patient mobility (Castile-La Mancha, Extremadura, Castile and Leon, Balearic Islands, Aragon) present an average of bilateral agreements 1.6 times higher than the five regions with a positive balance on the same fund (Madrid, Catalonia, Cantabria, Andalusia and Valencia).

The agreements seem relevant in explaining Health Cohesion Fund imbalances. But we should be careful with this conclusion. The regulations that allow regions to sign health cooperation agreements (Section 48 of the National Health Systems [NHS] Act 1986) lack a single criterion for the adoption and content of agreements. Therefore, there is flexibility to create customised agreements and no established criteria for the financial part and the use of funds developed for inter-regional patient mobility.

While we do not have access to the content of all bilateral funds, we can assess some content to understand how they reduce the positive balance of the Health Cohesion Fund for the costs of referred patients. For example, the first agreements between Aragon and Catalonia signed between 2002 and 2005 did not provide for any financial allocation or compensation, as this was to be assumed by the FCS. An in-depth evaluation of the existing agreements is needed to confirm whether the compensation of agreements is only for patient referrals in most cases and whether it is done through the FCS.

We also know that there are agreements where the modus operandi of financial compensation between regions is precisely defined and where there is no reference to funds as tools for channelling compensation. The cooperation treaty signed in 2015 between Madrid and Castile-La Mancha establishes that Castile-La Mancha must periodically pay the compensation quotas for budgetary imbalances caused by their mobile patients. This agreement stems from conflicts between the regions due to the insufficient budget of the FCS, which was detrimental to Madrid because of Castile-La Mancha’s inter-regional patients. Other regions have defined hybrid forms of financial compensation, applying both the Health Cohesion Fund and other compensation procedures, as in the case of the agreement signed between Valencia and Aragon.
In sum, signing agreements might signal that regions are trying to reduce externalities driven by patient mobility and incomplete compensation of services. On the demand side, higher patient mobility due to restricted services in some regions will be associated with additional travel time and costs due to the larger distance to the health service. As distance is a main driving force, this might have negative consequences on health outcomes, particularly in net-emitters regions. These additional distance costs are less severe if patients can combine seeing a hospital with other travel, for example, local tourism (which is also a relevant explanatory factor as shown above and will be discussed below). Additionally, quality-driven mobility might raise inequality concerns if income determines the quality of the service.

5.3 Net local tourism

We also confirm hypothesis 3. Net local tourism is a determinant of imbalances in patient mobility funds. Regions with more tourism inflows tend to have higher health expenditures to treat non-referred inter-regional patients than the rest of the regions. The four regions with the highest credit on FOGA for treating non-referred patients (Valencia, Castile and Leon, Galicia and Castile-La Mancha) have an average of overnight stays 2.7 times higher than the four regions with the highest debit on the same fund (Madrid, Basque Country, Catalonia and Asturias). Therefore, the significant impact of tourism (and mobility more broadly) within the national territory on ‘regions’ fund imbalances can be readily understood.

Accordingly, when asked about the main problem facing the SNS concerning patient mobility, one of the key informants in our project mentioned “the sustainability of the system due to mobility, especially in areas of tourism and increased demand for care” (Interview 11).

Although we lack data concerning the latter, the experts consulted made a clear distinction between summer visitors (generally younger, in better general health and with shorter stays, and who, therefore, are likely to generate much lower and less expensive healthcare demands) and visitors during the rest of the year, particularly in winter (often retired people with a higher prevalence of chronic illnesses and more intense and expensive pharmaceutical treatments, whose associated costs can be considerably high). This situation is dire in the case of regions that are underfunded due to the imbalances accumulated over the years in the regional funding model.

Despite this, one of our key informants referred to another critical element to be taken into consideration in this regard, questioning the perception of an overall imbalance in healthcare funding caused by population mobility. Accordingly, this informant referred to the greater tax revenue obtained through the indirect taxes paid by tourists through the purchase of goods and services in the territory visited:

You have a [health] budget based on the official population and, in the winter, you have a much larger population. But then that additional population is consuming, and regions receive half of the VAT collected in its territory

(interview 3).

Some experts argue for implementing a tourist tax for non-local residents, which could partly finance the health infrastructure and services in the current situation where there is no adequate working compensation scheme for funding inter-regional patient mobility. Tourist taxes have been implemented across the globe, but there is limited explicit mention of using these taxes for the health expenditures of tourists. However, tourist taxes have proven to be an effective financing instrument and have been positively assessed by locals and tourists in Spain.
CONCLUSIONS AND POLICY RECOMMENDATIONS

Inter-regional patient mobility represents both a challenge and a resource for the organization and financing of health systems, particularly in decentralised ones. Using cross-sectional time series regression analysis, we test the determinants of imbalances in regional funds on inter-regional patient mobility in Spain for 2014–2020. The findings indicate that highly specialised centres partly explain funds’ imbalance for referred inter-regional patient mobility, while local tourism partly explains imbalances in regional funds for non-referred patients. Bilateral agreements on patient mobility smooth budget imbalances and are primarily used by regions that are net senders of patients to other regions. The results explain the cross-sectional variation in the data but not within regions due to unobserved heterogeneity. However, after using dynamic models (lagged dependent variable), we confirmed a dynamic interplay between the history of the budgetary balances and the CSUR, bilateral agreements and local tourism. We also denied the reverse causality problem by confirming the temporal precedence in dynamic models with lagged explanatory variables.

Our research partly confirmed (using the proxies of budgetary balances of inter-regional patients) the quality-driven mobility shown by the literature on spatial determinants of healthcare accessibility.15–17 Richer regions are net creditors of inter-regional patient mobility funds (they spend more treating referred patients from other regions than their residents spend across regions). However, regions that invest more in health expenditure are not attracting inter-regional patient mobility funds. This could be due to the absence of an effective compensation scheme at the national level for financing inter-regional mobility, although further research is needed.

Spanish regional health authorities have repeatedly made explicit the dysfunctions introduced by the system of financial compensation between regions, demanding a greater role for the central government in financing the cost of treatments for displaced patients. Appropriately funding and even returning the FCS to its original budgetary nature might help reduce the budgetary imbalances in patient mobility funds while promoting the right to effective healthcare in the national territory for every patient. Since the implementation of Royal Decree-Law 16/2012, neither of the two funds allocated to finance patient mobility are included in the Ministry of Health’s budget, and their allocation depends on the explicit will of the central government in each fiscal year. In other words, since 2012, they do not have a budgetary nature. Similarly, the Ombudsman57 has systematically highlighted the challenges of financial compensation in inter-regional patients’ healthcare coverage in its annual reports. Appropriately funding and even returning patient mobility funds to a budgetary nature might help reduce imbalances in patient mobility funds while promoting the right to effective healthcare in the national territory for every resident.

As previous research has shown,29 a system of automatic allocation of costs incurred by mobile patients can be established to address patient mobility funds imbalances. The current individual health card in Spain can function as the instrument for automated billing and settlement of the costs between regions for the treatments provided to patients through an analytical accounting system, removing disincentives to treat mobile patients due to uncertainty in the reimbursement between public administrations. However, we should ask what the central government’s incentives would be to compensate for the expenses partially. Moreover, would this worsen the financial inequalities across regions? Further research should critically assess this.

Implementing an individualised cost attribution system should not be incompatible with re-establishing specific funds in the NHS budget to finance (at least partially) the costs of health care for inter-regional patients. If the central government assumes part of the costs of treating displaced patients, it could substantially reduce the reluctance of healthcare centres to treat inter-regional patients. The current financial uncertainty concerning the payment of such treatment would disappear. The findings of this study are relevant beyond Spain for welfare states with multilevel governance and, particularly, for those with decentralised health systems. Subnational collaboration through bilateral agreements is relevant, especially when the central government fails to meet budgetary responsibilities.

Future research should include other controls to elucidate the unexplained variance in the budgetary balance of the two funds for inter-regional patient mobility. It would also be beneficial to have data on the flow of funds and
patients between regions (i.e. to know where the patients who cause a positive balance in certain regions come from or where the patients in regions with negative balances go to), which is currently available to date. Knowing these bilateral flows could improve our understanding of mobility patterns and allow for the formulation of region-specific policy recommendations to deal with existing barriers to patient mobility across the Spanish decentralised system. Moreover, future research should consider unobserved heterogeneity and look for factors that might help us understand the variation of budgetary balances within regions. Qualitative research and case studies of a sample of regions might be a point to start.

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CONFLICT OF INTEREST STATEMENT
The authors report there are no competing interests to declare.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT
Not applicable.

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APPENDIX: ADDITIONAL INFORMATION

TABLE A1  List of interviewees.

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<th>Interviewees</th>
<th>Participant’s professional profile</th>
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<tr>
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<td>Ex-policy maker at the central government (high profile)</td>
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<td>Ex-policy maker at the central government (high profile)</td>
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<tr>
<td>3</td>
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<td>7</td>
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<td>Representative of a patient’s organization</td>
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<td>10</td>
<td>Technical expert of a human rights organization</td>
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<td>11</td>
<td>Policy maker at the regional government (high profile)</td>
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<td>Table A2</td>
<td>Summary statistics of indicators used in the time-series cross-section regression analyses (TSCS).</td>
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<td>CSUR</td>
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<td>Bilateral agreements</td>
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<td>Net local tourism</td>
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<td>Public health expenditure</td>
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<td>Satisfaction with the NHS</td>
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<td>Beds per inhabitant</td>
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<td>GDP per capita</td>
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<td>Health Cohesion Fund</td>
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Abbreviations: CSUR, Centros, Servicios y Unidades de Referencia; FOGA, Fondo de Garantía Asistencial; GDP, Gross Domestic Product; NHS, National Health Systems.