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Does devolution influence the choice and quality of public (vs private) health care?☆

Joan Costa-Font[a,*], Ada Ferrer-i-Carbonell[b,*]

[a] London School of Economics and Political Science (LSE), CESIfo & IZA, Houghton Street, WC2A 2AE, London, England, UK
[b] Barcelona School of Economics, and IZA, Institute of Economic Analysis (IAE-CSIC), Campus UAB, Institute for Economic Analysis (IAE-CSIC), Bellaterra 08193, Spain

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ABSTRACT

Government decentralisation also called 'government devolution' (GD) can provide an alternative to the 'build in' accountability mechanism of markets by influencing both the choice as well as the perceived quality of public versus private health care. To test this hypothesis, this paper exploits the gradual decentralisation of the political stewardship of the Spanish National Health System (NHS) on a difference-in-differences design. We find that GD (abandoning centralised governance) increases the choice and quality of (measured by the preference for, perceptions of, and satisfaction with) public health care (NHS) compared private health care. Consistently, we also find that the GD reduces the uptake of private health insurance among higher income and education groups. These effects are mainly driven by improvements in health care quality as well as policy innovation and diffusion.

1. Introduction

A National Health System (NHS) that provides uniform public health care rarely meets all people's expectations. By providing uniform (or 'one size fits all') public (health) services, centralised governance is less likely to satisfy heterogeneous preferences (Alesina and Spolaore, 1997; Besley and Coate, 2003; Ellingsen, 1998). Unsatisfied individuals can then turn to private alternatives, which include seeking out of pocket private health care, or subscribing a private health insurance (PHI) policy (Besley et al, 1999)[1], which, in turn, can decreases NHS congestion among those who continue to use the NHS care (Besley and Coate, 1991). Alternatively, when health care preferences (e.g., preferences for specialist waiting times, for access to mental health services, or for direct access to a specialist) are heterogeneous across the territory, government

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* Corresponding author.
E-mail addresses: j.costa-font@lse.ac.uk (J. Costa-Font), ada.ferrer@iae.csic.es (A. Ferrer-i-Carbonell).

[1] Quality is not fully observable to individuals and they can thus not make a completed informed choice. In evaluating health quality individuals need to rely on a subset of observable measures of quality (e.g., waiting times or waiting lists for specific services), which in turn are the ones influencing their choice between NHS or private health care.

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devolution (GD) is an organisational alternative to the reliance on private health care markets[2]. Indeed, privatization and GD can become mutually exclusive policy alternatives when a centralised public service (e.g., NHS) fails to accommodate citizens preferences (Tanzi, 2008). However, the empirical evidence that GD reduces the use of, and preference for private health care is limited.

GD provides political incentives to local incumbents by delegating political stewardship of the health system to sub-central governments (increasing the probability of re-election), and more specifically to local incumbents that can profile the supply of health services to their regional specific health care needs[3]. That is, decentralization can strengthen the citizens political agency by bringing decision makers closer to incumbents (Seabright, 1996). This is of significant organisational relevance given that health care is the chief responsibility of sub-central governments in most European countries, especially in some countries such as Sweden, Spain, Switzerland, and Italy (OECD, 2019)[4]; and under GD, subnational health services can influence the health care quality delivered by the NHS in their area, which can in turn influence the chances of the regional incumbents re-election.

This paper examines whether GD alters the choice and preference for public (NHS) vs private health care, alongside individuals' quality assessments or their reported satisfaction with publicly funded health care[5]. Although private health care is very sensitive to quality assessments (Gouveia, 1997; Besley et al., 1999; Costa-Font and Jofre-Bonet, 2008), we still know little about how health care choices react to changes in quality improvements in public health care.

We empirically test the above claims drawing upon evidence from Spain, where the health care system became fully decentralised after a short and unexpected institutional reform in 2002. More specifically, we study whether which entailed abandoning centralised governance in ten regions where the health system stewardship was previously centralised. As a result, Spain is today the OECD country where sub-central governments are responsible for the highest share of public health responsibilities (see Figs. A1 and A2 in the Appendix)[6].

We document that GD increased the perception that the public health system is working well in 7.5pp (compared to a mean scale of 1.87), 12pp (compared to a mean value is 2.57) the preference for the National Health System (NHS) and 10.5pp (compared to a mean rating value of 6.43) satisfaction with the NHS, and it resulted in a decrease in the use of PHI among people with higher incomes and education, who typically can afford private insurance premiums, and thus can choose to opt out of the NHS care (if they are not satisfied with it). These results are consistent with the hypothesis of the paper, that decentralization provides an alternative to the 'build in' accountability mechanisms of markets (Tanzi, 2008). Our findings are based on a DiD strategy in which we compare ten regions that received health-care responsibilities after 2002 (treatment group) to seven regions that did not change their health-care stewardship status for many years (control group), which was previously decentralized between 1981 and 1990, except for Canary Island that was decentralized in 1994)[7]. That is, we study whether 'turning on' the devolution treatment altered the choice, preferences, and assessment of the public versus private health care system, when the only change that could have motivated such a change in trends is the inception of GD in those ten treated regions.

The validity of our strategy rests on the existence of parallel trends between control and treatment regions to 2002. That is, we do not expect the two sets of regions to show differences in behaviour prior to the treatment. However, we do not hold any prior belief regarding which of the two set of regions should be more satisfied with the NHS prior to the treatment, as individuals' tastes and expectations, political governance, and many other relevant characteristics can differ largely across regions. Our DiD strategy relies on the reasonable assumption that the effect of a previous GD a decade or two before in the control regions had already vanished by the time we observe them, and that only the change in health quality level remains. This is, although GD in the control group increased health quality when they were decentralized, the effect had already flattened in 2002. Given that health care in all regions (except for two regions that make 5% of the Spanish population) were funded by an homogenous block grant, differences across regions after devolution cannot be driven by differences in available funding, but solely by regional specific policy priorities.

We exploit several heterogeneous effects, including income and age specific differences, alongside different political incentives across regions (e.g., party affiliation coincidence of central and regional governments). Our results are robust to, among others, the exclusion of both the capital region of Madrid as well as the two mentioned regions with special fiscal regime (Navarra and the Basque Country); and to examining only the period before the financial downturn of 2008 (1998-2006). Our results are robust to a battery of checks and survive a number of falsification tests. Finally, we examine several alternative mechanisms that can potentially drive our results, including funding changes, measures of quality of health care, as well as selective migration. We show evidence suggestive that GD increased satisfaction with waiting for specialist (but

[2] As stated by the decentralisation theorem (Oates, 1972), in the absence of spillovers and cost savings, the larger the heterogeneity of preferences, the higher the benefits of GD

[3] Other heterogeneity in health care preferences that is not region specific might still not be responded to, which might still call for a role of the private sector.

[4] However, as Figure A1 in appendix shows, there is a large cross-country variation in the level of health care decision making, and some countries have re-centralized their health system.

[5] Previous research has documented that individual health care quality assessments correlate with objective measures of health care quality (Batbaatar et al, 2017), perception of patients' rights (Mpinga and Chastonay, 2011), and patients' behavioural intentions (Itzia and Wood, 1997).

[6] Spanish decentralisation compares to other experiences in the United Kingdom after devolution in 1999-2000; or in Italy after 1978 and 1997.

[7] Our results hold if we exclude Canary Islands from our analysis (Table C6).

not for inpatient care), as well as qualitative evidence that GD promoted policy innovation and its diffusion across regions. However, we do not find evidence suggestive that changes in resources, capacity, or migration to influence our results.

In short, we contribute to the literature by documenting that GD strengthens the preference for the care delivered by the NHS, it increases the perceived quality of the NHS, the satisfaction with NHS care and, it reduces the uptake of PHI among higher income and education individuals (who can afford the premiums, or their jobs subsidize the uptake of PHI). Next, we describe the institutional setting in Section 2. In Section 3 we describe the data and the empirical strategy. Sections 4 and 5 contain the results and Section 6 reports evidence on several mechanisms that could have driven the effect, and finally we conclude with a discussion section.

2. Institutional setting

2.1. Health care decentralisation in Spain

Health care is, together with education, the main responsibility of sub-central governments in Spain, and is funded by general taxation as other NHS system. Individuals using the NHS face a rather limited cost sharing (restricted to medicines and orthopaedic products). Spain, like other NHS based health systems such as Italy ot the United Kingdom has descentralisated its health care provision. The decentralisation of the health system in Spain followed a two-step (wave) process. A first decentralisation wave (1981-1994) began with the progressive transfer of healthcare responsibilities to the so-called seven historical regions (legally called Autonomous Communities) in period 1980-1994[8]. Healthcare in the remaining ten regions remained centrally managed by the National Institute of Health (Instituto Nacional de la Salud, INSALUD) until 2002, when a second decentralization process wave took place, which is the treatment we exploit in this paper[9] (see Table A1 in the Appendix). This second wave of decentralization offers a unique opportunity to examine the impact of GD, as health care responsibilities were transferred to ten regions at the same time (e.g., it was not progressive, as the first wave) and, it was a largely unexpected reformed that resulted from the first absolute majority of a conservative government in 2000 for almost two decades. At the time that health care decentralization was put in place, there was no other major public sector reform that could have modified quality of care.

Regional governments were equipped with large discretion in the allocation of their health care budgets and exhibited only a very limited capacity to raise a small number of small taxes and, more recently, to participate in central level taxes[10]. Indeed, although GD mainly referred to the transfer of political responsibilities, it too expanded the regional participation in some general taxes (33% of income tax and 40% of value added tax) in both our treatment and control regions. However, most of the funding for health care remained centrally allocated via block grants (except for two regions, Navarra and the Basque Country that have a special tax regime) following a capitation formula[11]. In our period of analysis, total health spending as a share of GDP remained unchanged from 1995 to 2005 (7.6%) and, only increased to 8.7% in 2009, as shown in Table A2 in the Appendix. Hence, GD did not entail a significant shift in regional health care funding, and our main findings drawing on data from 1998 to 2009 are consistent with those of the period1998-2006.

Crucially, GD changed the nature of political agency in health care by entrusting regional governments with a new policy responsibility to demonstrate their value to constituents relative to the central government and other similar regional governments.[12]. Indeed, GD equipped Spanish regions with significant legislative capacity to design the visible regional health system architecture, which allowed adjusting each regional health service to the preferences of its own regional constituents (and increase their chances of re-election as a result), only limited by central level framework legislation[13]. Although in some cases regional incumbents were constrained by central level party strategies, this does not impact our results (we come back to this point in Section 5.3)[14].

A side effect of such legislative activity has been the development of further policy interdependence leading to the design of new policies (policy innovations) as well as the dissemination of those policies that have proven successful to regions (Costa-Font and Rico, 2006). Policy interdependence generally takes the form of yardstick competition (e.g., constituents and local incumbents compare health services across borders) rather than welfare migration (e.g., voting with their feet), the

[8] First to Catalonia (completed in 1981), followed by Andalusia (1984), the Basque Country and Valencia (1988), Galicia and Navarra (1991), and ended with the transfer of health care responsibilities to the Canary Islands (1994).

[9] Health system coordination and cooperation were led by the Ministry of Health together with the Inter-Territorial Committee of regions, and a cohesion fund was created as an equalisation fund to correct for horizontal imbalances.

[10] Regions become responsible for the regulation and resource allocation according to the agenda of regionally accountable regional governments and their legislative chambers. The Ministry of Health plays a role in international health, health care coordination and, together with the Ministry of Finance, in the funding of the health system, including changes in cost sharing. Local authorities (and provinces) play a very minor role on public health matters.

[11] Regional governments could raise additional external financing from financial markets, the traditional way out for region states to make use of an expanding debt, which has increased systematically around ten per cent per annum on average and is generally between 10-15% of total budgeted expenditure. Yet, when the health system was centrally run by a central agency INSALUD before devolution, levels of debt exceeded those of devolved health services, which indicates that debts is mainly the results of underfunding rather than the result of devolution.

[12] This is true because all regions were funded in the same way and hence should be able to afford about the same package of care.

[13] A recent example: the constitutional court banned the universal health access law passed by one the regions.

[14] As a result, regional parliaments have exerted since 2002 a significant legislative activity in health care, especially that has changed the organization of the delivery of health care (e.g., integration of health and social care, new contractual arrangements with providers, etc.). For instance, Castilla-La Mancha's government introduced a legal limit to waiting list for surgical interventions and diagnostic tests in 2003, less than a year after devolution.

latter has been rather limited (less than 1% of patients are treated in hospitals of different regions)[15]. That is, information of reforms in neighbouring jurisdictions is often used to judge one's own regional government performance (Salmon, 1987), given that funding is comparable[16]. In the mechanisms section (Section 6) we argue that policy innovation and diffusion is one of candidate mechanisms that can explain the improvement in the perceived quality of the NHS after decentralization, even though resources did not increase significantly.

2.2. Private health care in Spain

In the period examined, public health expenditure remained stable from 1995 to 2005, and it only increased slightly from 5.4 to 6.5% in 2009, while private health expenditure remained constant at roughly 2% of the GDP (Table A2) throughout the period of our study (1995 to 2009)[17]. In addition to care paid out of pocket, a non-negligible share of the population takes up private health insurance (PHI), which supplements NHS care (it offers an addtional pathway to have access to care, without reducing the entitlement to accessing NHS care). Indeed, PHI is one of the most traditional mechanisms available to the middle income individuals to ensure access to affordable private health care[18], which can be subscribed via employer group plans offered to civil servants (22% of PHI policy holders in 2012) and to employees of large private corporations (35% in 2012), or individually purchased (43% in 2012) (IDIS Foundation, 2013)[19]. Previous studies have documented that the probability of PHI uptake is sensitive to the perceived quality of the NHS (Costa and Garcia, 2003; for a discussion of the UK see Besley et al., 1999). Hence, improvements in NHS quality after decentralisation, might alter the perceived quality and consequently the choice of public versus private health care. The rest of the paper will be devoted to empirically test these propositions.

3. Data and empirical strategy

3.1. Data description

Our data is primarily from the Spanish Health Care Barometer (Barometro Sanitario), an annually representative survey of the Spanish population eliciting individual attitudes towards health care utilisation. The survey contains standardized questions about the satisfaction, opinion (perception), and prospective use of the public health care system, information on the uptake of private health insurance (PHI), as well as individual and household socio-economic and demographic characteristics. The survey has been designed to be representative of each one of the seventeen Spanish regions and was first commissioned in 1993 by the Ministry of Health, Social Services, and Equality in collaboration with the Center for Sociological Research (Barometro Sanitario, 2010). However, given the nature of the reform we study in this paper, we only draw upon waves of data running from 1998 to 2009 (1998-2006; 2009), as earlier waves do not include all the information needed in the analysis, and later ones use different variable definitions. In addition, we could not include the 2007 and 2008 waves because the relevant questions of interest in this paper were not collected. Besides these data limitations, an economic downturn may have influenced health-care preferences, particularly after 2010, when spending cuts were implemented. Therefore, it is important to limit the analysis to 2009. In addition, given that the onset of the financial crisis and of the spending cuts was imprecise, we also perform some robustness checks with a sample ending in the 2006 wave, just before the economic downturn. Similarly, records earlier than 1998 were excluded as they might still capturing the effect of a positive trend of the control regions that had been earlier decentralised, which could jeopardize the assumption of parallel trends (see Section 3.4). In any event, our time span before and after the reform is large enough for our purposes.

The survey collects informamtion on individual and household socio-economic characteristics (income, education, and occupation), socio-demographics (age, gender, and marital status), and regional identifiers among other variables, such as attitudes towards education and other publicly provided services that we exploit in our falsification tests. We control for survey non-response by identifying and including missing information among those individuals who do not report their income or education.[20] Specifically, 27% of respondents do not report their income and 5% do not report their education

[15] Importantly, patient mobility declined from 2001 (where 60,500 patients were seeking care in another region) to 2005 (when this number was 58,000 patients). The region-specific flow of patients travelling has generally declined (Ministry of Health, 2008).

[16] This induced regional governments to at least 'do as well as its neighbour region' (Costa-Font and Pons, 2007), which has limited the emergence of regional inequalities (Costa-Font and Turati, 2018). This explains that perceived territorial equity (% of population who report that all citizens in Spain receive the same care irrespective of the region where they live) throughout Spain has remained stable at around 40%, also after devolution as depicted in Figure A3.

[17] Private sector in Spain accounts for 24% of discharges, 20% of A&E visits, and 30% of operations. Most of the private health expenditure comes from out of pocket expenditure, while insurance premiums barely account for approximately 21% of private health expenditure in 2010.

[18] Because insurance premiums are ex-ante, prices based on a pool of PHI subscribers, and the probability of receiving is smaller than one, Private Health Insurances are cheaper alternatives as compared to health care purchased out-of-pocket.

[19] PHI allows direct access to specialists, shorter waiting times, and hospital amenities, such as a private room. Insurance premiums do not differ across regions and the average share of private health insurance in Spain remained around 13-15% until 2014 (UNESPA, 2016).

[20] Indeed, Tanzi (2018) put forward the idea that privatization and GD are mutually exclusive alternatives when a centralised public service (e.g., such as a national health service) fails to accommodate citizens preferences. Here, we show that if a descentralised public service does a better job at improving quality of care, individuals are less likely to use private health care and purchase supplementary private insurance.

Table 1
Descriptive statistics.

	Total sample			Treated		Control	
	# Obs.	*Mean*	*St.dv.*	*Mean*	*St.dv.*	*Mean*	*St.dv.*
Dependent variables							
Perception health system	67,828	1.871	0.82	1.917	0.82	1.829	0.81
Preference for public health	67,795	2.556	1.70	2.587	1.70	2.528	1.71
Satisfaction with public health	55,402	6.432	1.61	6.592	1.60	6.293	1.61
Private health insurance	47,841	0.114	0.32	0.126	0.332	0.103	0.304
Control variables							
Years of exposure	68,608	10.496	8.39	3.003	3.063	17.265	5.383
Female	68,589	0.513	0.50	0.513	0.500	0.513	0.500
Age	68,568	46.249	18.28	46.764	18.435	45.783	18.125
Income, if not missing	49,766	3.395	1.27	3.407	1.277	3.384	1.271
Missing income	68,608	0.275	0.45	0.263	0.440	0.285	0.451
Education level, if not missing	65,189	2.465	1.24	2.475	1.255	2.456	1.226
Missing education level	68,608	0.050	0.22	0.042	0.201	0.057	0.231
Occupation:							
Employed/working	68,475	0.454	0.50	0.450	0.50	0.457	0.50
Retired	68,475	0.205	0.40	0.208	0.41	0.203	0.40
Unemployed	68,475	0.080	0.27	0.075	0.26	0.084	0.28
Student	68,475	0.060	0.24	0.055	0.23	0.065	0.25
At home	68,475	0.092	0.29	0.097	0.30	0.088	0.28
Other	68,475	0.109	0.311	0.116	0.32	0.103	0.30

Note: The table provides the descriptive statistics for the years 1998-2006 and 2009; for the total sample as well as for the treated (those regions that were decentralized in 2002) and the control (those regions that were decentralized prior to 2002).

attainment. Given that we observe very few missing observations in other control variables, we do not include in the analysis the missing information dummies, but instead we drop these observations from our regression analysis.

Table 1 summarizes the main variables for both, individuals already exposed to health care decentralisation before 2002 (controls) and those in regions that were equipped with health care responsibilities after 2002 (treatment). Specifically, the Table 1 reports the number of observations, mean, and standard deviation of the four dependent variables and several covariates[21]. Overall, treatment and control groups show similar descriptive statistics on all variables except for the satisfaction with the public health and years of exposure to treatment, which is precisely the variation we exploit in our analysis. About half of the sample is made of females and the average age is about 46. These estimates match those of the means for the Spanish sample in the survey c. The variable measuring income estimates the total household earnings, and is observed in 5 intervals: less than 361, 362-601, 602-901, 902-1202, or more than 1202 euros per month. The education variable is the highest education level attained by the respondent and can take 5 values: no education (23.22%), finished school at 14-15 years old (32.48%) or at 16-19 years old (21.14%), completed secondary education (8.26%), and university degree (9.91%) (and 4.98% do not report their education level). The last control variable included in the regressions is individual occupation, and the percentage in each category is presented in Table 1: 45.4% of our sample is currently working, 8% are unemployed, and about 20% is retired.

Our study focuses on four dependent variables proxying the demand and satisfaction with public health care, which we can identify in our data as follows (Appendix B displays how they have been recoded from its original format in the survey, as well as detailed descriptive statistics):

(a) *Quality perception of the public health system*: this variable refers to a general question in which respondents are asked whether the National Health System (NHS) works well. Answers can take values (0) the NHS works well, (1) the NHS works well, although some changes are needed, (2) the NHS needs fundamental changes, although some things do work well, and (3) the NHS works so poorly that it needs to be rebuilt completely. To ease its interpretation, we have inverted the Likert scale, so that a value of 3 means that the respondent is very satisfied with the way in which the health system works and 0 means that the respondent thinks that the health system works very poorly.

(b) *Preferences for public (vs. private) health care*: respondents are asked about their hypothetical choice between public versus private health care for themselves or for a family member in case they needed it. Respondents are asked this question for four different categories of health use (primary care, specialist, hospital admission, and emergency room) and they can cast their answer into 3 categories: public, private, or both. The answers are recoded as 0 if the respondent chooses private or both, and 1 if they choose public care. Hence, we measure whether the respondent has a strong preference for using the public health system for any of the four categories of health use. Once the four categories are added together, we end up with a variable that ranges from 0 to 4, where 4 means that the respondent reports to prefer to use public health for all the four categories of health use (primary care, specialist,

[21] Unfortunately, the questionnaire does not include a question on self-reported health until 2010. However, we proxy it by adding the effect of age which captures the natural depreciation of health capital.

hospital admission, and emergency room). In other words, 3 means that the respondents have a strong preference for public health, while 0 means that the respondent chose private or both (public and private) in all four categories.

(c) *Satisfaction with the public health system:* respondents are asked to evaluate from 1 to 10 eight different aspects of the public health system[22]. Although the questionnaire includes satisfaction with fifteen different dimensions, some questions have many missing values, so that we can only use eight of the fifteen satisfaction questions. We assume that satisfaction is cardinal and take the mean of all eight satisfaction domains as an overall measure of satisfaction with the NHS. The overall satisfaction measure used in the paper can thus range from 1 to 10. Our results are robust to instead use principal component analysis (PCA) to generate the satisfaction measure[23].

(d) *PHI uptake* refers to a dummy variable indicating whether an individual has private health insurance. Data on the PHI uptake is not collected in all waves, but it is available from 1998 to 2004 and in 2009.

3.2. Empirical strategy

We empirically estimate whether exposure to GD has shifted individuals' satisfaction, quality assessment, and demand of public health care measured through the four variables described in Section 3.1: namely (i) the quality perception of, (ii) satisfaction with, and (iii) expected use of public health care; as well as (iv) the uptake of private health insurance (PHI). Traditionally, models of health care assume that quality of health is perceived out of salient quality proxies, such as waiting lists, which are uniformly provided by the NHS (Besley et al, 1999).

Our identification strategy relies on exploiting the variation resulting from the 2002 decentralisation rollout to ten regions. That is, we exploit a reform that 'turned on' the decentralization treatment and entailed abandoning centralised governance in ten regions, while no reform took place among the control regions (whose governance was not modified during the period of analysis).

Unlike conventional specifications, our control group refers to the seven regions that were already treated before 2002 and did not change its governance in the period, while the treated group refers to those regions that were equipped with health care responsibilities after 2002. Our control group is valid because the control regions were decentralized between 20 and 12 years before 2002 (except for Canary Islands that was decentralized in 1994). We expect pre-trends (1998-2002) to be parallel between control and treatment regions, as by 1998 the control regions had been already 8 to 17 years decentralized, except Canary Islands. Our results are robust to excluding Canary Islands (Table C6).

Nevertheless, we do not hold any hypothesis on the levels, as there might be different reasons on why regions might have different levels of satisfaction with the NHS, including individuals' tastes and expectations, demographic characteristic of each region, or the positive impact of the decentralization in the control regions. In contrast, after the treatment in 2002, we expect the treated group to show a trend change in NHS satisfaction, while the trend in control regions should be stable. We will test the pre-trend parallel assumption in Section 3.4. Finally, we limit our analysis to 2009 (and show robustness to limit the data to 2006) to estimate of the effect of GD before it vanishes over time.

Our estimation includes several confounders as well as vectors of region and year dummy variables so that either region specific or temporal shocks are controlled for. Our dependent variables refer to an individual *i*, in region *g*, and time *t*. We define a variable *POST* to identify the period after the decentralisation of health care services (2002-2009). Time effects are important insofar as decentralisation is also a function of years of exposure. The specification is as follows:

$$Y_{it(g)} = \gamma_1 D_{(g)} + \gamma_2 \left(POST_{(t)} \cdot D_{(g)}\right) + \gamma_3 POST_{(t)} + \gamma_4 X_{it(g)} + \gamma_5 \mu_t + \gamma_6 \vartheta_g + \varepsilon_{it(g)} \quad (1)$$

where $D_{(g)}$ is the dummy variable indicating that the region belongs to the treatment group, $X_{it(g)}$ refers to covariates of each individual, ϑ_g and μ_t are region and time fixed effects, and $\epsilon_{it(g)}$ is the usual error term. For the experiment to be credible it is important to compare the changes in the group of treated regions with the changes of the control group after 2002. In other words, we regress Eq. (1) with a difference in differences model and use a linear model, except for the dependent variable "Private health insurance take up", for which we use a Probit. The results we present however are consistent to estimating the other three dependent variables with an ordered Probit model (see Table C5). The coefficient γ_2 represents the interaction between treatment and post and estimates the effect of the reform on the treated regions, as compared to the control ones.

3.3. No spillover effects

We further check that decentralisation in the ten treated regions added no additional powers to the previously decentralised (cotrol) regions. That is, the already decentralised regions were not directly influenced by the reform, as they already had health care responsibilities. However, over time one could expect to see some longer-term effects resulting from policy interdependence, if regions that already had health care responsibilities reacted to new policies of the newly decentralised regions. These effects can explain some of the effects of decentralisation, such as yardstick competition and other effects (Costa-Font and Rico, 2006).

[22] We do not observe the individual's satisfaction with private health care, hence this remains unobservable in our analysis.

[23] In fact, PCA analysis shows that the first eigenvalue explains 58% of the variance and each of the eight satisfaction dimensions exhibits a very similar weight (0.28, 0.34, 0.38, 0.36, 0.33, 0.38, 0.32, and 0.38). Therefore, it is not surprising that the average satisfaction of all 8 satisfaction questions give very similar results to taking the PC.

Table 2
Baseline results-The effect of political decentralisation on health care.

	Perception public health system[0 bad – 3 excellent]				Preference for public health[o never use – 4 use it always]			
	1998-2009		1998-2006		1998-2009		1998-2006	
	No contr.	Controls	No contr.	Controls	No contr.	Controls	No contr.	Controls
Treated	0.303***	0.298***	0.329***	0.321***	-0.081	-0.038	-0.009	0.049
	(0.042)	(0.041)	(0.040)	(0.040)	(0.092)	(0.096)	(0.071)	(0.074)
Post 2002	0.049	0.040	0.051*	0.043	-1.144***	-1.155***	-1.147***	-1.198***
	(0.031)	(0.031)	(0.029)	(0.030)	(0.057)	(0.056)	(0.055)	(0.054)
	0.071***	0.075***	0.077***	0.082***	0.121**	0.120**	0.123**	0.124**
Treated*Post								
	(0.025)	(0.025)	(0.025)	(0.025)	(0.052)	(0.052)	(0.056)	(0.055)
Number Obs.	60647	60526	53460	53350	60643	60503	53516	53386
	Satisfaction with public health system [0 unsatisfied – 10 very satisfied]				PHI [1 yes -0 no] Probit			
	1998-2009		1998-2006		1998-2009		1998-2006	
	No contr.	Controls	No contr.	Controls	No contr.	Controls	No contr.	Controls
Treated	0.333***	0.309***	0.382***	0.362***	0.155	0.059	0.160	0.063
	(0.063)	(0.062)	(0.048)	(0.047)	(0.113)	(0.123)	(0.136)	(0.149)
Post 2002	1.745***	1.723***	1.720***	1.694***	0.509***	0.580***	0.099**	0.138***
	(0.056)	(0.056)	(0.052)	(0.051)	(0.060)	(0.063)	(0.039)	(0.038)
	0.094**	0.105**	0.081*	0.087*	-0.039	-0.045	0.026	0.019
Treated*Post								
	(0.046)	(0.045)	(0.047)	(0.045)	(0.051)	(0.051)	(0.041)	(0.042)
Number Obs.	49443	49352	43583	43501	47824	47723	40607	40517

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Errors clustered at the year*region level. Regression with controls include: female, age, income, education level, occupation, and a dummy for missing income and education level. All regressions include year and region fixed effects.

3.4. Parallel trends

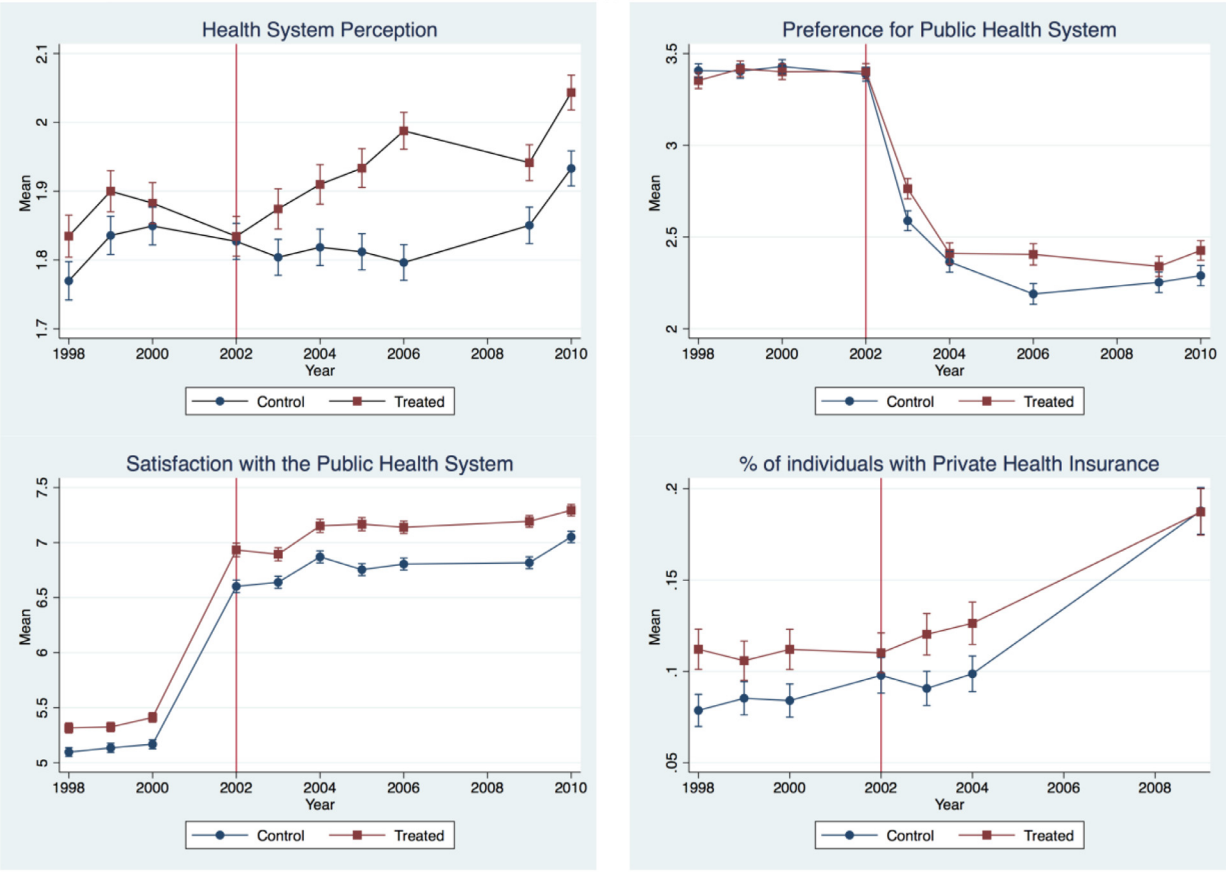
In a DiD analysis typically the control group remains untreated during the entire period, while the treated group is affected by the treatment at some point. In the present study, the control group consists of those individuals residing in a region that was already treated 12 to 21 years before the reform we study, except for Canary Islands that was decentralized 8 years before, in 1994 (our results are robust to excluding Canary Islands, Table C6). However, we exploit the fact that the effects of health care decentralization in the control regions had already vanished by the time our treated regions were equipped with health care responsibilities. Therefore, we expect pre-trends (1998-2002) to be parallel between control and treatment regions. Our data begins in 1998, between 17 and 8 years after all control regions, except the Canary Islands, were decentralized. For a DiD analysis to hold, any difference between regions prior to the 2002 reform should be in levels, but not in trends. In short, although we do not make any assumptions about the level of public health care quality in the control regions prior to the 2002 reform, we test whether after the reform, treated regions experienced an increse in the health care quality difference compared to the control regions.

Fig. 1a graphically displays whether the assumption of parallel trends holds, for the four dependent variables in the study. The line with squares depicts those regions that were already centralized prior to 2002 (treatment), while the dotted line depicts to those regions that were already decentralized prior to 2002 (control). Visually, the four dependent variables of interest show clear parallel trends prior to the reform. In addition, we formally test for the presence of parallel pre-trends in a regression setting (see Fig. 1b) and results indicate, that as expected, there are no pre-trends differences across the two set of regions. In other words, the assumption of parallel trends, which relies on the fact that the impact of GD had already vanish by 1998, is supported by the data.

4. Empirical findings: baseline results

Table 2 reports the difference-in-differences (DiD) estimates of the impact of GD on the four different proxy measures of the public health care preferences and choices (quality perception of, preference for, and satisfaction with the public health system; and private health insurance uptake). These are our baseline results. We report the estimates with and without controls for the entire period of analysis (1998-2009), as well as for the time period that excludes the period of economic downturn (1998-2006) to avoid potential confounding effects. Our findings indicate that excluding the downturn years yields estimates that are comparable to those for the entire time period, and therefore the rest of the paper draws from data for the entire period 1998 to 2009. Although excluding individual controls has no significant effect on the results, the rest of the

a



b

	Health System Perception	Preference for Public Health	Satisfaction with Public Health	PHI
Treated	31.873	-25.962	-25.403	5.499
	(29.431)	(41.118)	(43.098)	(10.106)
year	0.040***	0.011	0.035**	0.003
	(0.010)	(0.014)	(0.015)	(0.003)
Treated*year	-0.016	0.013	0.013	-0.003
	(0.015)	(0.021)	(0.022)	(0.005)
Number Obs.	20058	20092	16599	20331

Average marginal effects year (δyear/δtreatment)

	δy/δx	std. err.	δy/δx	std. err.	δy/δx	std. err.	δy/δx	std. err.
Control	0.0399	0.0101	0.0111	0.0141	0.0353	0.0146	0.0027	0.0035
Treated	0.0239	0.0108	0.0240	0.0150	0.0481	0.0159	0.0000	0.0037

Fig. 1a. Trends in the demand for health care treated and control groups.
Testing parallel pre-trends.
Note: This figure displays the time evolution 1998-2010 for the four dependent variables of our study for those regions that were decentralized prior to 2002 (blue line- round points) and for those that were decentralized in 2002 (blue line- round points). Note: regression includes years prior to treatment. Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

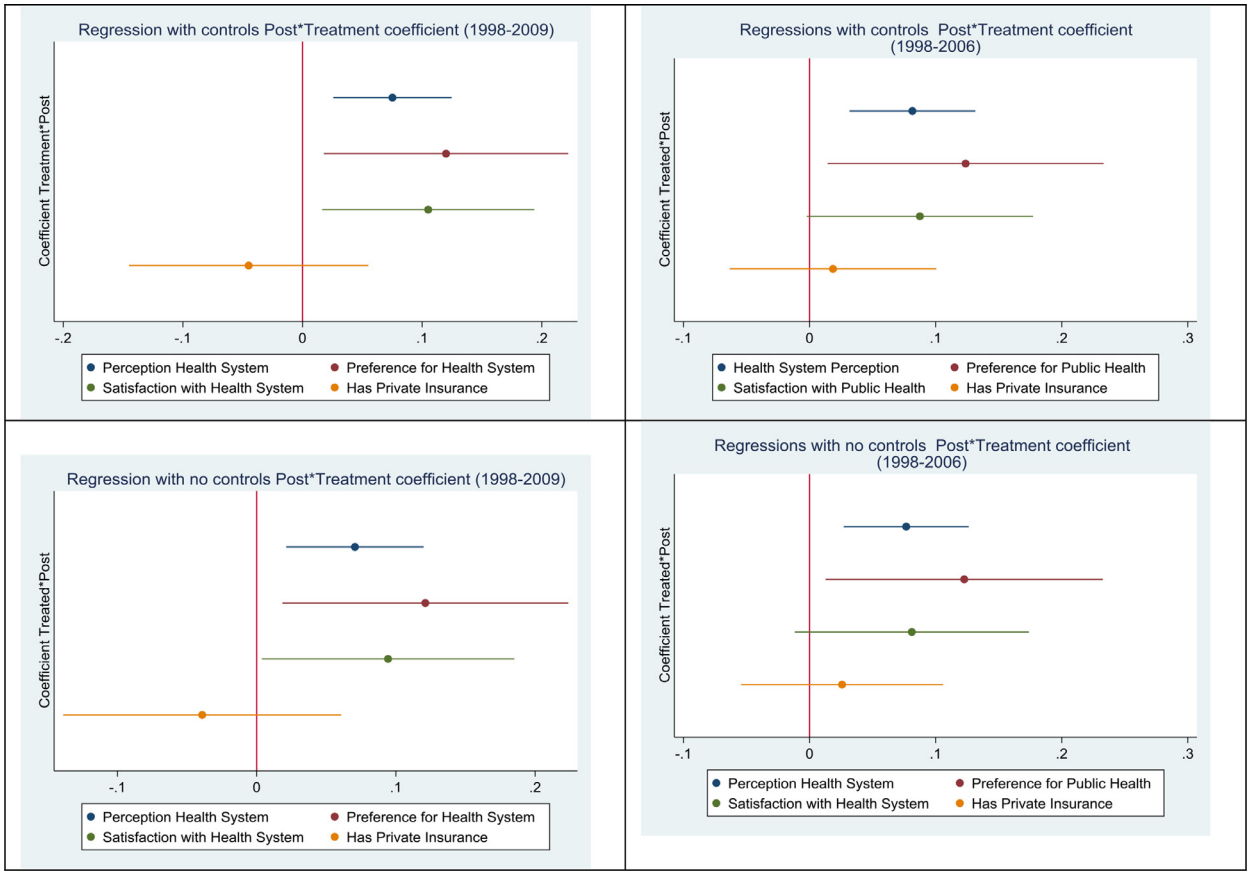


Fig. 2. Coefficient Treated*Post 2002 (Table 2).

paper does include controls. Controls refer to, besides time and region fixed effects, individual income, education level, age, gender, occupation, and a dummy variable for missing income and education level. Fig. 2 graphs the coefficient of interest (the interaction terms between treatment and post) for the four specifications and outcome variables.

Our main focus refers to the results for the entire period (1998-2009) with controls (second column of each of the four panels). Our baseline results suggest a positive and precisely estimated effect of GD in three of the four domains of public health care assessment and preferences, while the coefficient of the interaction is small and imprecisely estimated for the dummy variable indicating whether the individuals has Private Health Insurance (PHI). In Section 5.2, we expand on this point, and we examine whether these effects change when we consider individual specific heterogeneous effects.

We estimate a 7.5pp (percentage points) or 4% increase in the perception that the public health system is working well (the mean value of this variable is 1.87), a 12pp or 5% increase in the preference for public health care (mean value is 2.57), and a 10.5pp or 2% increase in the satisfaction with the NHS (mean value is 6.43). Consistently, we estimate a comparable reduction in the marginal effect of 4pp of private health insurance uptake though imprecisely estimated. Hence, overall, these results are consistent with the hypothesis that GD does indeed increases both the satisfaction and the demand for public health care[24].

In interpreting our estimates, a question that emerges is whether the effect is driven by the GD in all regions, or only by the two regions that have a special fiscal regime (can collect all their taxes). The latter would tend to indicate that fiscal, alongside political incentives, are driving the results. To address this concern, in Table C1 in the appendix, we report the estimates once we remove the observations referring to individuals residing in those two regions, which make up less than 5% of the total Spanish population. We find that our results remain virtually unchanged for the four dependent variables examined. These results confirm that political incentives are driving the results. Similarly, we consider whether our results are driven by the effect of the capital region of Madrid, as one could argue that capital cities tend to have a more developed health care insfraestructure, prompting an easier access to health care. Table C2 in the appendix examines whether our results hold to the exclusion of Madrid and, again, suggests identical coefficients as our baseline results.

[24] The coefficients are economically meaningful and compare well with those of other studies (Costa-Font and Jofre-Bonet, 2008).

Table 3
Falsification tests: Effect on health and the government priorities.

	Satisfaction with education	Satisfaction with health	Satisfaction with housing	Satisfaction with pensions
Treated	-0.052***	0.001	-0.005	0.028*
	(0.014)	(0.019)	(0.014)	(0.015)
Post2020	0.027***	-0.017	0.031***	-0.020
	(0.010)	(0.012)	(0.007)	(0.012)
Treated*Post2002	-0.003	0.023**	-0.007	0.003
	(0.008)	(0.010)	(0.007)	(0.008)
Nbr. Observ.	66633	66633	66633	66633

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009.

5. Robustness and heterogeneity

Next, we present some falsification tests, heterogeneity analysis, and robustness tests. First, we report a number of falsification tests to address a potential concern that in 2002 other political decisions might have taken place. Second, we examine the presence of heterogeneous effects across education and income as well as the age of the survey respondent. Finally, we report some additional evidence of the robustness of our results to the combined effect of decentralisation alongside other political incentives.

5.1. Falsification test

One possible concern with our baseline estimates is that GD gave rise to broader political reforms influencing other public services. Hence, we examine whether decentralization affected the satisfaction with other public services unaffected by health decentralization. Table 3 reports the DiD estimates on the satisfaction with other public services, which we use as a falsification (placebo) test. More specifically we examine the effect on housing and education, which was not affected by any reform around the time of the health decentralization reform examined. Similarly, we examine the effect on satisfaction with pensions, which were centrally regulated and hence unaffected by government devolution. Consistently, we find no significant effect of GD on the satisfaction with education, housing, and the pension system, and we do find an effect with the variable capturing individuals' interest in health. Hence, this adds credibility to the study hypothesis, suggesting that the effect of GD on the health systsm is genuine.

5.2. Heterogeneity

In this section we examine whether our results are heterogeneous across some socio-economic or age groups. Indeed, the effect of GD is likely to be different depending on whether individuals can afford private health insurance (PHI), and whether individuals hold prior knowledge that can be used to "navigate better" the health system, which we proxy by education. Similarly, its seems reasonsable to assume that the expected use of health care is influenced by an individuals age, which affects the depreciation of health capital in a standard Grossman model (1972). Thus, we expect individuals' age to impact the effect that GD has on their perceptions and use of public health care.

Table 4 reports the results of the heterogeneity analysis of our four dependent variables according to individuals' socio-economic status, namely income and education.[25] Although the differences in their perceptions of the quality of the public health system are not statistically significant, we do find statistically significant differences in the preference for NHS care and satisfaction with the NHS across socioeconomic status. When we examine the uptake of private health insurance, we only find a negative and satistically significant coefficient among high social-economic status individuals (both the high education and high-income respondents). In contrast, we find a small and imprecise coefficient of the effect of the reform for private health insurance uptake for the total sample (Table 2). This is consistent with the idea that only more affluent individuals can afford private health insurance, and thus are the ones who can discontinue their PHI policy when the NHS quality improves [26]. Specifically, we find that GD brought a reduction in the uptake of PHI of a similar magnitude for both high-income (13.1pp) and high education (14pp) individuals. Consistently, such effects are not observed among middle- and lower-income individuals, who were less likely to take up PHI before to the reform.

[25] We define four income groups: (i) those who do not report their monthly income, (ii) low-income respondents (income below €900 per month), (iii) middle income when their income ranges from €901 to €1800, and (iv) upper income when individuals report a monthly income above €1801. Similarly, we also distinguish four education groups: level 0 when there is missing information, level 1 for primary education or less, level 2 for high school or finished professional education, and level 3 for those with a university degree or higher.

[26] Indeed, although middle- and low-income individuals might be more price sensitive, they are more likely to be price out of the market given that they cannot afford the insurance premiums.

Table 4
Heterogeneous effects across income and education groups.

	Perception health system [0 bad - 3 excellent]			
	Missing income	*Income<900*	*900<=inc.<1800*	*Income>=1800*
Treated*Post 2002	-0.008	0.130***	0.084**	0.123***
	(0.032)	(0.034)	(0.035)	(0.027)
	Missing education	*Low education*	*Middle education*	*High education*
Treated*Post 2002	0.199**	0.060**	0.099***	0.047
	(0.099)	(0.027)	(0.029)	(0.036)
	Preference for public health [0 never use it – 4 always use it]			
	Missing income	*Income<900*	*900<=inc.<1800*	*Income>=1800*
Treated*Post 2002	0.063	0.142**	0.067	0.290***
	(0.062)	(0.056)	(0.054)	(0.067)
	Missing education	*Low education*	*Middle education*	*High education*
Treated*Post 2002	0.140	0.085*	0.140**	0.213**
	(0.133)	(0.051)	(0.055)	(0.088)
Satisfaction with public health [0 unsatisfied - 10 very satisfied]				
	Missing income	*Income<900*	*900<=inc.<1800*	*Income>=1800*
Treated*Post 2002	-0.046	0.283***	0.089	0.077
	(0.071)	(0.063)	(0.056)	(0.064)
	Missing education	*Low education*	*Middle education*	*High education*
Treated*Post 2002	0.066	0.087*	0.119**	0.006
	(0.127)	(0.051)	(0.053)	(0.071)
Private health insurance (PHI) uptake (Probit)				
	Missing income	*Income<900*	*900<=inc.<1800*	*Income>=1800*
Treated*Post 2002	0.012	-0.038	-0.028	-0.131**
	(0.066)	(0.148)	(0.073)	(0.063)
	Missing education	*Low education*	*Middle education*	*High education*
Treated*Post 2002	0.210	0.038	-0.095	-0.140*
	(0.277)	(0.065)	(0.066)	(0.083)

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009.

Table 5
Heterogeneous effects by age.

	Perception health system[0 bad-3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated*Post2002	0.061***	0.101***	0.067***	-0.039
	(0.013)	(0.022)	(0.024)	(0.034)
Treated*Post2002*Old	0.099***	0.162***	0.158***	-0.064
	(0.017)	(0.030)	(0.034)	(0.062)
Nbr. Observ.	67692	67641	55297	47723

Note: Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009, but it includes a dummy variable "old", which takes value 1 if the individual is older than 70.

Next, in Table 5, we examine the heterogeneity of our estimates by age group. Accordingly, we split our sample between those older than 70 and the rest[27]. Table 5 reveals larger coefficients among the older respondents. This is consistent with our hypothesis, as we expect older respondents to be more likely to use health care and thus to be more sensitive to changes in the public health care quality. That said, the estimates of GD on PHI uptake are, as for the total sample (Table 2), small and imprecisely estimated for both samples. Although older individuals might benefit more from being over insured, it is also true that they face a much higher PHI premium or be excluded from coverage, which reduces the probability to have been privately insured before the reform.

[27] Figure B1 in the Appendix depicts respondents visits to the GP in the 4 weeks previous to the interview by age and gender. The graph shows that the increase is fairly constant after 35 years old for women and 45 years old for men, but it reaches a larger percentage of GP visits between 65 and 75. Hence, given such a turning point we believe it is meaningful to set the cut-off age of 70 years of age.

Table 6
Interaction with "election year".

	Perception health system[0bad-3excellent]	Preference for public health[0never–4always]	Satisfaction with public health[0unsat.-10v.sat.]	PHI[1yes-0no]Probit
Treated*post2002	0.076***	0.127***	0.090**	-0.045
	(0.024)	(0.047)	(0.043)	(0.051)
Election year	-0.096***	0.036	-0.134**	-0.411***
	(0.027)	(0.041)	(0.053)	(0.049)
Nbr. Observ.	67692	67641	55297	47723

Note: Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009, but the regression includes "election year", a dummy variable that takes value 1 if there were elections on that year.

Table 7
Effects of decentralisation on a number of mechanisms.

	Public Health Spending	Surgical theatre rooms	Number of specialists	NMR equipment	Satisfaction waiting lists hospital	SatisfactionWait. times specialist
Treated	872.831***	0.213	0.448***	0.687***	0.689***	1.079***
	(22.811)	(0.210)	(0.034)	(0.052)	(0.156)	(0.144)
Post2020	116.291***	0.236	-0.018	-0.305***	0.854***	0.838***
	(24.258)	(0.231)	(0.037)	(0.057)	(0.186)	(0.173)
Treated*Post2002	81.149***	0.033	0.038	-0.024	0.162	0.216*
	(15.965)	(0.147)	(0.024)	(0.036)	(0.123)	(0.114)
Nbr. Observ.	238	252	252	250	210	210

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. The regressions include year and regions fixed effects. years 1998-2009.

5.3. Political incentives

A potential driver of GD effects might be the different regional political cycle, that is re-election incentives of political incumbents at the regional level might differ across regions. Regional incumbents might instrumentally improve their regional health services strategically before the election to get re-elected, and election years might increase the salience of any health system failure. To address this point, Table 6, displays the estimates a specification controlling for the election year, a variable that takes value 1 in the year that there were general elections (2000, 2004, and 2008). Although the coefficient of the election year is statistically significant in three of our four specifications, our coefficients of interest do not change. The main picture indicates that public support for the NHS deteriorates in an election year.

6. Mechanisms

In this section we examine the different mechanisms can explain our findings. Tables 7 and 8 replicate the same DiD strategy using as dependent variable a series of potential drivers measured at the regional level for several years before and after the decentralization (1998-2009, as our main analysis), and Figs. 2.1 to 2.7 graphically display the trends in such variables (some figures include more years, if data is available) as follows. First, we examine whether GD changed the resources allocated to health care (first column of Table 7 – public health spending). This is important given that GD entailed some additional regional participation in national taxe collection. Second, we examine whether GD gave rise to an improved health care insfraestructure (more specifically, we examine the trends in the number of surgical theatres, specialists, and NMR equipment used) (columns 2 to 4 in Table 7). Third, given that GD allows addition regulatory discretion in the organisation of the supply of health care, we examine whether it increased the regional reliance on contracting out (outsourcing) private providers by the NHS. Fourth, we examine whether GD lead to any differences in individual's satisfaction with waiting times and waiting lists, two variables that we use as subjective measures of public health quality (Columns 5 and 6 of Table 7). Fifth, we briefly discuss whether decentralization brought policy innovation and diffusion drawing on qualitative evidence. Sixth, we examine the potential role of migration in driving the effects of GD. Finally, we examine the effect of other political incentives related to interjurisdictional interactions, namely the presence of strategic interactions between central and regional governments (Table 8).

Table 8
Interaction with "regional incumbent".

	Perception health system[0bad-3excellent]	Preference for public health[0never–4always]	Satisfaction with public health[0unsat.-10v.sat.]	PHI[1 yes – 0 no]Probit
Treated*post2002	0.142***	0.131**	0.179***	-0.117
	(0.029)	(0.061)	(0.050)	(0.073)
Treated*post2002*Incumbent	-0.120***	-0.112	-0.088	0.154*
	(0.036)	(0.078)	(0.065)	(0.083)
Post2002*Incumbent	0.052	0.233**	-0.029	-0.019
	(0.034)	(0.094)	(0.068)	(0.081)
Incumbent	0.020	-0.137***	0.125***	0.001
	(0.022)	(0.048)	(0.045)	(0.054)
Nbr. Observ.	67692	67641	55297	47723

Note: Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009, but the regression includes a dummy variable "Incumbent", which takes value 1 in the regions run by an incumbent of the same party as that of the central government.

6.1. Resource allocation

GD might have entailed a reallocation of regional spending out of other services, such as culture, into the health sector. Table 7 (column 1) reports the effects of GD on the reallocation of government resources and finds a precisely estimated coefficient indicating an annual increase in public health expenditure of 81 euros per person in the treated regions compared to the control group (the average over all the period and regions is of 992 euros)[28]. Fig. 3.7 in Fig. 3 displays evidence of this effect graphically. The figure indicates that although the increase in health expenditures took place in all regions, it was slightly larger for the treated regions, and it was mainly during the 2004-2007 period. Although health expenditures increase more among treated regions, these differences alone seem insufficeint to the drive our results, as Table C3 in the appendix shows that our baseline results (for the four dependent variables) do not change significantly after controlling for health spending per region.

6.2. Public health care capacity

One potential mechanism explaining the influence of GD on patients' health care choices refers to improvements in health care instraestructure (capacity). To test this, we examine the effect of GD on the number of operating rooms as percentage of the total number of operating rooms, the concertation of specialists per 1000 inhabitants, and the quantity of nuclear magnetic resonance (NMR) equipment (Table 7, columns 2 to 4). Estimates reveal imprecise and small effects for all the three variables: the number of specialists, operating rooms, and nuclear magnetic resonance (NMR) equipment. Figs. 3.1, 3.3. and 3.4 in Fig. 3 display the results, which are consistent with the estimates. Hence, it is unlikely that a higher infraestructure underpins the effects of GD on the public health system.

6.3. Contracting out

GD allowed for further discretion to outsource publicly funded health care activity to private providers. This could have explained the increase satisfaction with the public health care, while not increasing public health capacity substantially and containing the health expenditures[29]. Unfortunately, we do not have data from before 2002 but Fig. 3.2 in Fig. 3 reporting the trends in hospital contracting out after 2002 suggests a small increase of the percentage of public health expenditures used to contract out private health centres in the treated regions.

6.4. Waiting times

Changes in waiting times (defined as the time since patients are placed on a waiting list) are argued to play a role in explaining NHS dissatisfaction and private health choices. Unfortunately, the two measures of waiting times (average waiting time for a non-urgent operation and average waiting time for a first appointment with the specialist) are only available after 2003 (after a request of the Spanish ombudsman), when the reform had already taken place. Our data set

[28] Such differences are mainly explained by differences in demographics and geography, alongside a reduced allocation to 'cultural spending', as many regions lack a distinct regional language.

[29] Catalonia is a clear outlier on the percentage of public expenditures devoted to contracting out private health, with a percentage that ranges from 24 in 2002 to 37% in 2015. In Madrid, the second region with the largest percentage, this increased to 12% in 2015 (starting in 2002 with less than 6%).

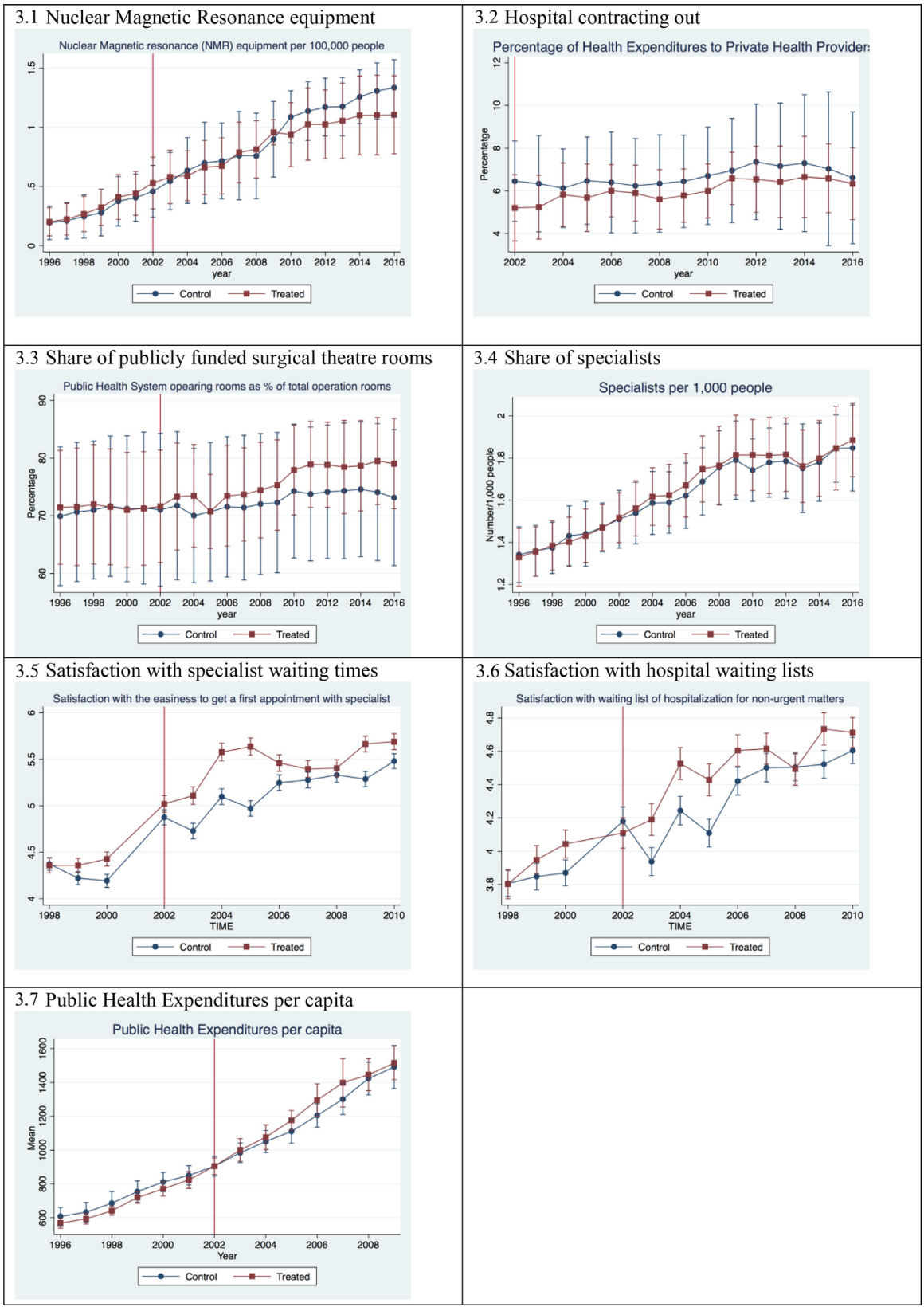


Fig. 3. Trends in selected health care.
Source: Ministry of Health (Ministerio de Sanidad), several years.

however has information on individual satisfaction (perceived) with waiting times for all the years of our analysis. Figs. 3.5 and 3.6 in Fig. 3 suggest that both measures of satisfaction (satisfaction with waiting times for a visit with the specialist and for hospitalizations) had increased in all regions, although the increase has been larger for the treated regions. However, Table 7 shows that this increase in satisfaction is only precisely estimated (at 10%) whne we examine the satisfaction with specialist waiting times, indicating an increase of about 1/3 of one standard deviation of the average satisfaction in the treated regions. However, the difference is imprecisely estimated for satisfaction with hospital waiting lists. This results are consistent with our main results, and show that satisfaction with public health care increased in treated regions after decentralisation.

6.5. Policy innovation and diffusion

GD allows for lower cost innovation and experimentation, which if successful can be easily disseminated. Once a specific policy has demonstrated success in one region, other regions have an incentive to free ride. (Besley and Case, 1995). Hence, it is efficient for decentralised governments to choose policies of similar (benchmark) jurisdictions so long as voters use relative rather an absolute quality assessment in making their public choices. In Spain, experiences of innovation and diffusion extend the development of preventive programs, mental health care, and hospital organisation primarily[30], and a number of regions that received health care responsibilities became front runners in certain policy areas. Hence, during the years after 2002 decentralized regions had significant legislative activity aiming at increasing health quality and adjusting it to the regional preferences. For example, Castilla-La Mancha's government introduced legal limits to waiting list for surgical interventions and diagnostic tests in 2003, only a year after devolution. Other examples include Madrid's new school nursing program initiative, the heavier prioritization of robotics in cancer care, Extremadura's and the Balearics pioneering the implementation of electronic prescription alongside efficiency enhancing initiatives, such as the automatic substitution of originators drugs for generics in Castilla-La Mancha among other. In other words, a potential mechanism was the furthering of policy innovation and diffusion of health programs across regions.

6.6. Migration

During the period examined, Spain exhibited a large inflow of migrants. To further examine the effect of migration, we have tested whether the regions that have been more heavily exposed to migration exhibit a different effect of decentralisation on our four dependent variables. Specifically, this was the case of Catalonia, the Canaries, Valencia, Madrid, Balearic Islands, and Murcia. We find that, even though the sample size is smaller (we keep 6 of our 17 regions), our results with these six regions remain similar to those on the baseline (Table 2), although the interaction coefficient for satisfaction with public health becomes imprecisely estimated, which can be explained by the fewer number of observations, and, in contrast, the reduction of private health take up becomes precisely estimated (Table C4 in the Appendix).

6.7. Regional incumbents and political incentives

Regional incumbents are not just agents of their constituents, but they might become agents of their political party too. However, GD in Spain is found to strengthen the regional organisation of multi-level state-wide parties (Fabre 2008, 2011). As a result, we investigate whether the effect of GD on health-care decisions is affected by whether the regional incumbent coincides with the central government incumbent, given that it might influence incentives for regional governments to engage in vertical competition (Breton, 1998, Costa-Font and Rico, 2006). Thus, we expect the effect of GD to be larger if the incumbents at the central and regional level do not coincide as it increases the incentives to experiment and engage in competition with regions run by the same party and the central level. Table 8 reports the results in which we include the triple interaction with central and regional incumbents. The variable "incumbent" takes value 1 if the regional incumbent coincides with that at the central level; and 0 otherwise. Our results are consistent with the presence of vertical competition: the effect of decentralisation is smaller when the regional and central governments are ruled by the same party, although the triple interaction is precisely estimated only for two out of our four variables of interest (quality perception of the NHS and PHI).

7. Conclusion

This paper has examined the effect of the government devolution (GD) of health care stewardship to sub-central governments on individual health care choices, preferences, quality perceptions, and satisfaction with the National Health System

[30] Some regions, such as Catalonia, the Basque Country and Andalucía have played the role of leaders in introducing innovations. In the case of Catalonia, this has been, for example, in the setting up of health technology agencies, in the purchaser-provider split, and in several experiences with long-term care. In Andalucía innovation has been in coverage of dental care, exchange and opposition to negative lists. The Basque Country is another front-runner, among other reasons due to the higher expenditure per capita at its disposal (Costa-Font and Rico, 2006).

(NHS). We exploit quasi-experimental evidence from GD in Spain, where health care responsibilities were transferred to a group of ten regions in 2002, and we compare them to a group of regions exhibiting no institutional reform in their health system stewardship in the period. The earliest GD reform on the 7 control regions took place at least 8 years before 2002 (12 to 21 years before in 6 of the 7 regions), and consistently we find evidence of parallel trends between control and treatment regions before 2002.

Our findings suggest that GD has led to a change in the perception of, preference for, and satisfaction with the National Health System (NHS). Consistently with the hypothesis that GD is an alternative to privatisation, we find that GD led to a reduction in the uptake of PHI among higher income and education individuals, who typically can afford insurance premiums and thus opt out of the NHS care if they are not satisfied with it. Our estimates are robust to different specifications, falsification tests, and controls for political variables. Notably, we find heterogeneous effects with respect to the political incentives of the regional political incumbents. These changes can be explained by electoral incentives to improve visible dimensions of health care quality in the NHS, such as reduced waiting times and policy independence. More generally, these results are consistent with other survey evidence suggesting individuals trust more regional than central government, during the time of our study[31]

Our results suggest that the model of GD common to many European countries, characterised by high political but limited fiscal decentralisation, strengthens the choice of NHS care. More generally, our results are consistent with the thesis that GD provides an alternative to the 'build in' accountability mechanisms of health care markets. In a setting where taxes are mainly uniform, higher NHS accountability after GD rests upon the visibility of the performance of one's own regional health services, compared to other regional health services.

CRediT authorship contribution statement

Both authors have contributed equally to the idea, writting, data analysis and revisions of the paper.

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Appendix A. Background information and institutional setting

Figs. A1, A2, A3; Tables A1, A2

Table A1
Time of decentralisation transfers by region state.

Andalusia	Royal Decree (RD) 400/1984, 22nd February
Aragon	RD 1475/2001, 27th December
Asturias	RD 1471/2001, 27th December
Balearic Islands	RD 1478/2001, 27th December
Basque Country	RD 1536/1987, 6th November
Canary Islands	RD 446/1994, 11th March
Cantabria	RD 1472/2001, 27th December
Castile-La Mancha	RD 1476/2001, 27th December
Castile and Leon	RD 1480/2001, 27th December
Catalonia	RD 1517/1981, 6th July
Extremadura	RD 1471/2001, 27th December
Galicia	RD 1679/1990, 28th December
La Rioja	RD 1473/2001, 27th December
Madrid	RD 1479/2001, 27th December
Murcia	RD 1474/2001, 27th December
Navarre	RD 1680/1990, 28th December
Valencian Community	RD 1612/1987, 27th November

[31] Survey evidence form the Centre for Sociological Research (2008) rating government trusts suggests a 3.54 score for the central governments which compared to a 4.41 of regional governments.

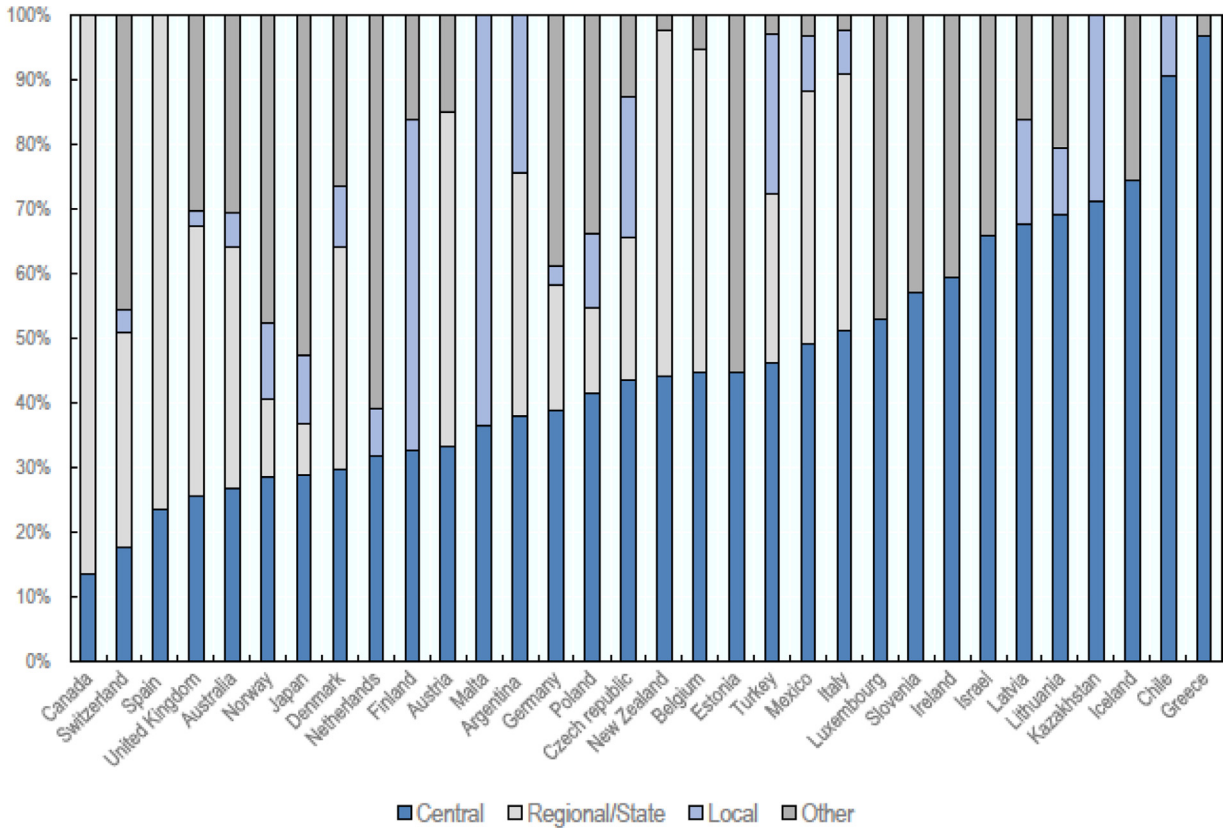


Fig. A1. Decision-making power in the health sector, across levels of government.
Note: Proportion is in percentage. Source: OECD, 2019.

Table A2
Health expenditure in Spain 1995–2009.

	1995	*2000*	*2005*	*2009*
Public Health Expenditure				
%	72%	72%	71%	75%
% GDP	5.5	5.4	5.4	6.5
Private Health Expenditure				
%	28%	28%	29%	25%
% GDP	2.1	2.1	2.2	2.2
Total Health Expenditure				
% GDP	7.6	7.5	7.6	8.7

Source: Ministerio de Sanidad, Política Social e Igualdad, 2011.

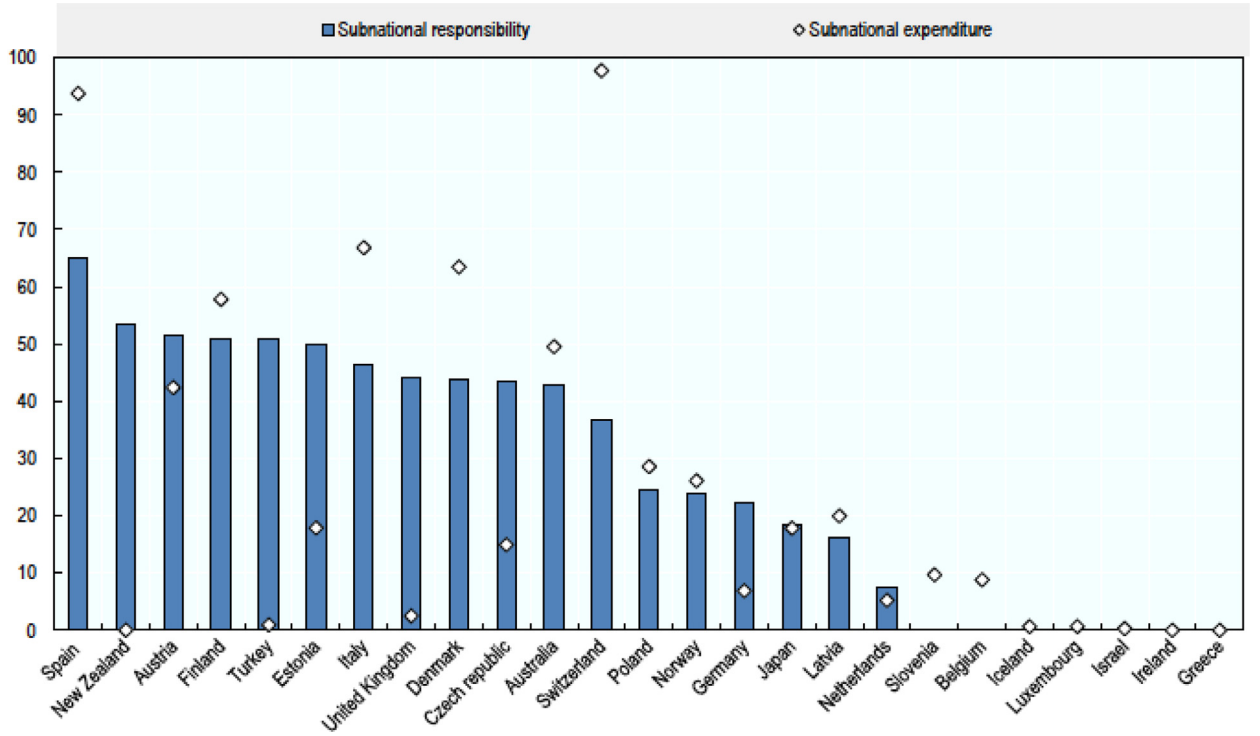


Fig. A2. Representability and health expenditure in hands of subnational governments.
Note: Subnational expenditure in % of the total health expenditure. Source: OECD, 2019.

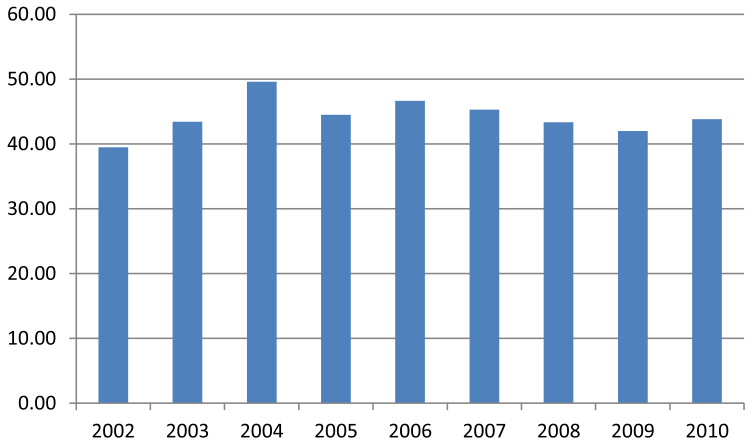


Fig. A3. Perceptions of territorial equity.
Note: % of the population that agree with the statement that "all citizens receive the same care irrespective of what regional states they live". Source: Spanish Health care barometer, several years.

Appendix B. Definition and descriptive statistics of the three self-reported dependent variables

B1. Preference for public (vs private) health care

Original question: respondents are asked about their hypothetical choice between public and private health system for themselves or a family member in case they needed, for four different types of health care. Respondents are asked whether they would use public, private, or both.

Descriptive statistics: % respondents in each category

	Primary care	Specialist	Hospital	Emergency
Public	73.64	59.91	73.32	75.39
Private	19.86	29.46	20.46	18.37
Both	6.10	10.08	5.41	5.46
Missing	0.39	0.56	0.80	0.79

Dependent variable: The answers are recoded as 1 if the individual would choose public health care (and 0 otherwise). Our dependent variable is the sum of the four recoded variables (primary, specialist, hospital and emergency) and it can therefore range from 0 (the respondent has chosen private or both for each of the four types of care) to 4 (the respondent has chosen public health care for all the four types of care).

Descriptive statistics: About half of the respondents (50.73%) choose public health for all the four types of care. The mean (see Table 1) is 2.556 (sd 1.7)

Preference for public health % respondents in each category:

0	25.46
1	5.82
2	7.07
3	10.92
4	50.73

B2. Quality perception of the public health system

Original question: Respondents are asked whether they think that the public health system works well. They can cast their answers into the following four categories:

Respondents answers:	Recoded into:	% respondents in each category
Health System works well	4	5.22%
Health System works fairly well	3	24.96%
Health system works well, but needs changes	2	47.34%
Health System needs fundamental changes	1	22.48%

Dependent variable: The dependent variable can range from 1 to 4, in which 4 means that the respondent thinks that the NHS works well. The mean (see Table 1) is 1.871 (sd 0.82).

B3. Satisfaction with public health system

Original question: Respondents are asked to evaluate from a scale ranging from 1 to 10, the following eight different aspects of the public health system:

Satisfaction with (1 to 10):	Mean
Proximity	7.04
Time Openings	6.56
Kindness of personnel	6.86
Home care	6.42
Time doctor spends per patient	6.15
Knowledge of the doctor about their patients	6.52
Easiness to get to the specialist	6.23
Trust and confidence with the doctor	6.83
Waiting time at the doctor room	5.24
Team	6.18
Information received on my health problems	6.59

Dependent variable: The dependent variable is the average of the eight satisfaction questions. Therefore, our dependent variable can take more than 11 values. The mean (see Table 1) is 6.432 (sd 1.61)

Appendix C. Robustness regressions

Table C1
Excluding Navarra and the Basque Country.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated	0.286***	-0.073	0.317***	0.057
	(0.041)	(0.089)	(0.058)	(0.124)
Post 2002	0.140***	-1.107***	1.851***	0.564***
	(0.030)	(0.045)	(0.058)	(0.069)
Treated*Post 2002	0.067***	0.141***	0.111**	-0.038
	(0.025)	(0.048)	(0.045)	(0.055)
Nbr. Observ.	61693	61617	50208	43504

Note: Standard errors in parentheses.
* $p < 0.1$.
* $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009. Regressions exclude the Bask Country and Navarra.

Table C2
Excluding Madrid.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated	0.282***	-0.064	0.326***	0.059
	(0.040)	(0.088)	(0.057)	(0.123)
Post 2002	0.129***	-1.103***	1.890***	0.580***
	(0.028)	(0.043)	(0.055)	(0.063)
Treated*Post 2002	0.076***	0.127***	0.090**	-0.045
	(0.024)	(0.047)	(0.043)	(0.051)
Nbr. Observ.	67692	67641	55297	47723

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009. Regressions exclude Madrid.

Table C3
Baseline estimates controlling for regional health spending.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated	0.335***	-0.022	0.328***	0.001
	(0.043)	(0.104)	(0.070)	(0.124)
Post 2002	0.328**	-1.035***	1.866***	0.021
	(0.132)	(0.297)	(0.196)	(0.253)
Treated*Post 2002	0.097***	0.129**	0.116**	-0.062
	(0.028)	(0.058)	(0.048)	(0.050)
Pub. Health Exp. p/c	-0.000**	-0.000	-0.000	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Nbr. Observ.	60526	60503	49352	47723

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009. Regressions control for public health expenditures per capita.

Table C4
Baseline estimates in regions that are more exposed to migration.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated	-0.126***	-0.672***	0.357***	0.951***
	(0.037)	(0.070)	(0.071)	(0.050)
Post 2002	0.035	-1.233***	1.717***	0.479***
	(0.035)	(0.070)	(0.058)	(0.073)
Treated*Post 2002	0.117***	0.323***	0.080	-0.138***
	(0.036)	(0.065)	(0.056)	(0.053)
Nbr. Observ.	25543	25502	20606	20086

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009. The table only includes regions more heavily exposed to migration: Catalonia, the Canaries, Valencia, Madrid, Balearic Islands, and Murcia. This is, the table includes 6 of our 17 regions.

Table C5
Baseline estimates with Ordered Probit.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]
Treated	0.396***	-0.045	0.252***
	(0.057)	(0.074)	(0.029)
Post 2002	0.173***	-0.897***	1.430***
	(0.039)	(0.040)	(0.022)
Treated*Post 2002	0.107***	0.073*	0.067***
	(0.034)	(0.040)	(0.017)
Nbr. Observ.	53350	53386	43501

Note: Standard errors in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2006, but regressions are run with an Ordered Probit.

Table C6
Excluding Canarias.

	Perception health system[0 bad - 3 excellent]	Preference for public health[0 never–4 always]	Satisfaction with public health[0 unsat.-10 v. sat.]	PHI[1 yes – 0 no]Probit
Treated	0.306***	-0.030	0.317***	0.048
	(0.040)	(0.097)	(0.062)	(0.123)
Post 2002	0.054*	-1.126***	1.754***	0.540***
	(0.032)	(0.056)	(0.058)	(0.060)
Treated*Post 2002	0.057**	0.104*	0.083*	-0.021
	(0.025)	(0.053)	(0.045)	(0.050)
Nbr. Observ.	57698	57683	47086	45488

Note: Standard errors in parentheses
* $p < 0.1$
** $p < 0.05$
*** $p < 0.01$. Same specification as in Table 2, with controls, years 1998-2009. Regressions exclude Canary Islands.

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