
# Does Devolution Alter the Choice of Public versus Private Health Care?

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## Abstract

Government decentralisation (GD) can provide an alternative to the 'build in' accountability mechanism of markets by influencing the choice of and preference for 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) to study the effect of GD on the individual choice of public (NHS) and private health care drawing on a difference-in-differences design. We find that 'turning on' the decentralization treatment (abandoning centralised governance) increases the preference for public health care (NHS) compared to control regions that did not exhibit any major change in the health care governance in the least a decade. Specifically, we find that GD increases the perceptions of, satisfaction with, and preference for the NHS. Consistently, we also find that the GD reduces the uptake of private health insurance among higher income and education groups. The effects are mainly driven by improvements in health care quality as well as policy innovation and diffusion.

*Keywords:* devolution, National Health Service (NHS), private health care, private health insurance, health system satisfaction, health care quality.
*JEL-Codes*: H7, I18

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## 1. Introduction

The uniform provision of public health care under a National Health System (NHS) rarely satisfies all people's expectations. 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, decreases NHS congestion among those who remain using the NHS (Besley and Coate, 1991). Nonetheless, 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 devolution (GD) or decentralisation is an organisational alternative to the reliance on private health care markets. By allocating the political stewardship of the health system to subcentral governments, GD equips local incumbents with political incentives (increasing the probability of re-election) to locally profile the supply of health services to their regional specific health care needs[2]. This is of significant policy relevance given that health care is the chief responsibility of subnational governments in most European countries, especially in Sweden, Spain, Switzerland, and Italy (OECD, 2019)[3].

This paper examines whether GD alters the choice between public (NHS) and private health care and individuals' quality assessments of the publicly funded health car[4]. More specifically, we examine whether GD improved perceptions of and satisfaction

[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.

[2] 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.

[3] 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.

[4] 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).

with the NHS; and increased preferences for public health care, including the uptake of PHI. Although private health care is very sensitive to quality assessments (Gouveia, 1997; Besley et al., 1996; Hall and Preston, 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, 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 subcentral governments are responsible for the highest share of public health responsibilities (see Figure A1 and A2 in the Appendix)[5].

We draw on a DiD strategy where we compare the ten regions that received health care responsibilities after 2002 (treatment group) to the seven regions that *did not change* its health care stewardship status for at least 11 years (control group, which was already decentralized)[6]. That is, we study whether 'turning on' the devolution treatment (GD) altered the choice and preferences of public versus private health care, when the only change that could have motivated a change in trends is the inception of GD.

The validity of our strategy rests on the existence of parallel trends prior to 2002. That is, we do not expect the two sets of regions to show differences in behaviour prior to the treatment. Nevertheless, 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

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

[6] That is, the control group regions already had full health care responsibilities from 1981 to 1994 and were thus fully adapted to decentralization by 2002.

differ largely across regions. Given that health care in all regions (except for two regions that make 5% of the Spanish population) were funded by a homogenous block grant, differences across regions after devolution cannot be driven by differences in available budgets, but by regional specific policy priorities. Hence, we compare NHS quality, preferences, and choices of regions that were already managed on a decentralised basis (for more than a decade) throughout the period of analysis, with those that switched from centralised to decentralised governance in 2002.

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 regions with special fiscal regime (Navarra and the Basque Country); and to examining only the period before the financial downturn of 2008. The result is robust to a battery of checks and survive a number of falsification tests. Finally, we examine several alternative mechanisms potentially driving our results, including variations in regional level budgets, measures of quality of health care, the role of policy interdependence, as well as selective migration. Our results are consistent with the thesis that GD provides an alternative to the 'build in' accountability mechanisms of health care markets (Tanzi, 2001), in a setting where taxes are mainly uniform, and GD rests upon interjurisdictional interactions across jurisdictions.

In short, we contribute to the literature by documenting that GD strengthens the preference for (and improves the quality assessment of) NHS care and reduces the uptake of PHI among higher income and education groups (who can afford the premiums, or their jobs offer 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 subcentral governments, and is funded by general taxations with rather limited set of cost sharing (restricted to medicines and orthopaedic products). 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[7]. Healthcare in the remaining ten regions remained centrally managed by the National Institute of Health (Instituto Nacional de la Salud, INSALUD) until 2002, when the second decentralization wave took place, which is the treatment we exploit in this paper[8] (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, also important, it was a largely unexpected reformed that resulted from the first absolute majority of the conservative government in 2000. At the time of the health decentralization, no other reform took place that could have modified quality of care.

[7] First to Catalonia (completed in 1981), followed by Andalucia (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).

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

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[9]. Indeed, although Government Devolution (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[10]. In our period of analysis, 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.

In contrast, GD did significantly modify the nature of the political agency in health care, as it afforded regional governments with a new policy responsibility to prove themselves of value to constituents relative to the central government, and other regional government[11]. Indeed, GD equipped Spanish regions with significant legislative capacity to the regional health system architecture to adjust it to the preferences of regional constituents (and increase their chances of re-election), only limited by central level

[9] 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.

[10] Regional governments could raise additional external financing from financial markets, the traditional way out for region states has 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.

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

framework legislation[12]. 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)[13].

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 latter has been rather limited (less than 1% of patients are treated in hospitals of different regions)[14]. That is, information of reforms in neighbouring jurisdiction is often used to judge one's own regional government performance (Salmon, 1987), given that funding is comparable[15].

### *2.2 Private health care in Spain*

In the period examined, public health expenditure remained stable until 2005, and only slightly increasing after that time, while private health expenditure remained constant at roughly 2% of the GDP (Table A2) throughout the period[16]. In addition to care

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

[13] 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.).

[14] Importantly, patient mobility declined from 2001 where 60,500 patients seeking care in another regions state to 2005 where 58,000 patients were up for care and region-specific flow of patients travelling has generally declined (Ministry of Health, 2008).

[15] 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.

[16] 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 (OOP) expenditure, while insurance premiums (PHI) barely account for approximately 21% of private health expenditure in 2010.

paid out of pocket, a significant share of the population takes up private health insurance (PHI), which supplements NHS care. PHI is one of the most traditional mechanisms available to the middle class to ensure access to affordable private health care[17], 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 (43% in 2012) (IDIS Foundation, 2013) [18] . 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 this proposition.

## 3. Data and Empirical Strategy

### *3.1 Data description*

Our data is primarily from the Spanish Health Care Barometer (Barometro Sanitario, BS), an annually representative survey of the Spanish population aimed at capturing, among other things, the use, and attitudes towards the health sector. The survey contains standardized questions on the satisfaction, opinion, preferences, and prospective use of the public health care system, information on the uptake of private health insurance (PHI), and individual and household characteristics. The survey has been designed to be representative of each one of the seventeen Spanish regions and was

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

[18]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).

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 2010 (1998-2006; 2009-2010), as earlier waves do not include all the information needed to perform the analysis and later ones use different definitions of our main variables of interest. In addition, we could not include the 2007 and 2008 waves because the relevant questions were not asked. Besides these data limitations, Spain was hit by an economic downturn which could have modified health care preferences, especially after 2010 where spending cuts took place. Therefore, it is important to limit the analysis to 2010. In addition, given that the onset of the financial crisis and of the spending cuts was imprecise, we also perform an analysis with a sample ending in the 2006 waves, just before the economic downturn. Similarly, if we would go back much earlier than 1998, we might be still capturing the positive trend of the control regions that had been earlier decentralised. However, our time span before and after the reform is large enough for our purposes.

The survey includes information on individual and household 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 non-response by identifying and including missing information dummies for those individuals who do not report their income or education. Specifically, 27% of respondents do not report their income and 5% do not report education attainment.

We are interested in the following four dependent variables capturing proxies for the demand for and satisfaction with public health care, which we can identify in our data

as follows (Tables B1, B2 and B3 in the appendix show how they have been recorded from its original format in the survey, as well as detailed descriptive statistics):

(a) *Perception of the public health system*: this variable refers to a general question about whether the 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) our NHS works so poorly that we would need to rebuild it completely. To ease its interpretation, we have inverted the Likert scale, so that a value of 3 means that the respondent is 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 the public (vs. private) health system*: 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 about four 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 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 corresponds to having a strong preference for public health in all four categories of health use.

(c) *Satisfaction with the public health system:* respondents are asked to evaluate from 1 to 10 eight different aspects of the public health system. Although the questionnaire includes satisfaction with fifteen different dimensions, some responses have many missing values, so that we can only use eight of the fifteen satisfaction

questions. We have cardinalized the responses to these questions and taken the mean of all eight satisfaction domains as an overall measure of satisfaction with the NHS. The 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[19].

(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 1997 to 2004 and in 2009.

Table 1 summarizes the main variables for both, individuals 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[20]. 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 the variation we exploit in our analysis.

[Insert Table 1 about here]

### *3.2 Empirical Strategy*

We attempt to empirically estimate whether decentralisation has shifted individuals' demand of public health care measured through the four variables described in section 3.1: (i) the perception of, (ii) satisfaction with, and (iii) expected use of public

[19] 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 over all 8 aspects give very similar results to taking PC

[20] Unfortunately, a variable which we could not have access was self-reported health, which only available for 2010. However, we proxy it by adding the effect of age which captures the natural depreciation of health capital.

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 from salient quality proxies, such as waiting lists, which are uniformly provided by the NHS (Besley et al, 1999). We expect that decentralisation will adapt these salient features of the NHS to regional heterogeneous preferences and thus will increase individuals' satisfaction and preferences for the public health care[21].

Our identification strategy relies on exploiting the variation resulting from the 2002 decentralisation rollout to all regions. In other words, we exploit a reform that 'turned on' the decentralization treatment and entailed abandoning centralised governance in ten regions, while no reform took place for 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 first seven regions were decentralized between 21 and 11 years before 2002, which means that these regions had already adapted to the new organization by the time the treatment group got decentralised. We therefore should expect similar trends between 1998 and 2002, but we do not have 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 as well as demographic characteristic of each region. In contrast, after the treatment in 2002, we expect the treated group to show a positive trend in NHS satisfaction, while the trend in control regions should be stable.

[21] We also allow for preferences for public health care to vary across individuals' socio-economic characteristics (income and education) and individuals' age.

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, especially for those people who have experienced less contact with the health system. However, health care quality can be appreciated by users and non-users, though in a rather different way. Hence, the fact that someone has had some contact with the health system provides an additional source of variation to take account of. The specification is as follows:

$$Y_{it(g)} = \gamma_1 D_g + \gamma_2 \left(POST_t \cdot D_g\right) + \gamma_3 POST_t + \gamma_4 X_{it(g)} + \gamma_5 \mu_t + \gamma_6 \vartheta_g + \varepsilon_{it(g)} \qquad (1)$$

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, $\vartheta_g$ and $\mu_t$ 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 compare the changes in the group of treated regions with the changes of the control group after 2002. In other words, we regress equation (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).

### *3.3 No spillover effects*

Decentralisation in the ten treated regions added no additional powers to the previously decentralised 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 were to react to new policies of the newly decentralised regions. These effects can explain some of the effects of decentralisation, such as yardstick competition effects (Costa-Font and Rico, 2006).

### *3.4. Parallel Trends*

In a DiD analysis typically the control group remains untreated during all the period, while the treated group receives the treatment at some point. In the present paper instead the control group consists of those individuals living in a region that was already treated 11 to 21 years before the reform we study. However, we exploit the fact that the effects of decentralization on the NHS had already realised by the time our treated regions were equipped with health care responsibilities. Therefore, we expect similar trends between the treatment and control regions from 1998 to 2002. 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 assume that the control regions had a higher-level of public health care quality prior to the reform, we do test whether after the reform treated regions increased the quality difference between their health system and that of the control regions who made some of those reforms at least a decade before.

Figure 1 displays the trends of the four dependent variables in the study. The line with squares depicts those regions that were centralized prior to 2002 (treatment), while the line with dots refers to those regions that were already decentralized prior to 2002

(control). The figure indicates that three out of the four variables show clear parallel trends prior to the reform, while perception about the public health system ("health system perception", first figure) does not exhibit a clear pattern. In addition, we have tested for the presence of parallel pre-trends in a regression setting in which we include specific trends for treated regions in the pre-treatment period. Consistently with Figure 1 none of the specific pre-trends are statistically significant, except for the perception about the health system ("health system perception") in which two of the three pre-trends are statistically significant.

[Insert Figure 1 about here]

## 4. Empirical findings: Baseline Results

Table 2 reports the difference-in-differences (DiD) estimates of the impact of decentralisation on the four different proxy measures of the public health care preferences and choices (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 the survey (1998-2009) and excluding the years of the recession (1998-2007) to avoid potential confounding effects. The results excluding the recession years are like the estimates for the total period and therefore the rest of the paper draws from data from the entire period 1997 to 2009. Although excluding individual controls does also not change the results significantly, the rest of the paper does include controls. This is, besides time and

region fixed effects, we include income, education level, age, gender, occupation, and a dummy variable for missing income and education level[22].

In here we focus on the results for the entire period (1998-2009) and with controls (second column of each panel). Our baseline results suggest a positive and statistically significant effects of government devolution (GD) in three of the four domains of public health care preferences, while the coefficient of the interaction is close to zero, although imprecisely estimated, for the dummy variable indicating whether the individuals has Private Health Insurance (PHI). In section 5.2, we examine in more detail the extent to which these effects change when we consider individual specific heterogeneous effects.

We find a 7.5p increase in the perception that the public health system is working well (the mean value of this variable is 1.85), a 12p increase in the preference for public health care (mean value is 2.99), and a 10.5p increase in the satisfaction with the public health (mean value is 6.17). Next, we estimate a small (-0.045) and imprecisely estimated (std=0.051) coefficient for the uptake of private health insurance, which exhibit the expected sign. Hence, overall, these results are consistent with the argument that decentralisation does indeed shift the demand for public health care[23].

[Insert Table 2 about here]

[22] We find that 25 to 28% of the sample respondents fail to report their income. To address this feature, we include both the income covariate together with a dummy variable for missing income, which allows us to include all individuals. For education, which we follow the same empirical strategy, the share of missing observations is less than 8%. The two dummy variables for missing observations come out significant in almost all regressions. These results lead us to conclude that those individuals who do not report income or education have some unobservable characteristic in common that correlates with a worse opinion about the public health system and a larger probability to have health insurance. This however does not bias our results to the extent that we do control for those unobservables by including this dummy variable.

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

In interpreting our estimates, a question that emerges is whether the effect is driven by the GD, 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, and not political effects, 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, rather than fiscal incentives are driving the results. Similarly, we consider whether our results are driven by the effect of the capital region of Madrid, where one could argue that there is an easier access to health care resources and a more developed private health care. Table C2 in the appendix examines whether our results hold to the exclusion of Madrid and suggest identical coefficients as our baseline results[24].

## 5. Robustness and Heterogeneity

Next, we present some falsification, robustness tests, and heterogeneity analysis. First, we present a number of falsification tests to address a potential concern that in 2002 other political decisions might have taken place. Second, we examine heterogeneous effects across education and income as well as age groups. Finally, we present robustness of our results to possible interactions between decentralisation and political incentives.

[24] They show a statistically significant effect for perception of the public health System (0.076) and satisfaction with the public health system (0.127).

*5.1 Falsification Test*

One possible concern with our baseline estimates is that government devolution (GD) was accompanied by a broader political reform influencing other public services. Hence, we examine whether decentralization affected the satisfaction with other public policy services unaffected by health decentralization. Table 3 reports the DiD treatment on the satisfaction with other public services, which we use as a falsification (placebo) test. 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 leads us to conclude that the effect of decentralization is genuine.

[Insert Table 3 about here]

*5.2 Heterogeneity*

In this section we address whether our results are heterogeneous across some socio-economic or age groups. First, Table 4 reports the results for each of our four dependent variables[25] according to individuals' socio-economic status, namely income and education. The results reveal that our baseline estimates exhibit some heterogeneity. Although for perception of public health system the differences are not statistically significant, we find statistically significant differences across socio-economic groups for preference for public health system and satisfaction with health system; and across some education groups for satisfaction with heath. For uptake of Private Health Insurance, we

[25] We first proceed by splitting the sample into socio-economic groups. 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.

find that high social-economic status individuals have a statistically significant different coefficient than the rest.

While we found non-significant results for Private Health Insurance uptake for the total sample (Table 2), we find a negative and precisely estimated coefficient on the probability to take up Private Health Insurance, only for high income and high education individuals. 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 uptake when quality of public care increases[26]. Specifically, we find that decentralisation brought a reduction of the PHI take up in a similar magnitude for both high-income (13.1p) and high education (14p) individuals. Consistently, such effects are not observed among middle- and lower-income individuals, who were less likely to use PHI already prior to the reform.

[Insert Table 4 about here]

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 for the older sample. 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

[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.

[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.

samples. Although older individuals might benefit more from being over insured, it is also true that they face a much higher PHI premium, which reduces the probability to have been privately insured before the reform.

[Insert Table 5 about here]

*5.3 Political Incentives*

Regional incumbents are not just agents of their constituents, but they might become agent of their political party too. In fact, government devolution (GD) in Spain is found to strengthen the regional organisation of multi-level state-wide parties (Fabre 2008, 2011). Hence, we test whether the effect of GD on health care choices depends on 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, 1996, 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. Table 6 presents the results in which we include the triple interaction (treated*post*incumbent). 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. Nevertheless, the effect is only precisely estimated for two of our four dependent variables, namely perception of the public health system and the probability of PHI uptake.

Similarly, another potential political influence is the political cycle. Regional incumbents might instrumentally improve their regional health services to seek re-election, in which case, one would expect an additional positive effect of the election

period on our four dependent variables. Therefore, in the second panel of Table 6, we display 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). Nonetheless, the coefficient of the election year is statistically significant and exhibits the opposite sign in two of our four specifications. For Private Health Insurance take up the sign is as expected, and the coefficient is precisely estimated. Most important, the introduction of the variable election year does not change our coefficients of the treatment effects.

[Insert Table 6 about here]

## 6. Mechanisms

In this section we examine the different mechanisms that underpin our findings. Table 7 replicates the same DiD using as dependent variable regional data for several years before and after the decentralization on a number of potential mechanisms, and Figures 2.1 to 2.7 graphically displays the trends in such variables. First, we examine whether government devolution (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 participation in national taxes. Second, we examine whether GD gave rise to an improved capacity (more specifically, we use number of specialists, NMR equipment, and surgical theatres) (columns 2 to 4 in Table 7). Third, given that GD allows addition discretion in the supply of care, we examine whether it increased the contracting out of private providers by the public health system. Fourth, we examine individual's satisfaction with waiting time and waiting lists, two variables that we use as subjective measures of public health capacity (Columns 5 and 6 of Table 7). Fifth, we briefly discuss

whether decentralization brought innovation and diffusion. Finally, we examine the potential role of migration in driving the effects of GD.

[Insert Table 7 about here]

*6.1 Resource Allocation*

Government devolution (GD) might have entailed a reallocation of regional spending out of other services, such as culture, into health spending. 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 as compared to the control group (the average over all the period and regions is of 992 euros)[28]. Figure 2.7 shows this graphically. The figure indicates that the increase in health expenditures took place in all regions, but it was larger for the treated regions, and it was mainly driven by the 2004-2007 period. Although health expenditures increase more for treated regions, these differences alone seem not the driving our results, as Table C3 in the appendix show that our baseline results for the four dependent variables do not change significantly after controlling for health spending per region, and the difference in the expenditure increase is very small.

[Insert Figure 2 about here]

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

*6.2 Public health care capacity*

One potential mechanism that explains the influence of GD on patients' health care choices lies in improvements in public health care capacity. To test this, we examine the effects of GD on the concertation of specialists per 1000 inhabitants, the number of publicly operating rooms as percentage of the total number of operating rooms, and the nuclear magnetic resonance (NMR) equipment (Table 7, columns 3 to 5). This table shows imprecise and small estimates for the number of specialists and operating rooms; and a small precisely estimated decrease on the number of nuclear magnetic resonance (NMR) equipment. Figures 2.1, 2.3. and 2.4 display the results, which are consistent with the estimates. Hence, it is unlikely that a higher capacity underpins the effects of GD on the increase of preference and satisfaction with the public health system.

*6.3 Contracting out*

Government devolution 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]. Although we do not have data from before 2002, Figure 2.2 reporting the trends in hospital contracting out suggests a small increase of the percentage of public health expenditures used to contract out private health centres in the treated regions[30].

[29] Catalonia is a clear outlier on the percentage of public expenditures devoted to contracting out private health, whith 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%).
[30] Table 7 does include Catalonia, but the results we present are consistent to its exclusion.

*64 Waiting Times*

Changes in waiting times, (e.g., the time since patients are placed on the list), is argued to be an important variable underpinning the dissatisfaction and perceived quality shortcomings of health systems. 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 however has information on individual satisfaction (perceived) with waiting times for all the years of our analysis. Figures 2.5 and 2.6 seem to indicate 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%) for the satisfaction with waiting times for the specialist, indicating an increase of about 1/3 of one standard deviation of the average satisfaction in the treated regions. The difference is imprecisely estimated for satisfaction with waiting lists for hospitals. This estimate aligns with our main results and show that satisfaction with public health care increased in treated regions after decentralisation. Nevertheless, our results cannot be explained by an increase capacity (section 6.2), neither through contracting out private health (section 6.3), nor by an increase on health expenditures, which increased only little more in treated regions after decentralization (section 6.1).

*6.5 Policy innovation and diffusion*

Decentralisation allows for lower cost innovation and experimentation, which if successful can be easily disseminated. Although policy innovation can improve the re-election chances, once a specific policy has demonstrated success in one region, an

incentive exists to free ride by other regions (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 Spain, experiences of innovation and diffusion extend the development of preventive programs, mental health care, and hospital organisation primarily[31], and a number of those regions that received health care responsibilities became front runners in certain policy areas[32].

### *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 of our four dependent variables.[33] 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 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 (see Table C4 in the Appendix).

[31] 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).

[32] These 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. Hence, a potential mechanism was the furthering of policy innovation and diffusion of ne health programs across regions

[33] Following Jimenez-Martin et al, (2008) those regions are Baleares, Canarias, Catalonia, Valencia, Madrid, Murcia, Navarra, La Rioja.

## 7. Conclusion

This paper has examined the effect of the government devolution (GD) of health care stewardship to subcentral governments on individual health care choices, preferences, and satisfaction. We exploit quasi-experimental evidence from GD in Spain, where health care responsibilities were transferred to a group of ten regions in 2002, which we compare with a group of 7 regions exhibiting no institutional reform in their health system stewardship in the period. The earliest GD reform on those 7 regions took place at least 11 years before 2002. We measure the effects of GD on four different measures of health choice, preferences, and satisfaction: individuals' perceptions of, satisfaction with, and preference for public health system, as well as private health insurance uptake.

Our findings suggest that government decentralization (GD) has led to a change in the perception of, preference for, and satisfaction with the National Health System (NHS). Consistently with the findings with these self-reported variables, we find that GD led to a reduction of 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 survey evidence suggesting individuals trust more regional than central government, during the time of our study[34].

[34] 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.

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 (Tanzi, 2001), as it adapts the NHS to the regional specific preferences, and it makes its funders accountable. In a setting where taxes are mainly uniform, accountability after GD rests upon the visibility of the performance of one's own regional health services, compared to other regional health services.

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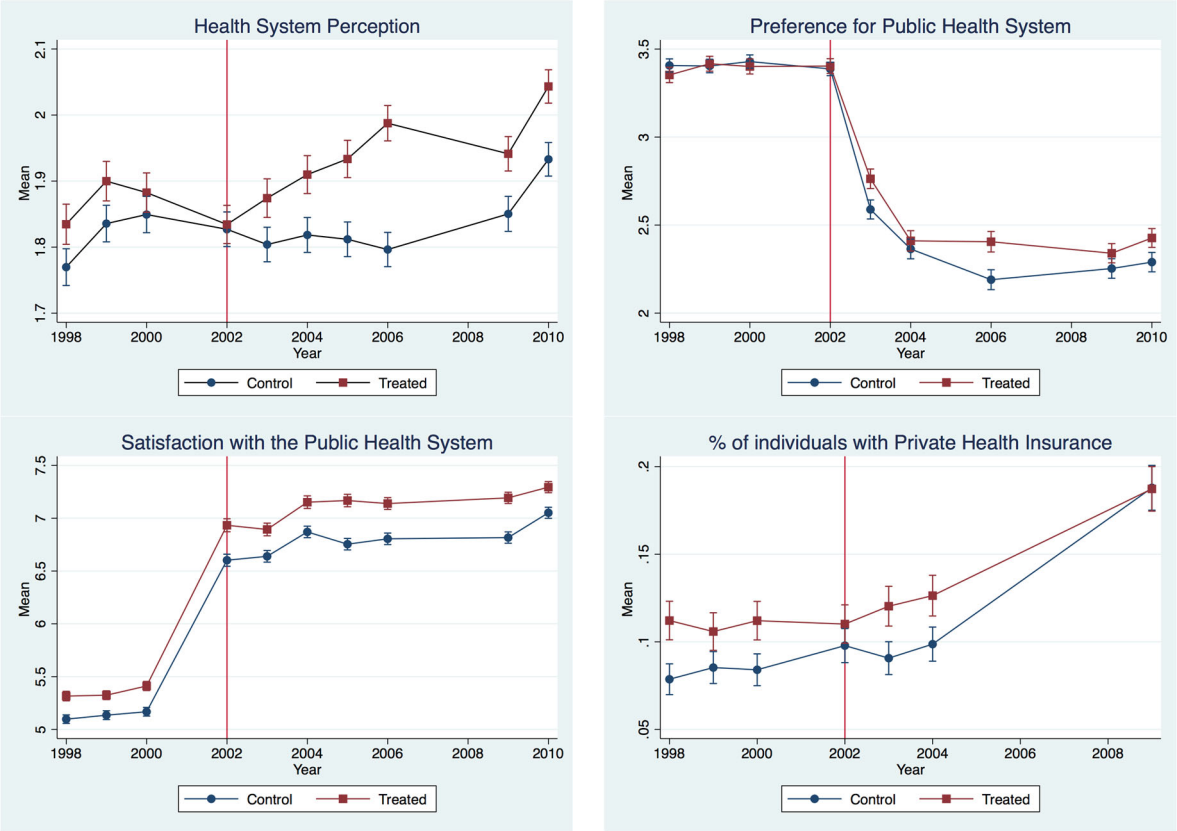
## Figures and Tables

**Table 1. Descriptive Statistics**

| | Total | | | Treatment | | Contro | |
|---|---|---|---|---|---|---|---|
| | *# Obs.* | *Agg.* | *(SD)* | *Agg.* | *SD* | *Agg.* | |
| *Dependent variables* | | | | | | | |
| Perception Health System | 67828 | 1.87 | (0.82) | 1.92 | (0.82) | 1.83 | ( |
| Preference for Public Health | 67778 | 2.56 | (1.70) | 2.59 | (1.69) | 2.53 | ( |
| Satisfaction with Public Health | 55402 | 6.43 | (1.61) | 6.59 | (1.60) | 6.29 | ( |
| Private Health Insurance | 47824 | 0.11 | - | 0.13 | - | 0.10 | |
| *Treatment and Controls* | | | | | | | |
| Years of exposure | 68591 | 10.50 | (8.39) | 3.00 | (3.06) | 17.27 | ( |
| Female | 68589 | 0.51 | (0.50) | 0.51 | (0.50) | 0.51 | ( |
| Age | 68568 | 46.25 | (18.28) | 46.76 | (18.44) | 45.78 | ( |
| Income, if not missing | 49766 | 3.40 | (1.27) | 3.41 | (1.28) | 3.38 | ( |
| Missing income | 68591 | 0.27 | - | 0.26 | - | 0.28 | |
| Education level, if not missing | 65189 | 2.46 | (1.24) | 2.47 | (1.25) | 2.46 | ( |
| Missing education level | 68591 | 0.05 | - | 0.04 | - | 0.06 | |
| Retired | 68475 | 0.21 | - | 0.21 | - | 0.20 | |
| Unemployed | 68475 | 0.08 | - | 0.07 | - | 0.08 | |
| Student | 68475 | 0.06 | - | 0.05 | - | 0.07 | |
| At home | 68475 | 0.09 | - | 0.10 | - | 0.09 | |
| Other | 68475 | 0.03 | - | 0.04 | - | 0.03 | |

Note: The table above provides the number of observations, means and standard deviations (only for continuous variables) for the total sample as well as for the treated sample (individuals residing in regions without health care responsibilities before 2002) and the control sample (individuals residing in regions with health care responsibilities before 2002).

## Figure 1. Trends in the demand for health care treated and control groups




Note: This figure displays the time evolution 1998-2010 for the four dependent variables of our study. The figure shows the evolution of these variables for those regions that were decentralized prior to 2002 (red line- round points) and for those that were decentralized in 2002 (blue line- squared points), standardized at 1 in 2002.

**Table 2. Baseline Results: The Effect of Political Decentralisation on Health Care**

| | Perception public health system [0 bad - 3 excellent] | | | Preference for public health [0 never use–4 use it always] | | |
|---|---|---|---|---|---|---|
| | 1998-2009 | | 1997-2006 | 1998-2009 | | 1998-2006 |
| Treated | 0.285*** | 0.298*** | 0.321*** | -0.099 | -0.038 | 0.049 |
| | (0.040) | (0.041) | (0.023) | (0.085) | (0.096) | (0.037) |
| Post 2002 | 0.141*** | 0.040 | 0.043*** | -1.088*** | -1.155*** | -1.198*** |
| | (0.029) | (0.031) | (0.015) | (0.044) | (0.056) | (0.025) |
| Treated*Post | 0.070*** | 0.075*** | 0.082*** | 0.129*** | 0.120** | 0.124*** |
| | (0.024) | (0.025) | (0.014) | (0.047) | (0.052) | (0.022) |
| Controls | Not incl. | Incl. | Incl. | Not incl. | Incl. | Incl. |
| N | 67828 | 60526 | 53350 | 67795 | 60503 | 53386 |
| | Satisf. with public health system [0 unsatisfied - 10 very satisfied] | | | PHI [1 yes – 0 no] Probit | | |
| | 1998-2009 | | 1998-2006 | 1998-2009 | | 1998-2006 |
| Treated | 0.352*** | 0.309*** | 0.362*** | 0.155 | 0.059 | 0.063 |
| | (0.058) | (0.062) | (0.047) | (0.113) | (0.123) | (0.064) |
| Post 2002 | 1.920*** | 1.723*** | 1.694*** | 0.509*** | 0.580*** | 0.138*** |
| | (0.056) | (0.056) | (0.051) | (0.060) | (0.063) | (0.039) |
| Treated*Post | 0.078* | 0.105** | 0.087* | -0.039 | -0.045 | 0.019 |
| | (0.044) | (0.045) | (0.045) | (0.051) | (0.051) | (0.039) |
| Controls | Not incl. | Incl. | Incl. | Not incl. | Incl. | Incl. |
| N | 55402 | 49352 | 43501 | 47824 | 47723 | 40517 |

Note: Standard errors in parenthesis. Controls: female, age, income, education level, occupation, and a dummy for missing income and education level. Year and region fixed effects included. Excluding year FE does not change the results. Standard errors, clustered at the region and year level. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

**Table 3. Falsification Tests: Effect on health and other government priorities**

| | Interested in Education | Interested in Health | Interested in Housing | Interested in Pensions |
|---|---|---|---|---|
| reated | -0.052*** | 0.001 | -0.005 | 0.028* |
| | (0.014) | (0.019) | (0.014) | (0.015) |
| ost 2002 | 0.027*** | -0.017 | 0.031*** | -0.020 |
| | (0.010) | (0.012) | (0.007) | (0.012) |
| reated*Post | -0.003 | 0.023** | -0.007 | 0.003 |
| | (0.008) | (0.010) | (0.007) | (0.008) |
| | 66633 | 66633 | 66633 | 66633 |

Note: Same specification as in Table 2; Standard errors in parenthesis; $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

## Table 4. Heterogeneous effects across income and education groups

| | **Perceptions of public health system [0 to 3]** | | | |
|---|---|---|---|---|
| | *missing income* | *Income<900* | *900<inc.<1800* | *Income>1800* |
| Treated*Post | -0.008 | 0.130*** | 0.084** | 0.123*** |
| | (0.032) | (0.034) | (0.035) | (0.027) |
| | *missing edu* | *Low education* | *Middle edu* | *High education* |
| Treated*Post | 0.199** | 0.060** | 0.099*** | 0.047 |
| | (0.099) | (0.027) | (0.029) | (0.036) |
| | **Preference for public health system** [0 never use –4 use it always] | | | |
| | *missing income* | *Income<900* | *900<inc.<1800* | *Income>1800* |
| Treated*Post | 0.063 | 0.142** | 0.067 | 0.290*** |
| | (0.062) | (0.056) | (0.054) | (0.067) |
| | *missing edu* | *Low education* | *Middle edu* | *High education* |
| Treated*Post | 0.140 | 0.085* | 0.140** | 0.213** |
| | (0.133) | (0.051) | (0.055) | (0.088) |
| | **Satisfaction with public health system** [0 unsatisfied - 10 very satisfied | | | |
| | *missing income* | *Income<900* | *900<inc.<1800* | *Income>1800* |
| Treated*Post | -0.046 | 0.283*** | 0.089 | 0.077 |
| | (0.071) | (0.063) | (0.056) | (0.064) |
| | *missing edu* | *Low education* | *Middle edu* | *High education* |
| Treated*Post | 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 | 0.012 | -0.038 | -0.028 | -0.131** |
| | (0.066) | (0.148) | (0.073) | (0.063) |
| | *missing edu* | *Low education* | *Middle edu* | *High education* |
| Treated*Post | 0.210 | 0.038 | -0.095 | -0.140* |
| | (0.277) | (0.065) | (0.066) | (0.083) |
| *N* | 13093 | 8375 | 16113 | 10142 |

Note: Same specification as in Table 2; Standard errors in parenthesis; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

## Table 5. Heterogeneous effects by Age – Old Age and Non-Old Age

| | Perception of public health system [0bad-3excellent] | Preference for public health system [0never use–4 use it always] | Satisfaction with public health system [0 unsatisfied - 10 very satisfied] | PHI [1 yes – 0 no] Probit |
|---|---|---|---|---|
| Treated*Post | 0.061*** | 0.101*** | 0.067*** | -0.039 |
| | (0.013) | (0.022) | (0.024) | (0.034) |
| Treated*Post*Old | 0.099*** | 0.162*** | 0.158*** | -0.064 |
| | (0.017) | (0.030) | (0.034) | (0.062) |
| *N* | 67692 | 67641 | 55297 | 47723 |

Note: Same specification as in Table 2, but it includes a dummy variable "Old", which takes value 1 if individuals older than 70. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

## Table 6. Interaction with a regional incumbent

| | **Perception of public health system** [0 bad-3excellent] | **Preference for public health system** [0never use–4 use it always] | **Satisfaction with public health system** [0 unsatisfied - 10 very satisfied] | **PHI** [1 yes – 0 no] **Probit** |
|---|---|---|---|---|
| **Interaction with a regional incumbent** | | | | |
| Treated*Post | 0.142*** | 0.133** | 0.179*** | -0.119 |
| | (0.029) | (0.065) | (0.050) | (0.074) |
| Treated*Post*Incumbent | -0.101*** | -0.026 | -0.098 | 0.146** |
| | (0.033) | (0.066) | (0.060) | (0.073) |
| Incumbent | 0.048*** | -0.015 | 0.110*** | -0.008 |
| | (0.014) | (0.034) | (0.023) | (0.042) |
| **Interaction with the election Year** | | | | |
| Treated*Post | 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) |
| *N* | 67692 | 67641 | 55297 | 47723 |

Note: Same specification as in Table 2, but (i) the first panel 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 ('double agents'); and (ii) the second panel includes election year, a dummy variable that takes value 1 if there were elections on that year; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

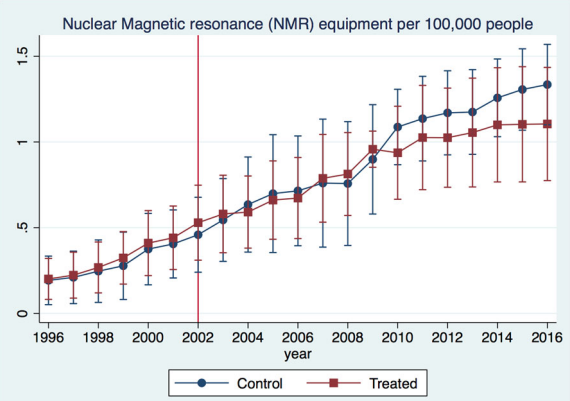
## Table 7. Effects of decentralisation on a number of mechanisms

| | Public Health Spending | Surgical theatre Rooms | Number of specialists | NMR Equipment | Satisf. waiting lists hosp. | Satisf wait. times specialist |
|---|---|---|---|---|---|---|
| post | 872.83*** | 0.811*** | 0.514*** | 1.072*** | 0.689*** | 1.079*** |
| | (22.811) | (0.271) | (0.043) | (0.059) | (0.156) | (0.144) |
| treated | 116.29*** | -1.046*** | -0.101** | -0.422*** | 0.854*** | 0.838*** |
| | (24.258) | (0.261) | (0.041) | (0.057) | (0.186) | (0.173) |
| Post*Treated | 81.15*** | 0.111 | 0.036 | -0.112*** | 0.162 | 0.215* |
| | (15.965) | (0.168) | (0.026) | (0.037) | (0.123) | (0.114) |
| N | 238 | 378 | 378 | 376 | 210 | 210 |

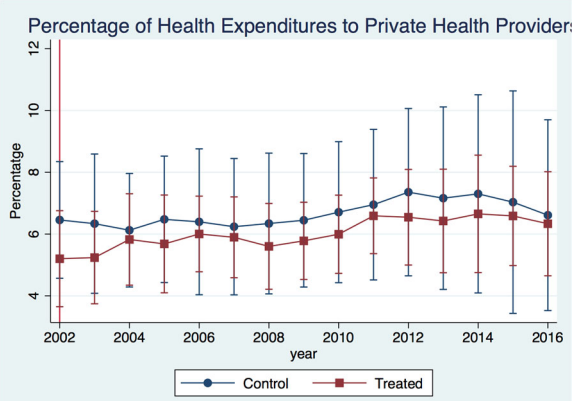
Note: Same specification as in Table 2. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

## Figure 2. Trends in Selected health care

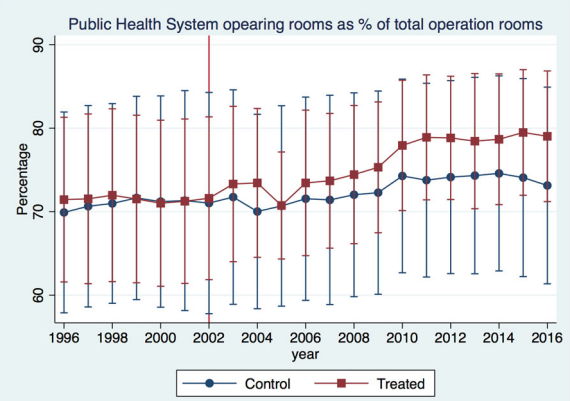
**2.1 Trends in Nuclear magnetic reassurance equipment**



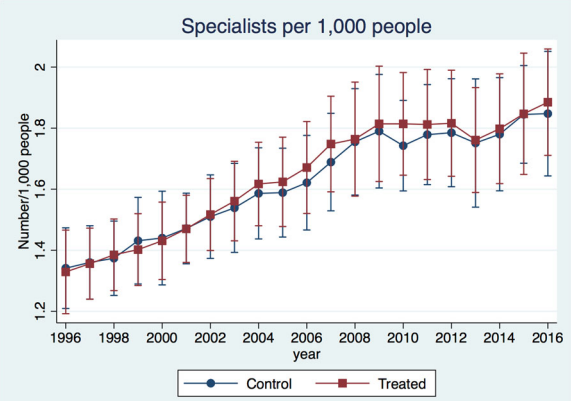

**2.2 Trends in hospital contracting out**



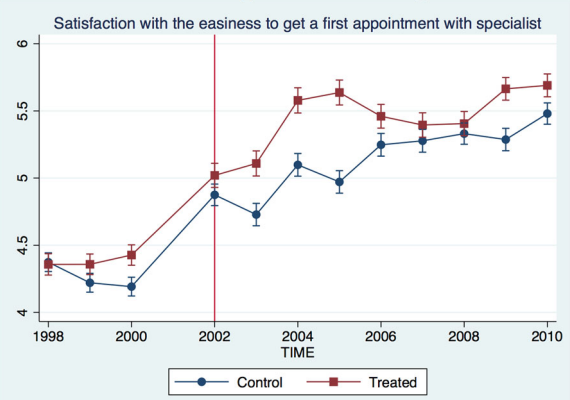

**2.3 Trends share of publicly funded surgical theatre rooms**



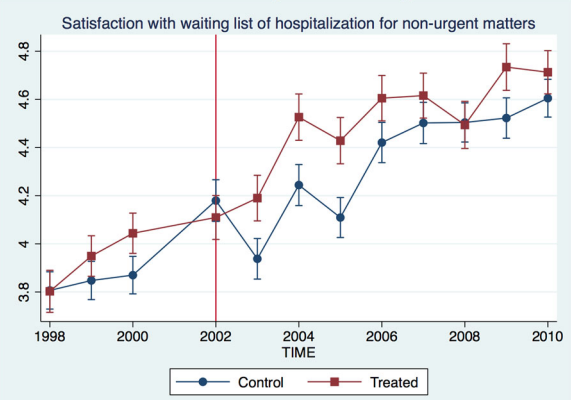

**2.4 Trends in the share of specialists**



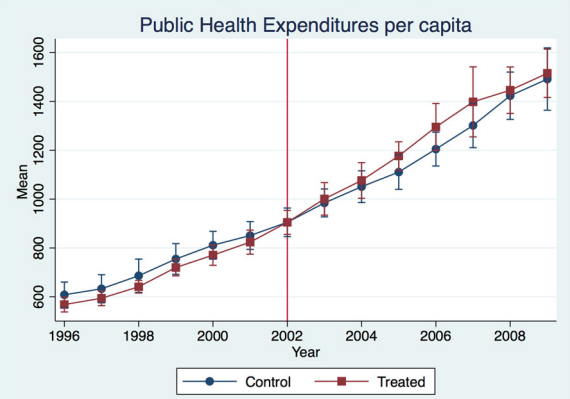

**2.5 Satisfaction with specialist waiting times**




**2.6 Satisfaction with hospital waiting lists**



**2.7 Public Health Expenditures per capita**

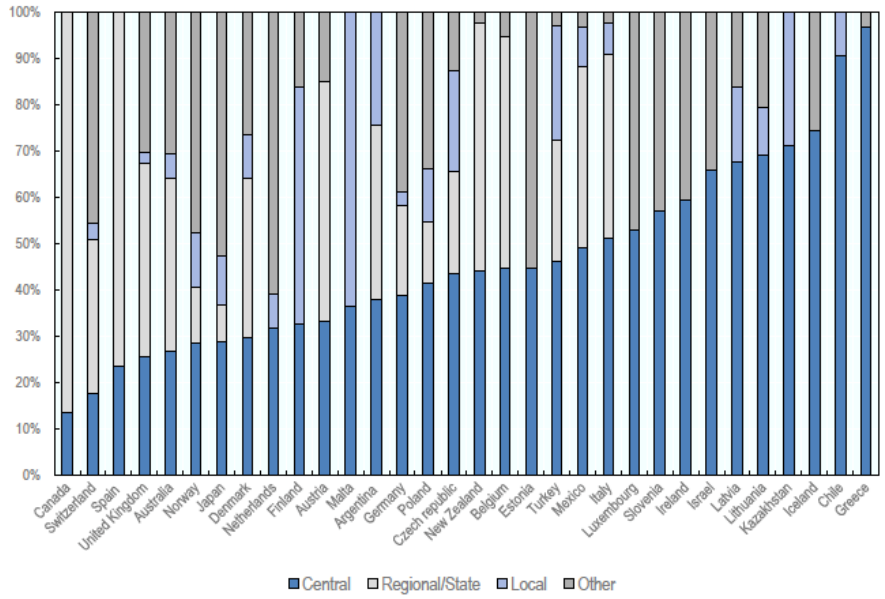



Source: Ministry of Health (Ministerio de Sanidad), several years.

# APPENDIX

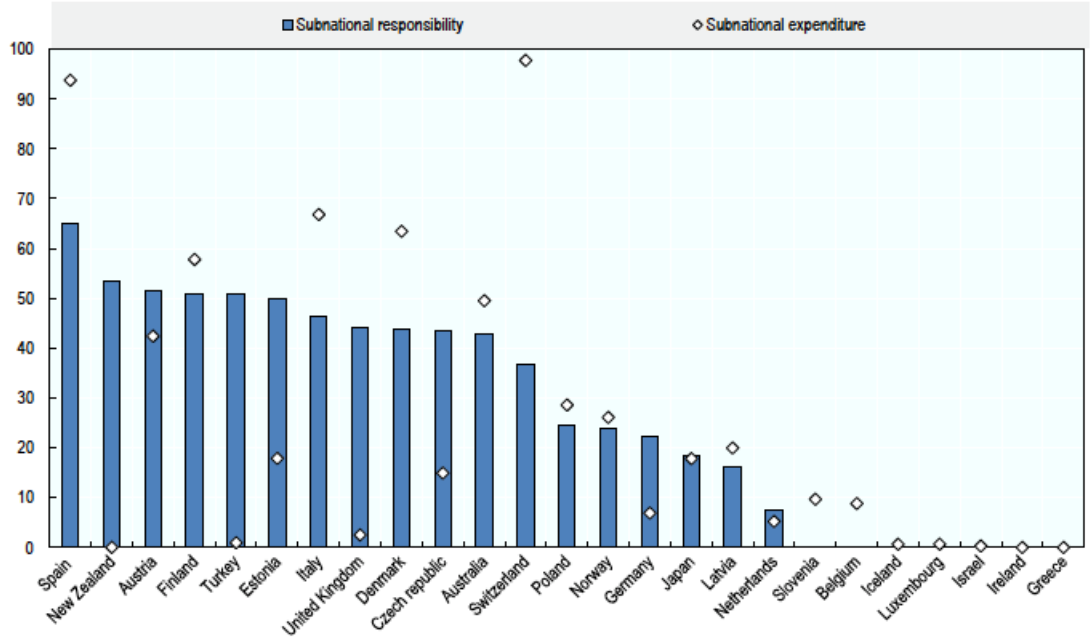
## Appendix A: Background information and institutional setting.

**Figure A1. Decision-making power in the health sector, across levels of government** (proportion, in %)



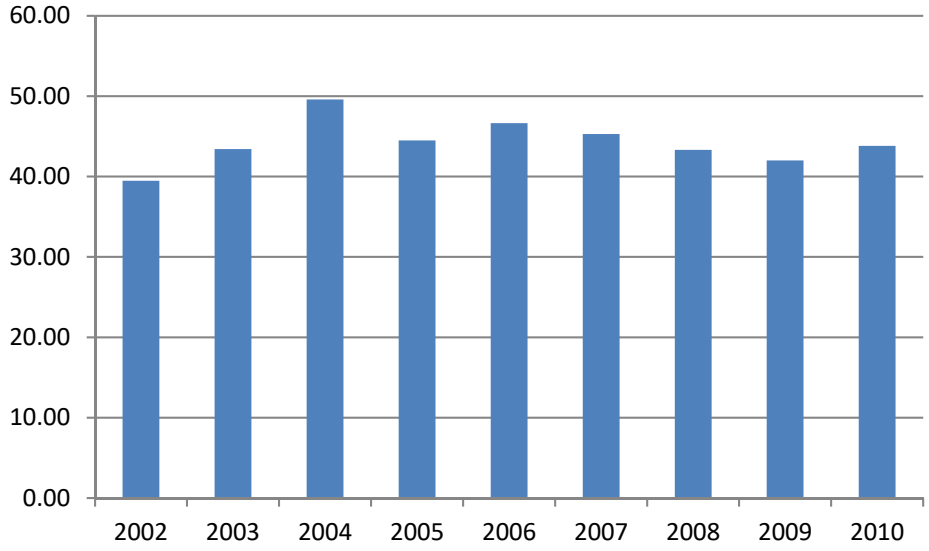

Source: OECD, 2019.

**Figure A2. Representability and % of total health expenditure in hands of subnational governments**



Source: OECD, 2019.

**Figure A3. Perceptions of Territorial equity (% of the population that all citizens receive the same care irrespective of what regional states they live).**




*Source*: Spanish Health care barometer, several years.

**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 |

**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.

## Appendix B: Definition and descriptive analysis of the three self-assessed dependent variables

### Table B1. Preference for public health care

| Question: hypothetical choice between public and private health system for themselves or a family member in case they needed for a number of potential services) | | | | | | |
|---|---|---|---|---|---|---|
| | Primary | Specialist | Hospital | Emergency | Dependent variable (recoded) | |
| Public | 73.64 | 59.91 | 73.32 | 75.39 | 0 | 25.46 |
| Private | 19.86 | 29.46 | 20.46 | 18.37 | 1 | 5.82 |
| Both | 6.10 | 10.08 | 5.41 | 5.46 | 2 | 7.07 |
| Missing | 0.39 | 0.56 | 0.80 | 0.79 | 3 | 10.92 |
| | | | | | 4 | 50.73 |

### Table B2. Perception of the public health system

| Question: refers to a general question about whether the NHS works well | | | |
|---|---|---|---|
| | Percent | Dependent variable (recoded) | |
| Health System works well | 5.22 | Worst perception (1) | 5.22 |
| Health System works fairly well | 24.96 | 2 | 24.96 |
| Health system works well, but needs changes | 47.34 | 3 | 47.34 |
| Health System needs fundamental changes | 22.48 | Best perception (4) | 22.48 |

### Table B3. Satisfaction with public health system

| Question: respondents are asked to evaluate from a scale ranging from 1 to 10, 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 (mean of above) | Mean= 6.345 |
| | Std. =1.605 |

# 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 use–4 use it always] | **Satisfaction with public health** [0 unsatisfied - 10 very satisfied] | **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 | 0.067*** | 0.141*** | 0.111** | -0.038 |
| | (0.025) | (0.048) | (0.045) | (0.055) |
| *N* | 61693 | 61617 | 50208 | 43504 |

Note: Same specification as in Table 2. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Regressions exclude the Bask Country and Navarra

**Table C2. Excluding Madrid**

| | **Perception health system** [0 bad - 3 excellent] | **Preference for public health** [0 never use–4 use it always] | **Satisfaction with public health** [0 unsatisfied - 10 very satisfied] | **PHI** [1 yes – 0 no] Probit |
|---|---|---|---|---|
| Treated | 0.282*** | -0.064 | 0.326*** | 0.059 |
| | (0.040) | (0.088) | (0.057) | (0.123) |
| Post | 0.129*** | -1.103*** | 1.890*** | 0.580*** |
| | (0.028) | (0.043) | (0.055) | (0.063) |
| Treated*post | 0.076*** | 0.127*** | 0.090** | -0.045 |
| | (0.024) | (0.047) | (0.043) | (0.051) |
| N | 67692 | 67641 | 55297 | 47723 |

Note: Same specification as in Table 2. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 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 use–4 use it always] | **Satisfaction with public health** [0 unsatisfied - 10 very satisfied] | **PHI** [1 yes – 0 no] Probit |
|---|---|---|---|---|
| Treated | 0.335*** | -0.022 | 0.328*** | 0.001 |
| | (0.043) | (0.104) | (0.070) | (0.124) |
| Post | 0.328** | -1.035*** | 1.866*** | 0.021 |
| | (0.132) | (0.297) | (0.196) | (0.253) |
| Treated*post | 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) |
| *N* | 60526 | 60503 | 49352 | 47723 |

Note: Same specification as in Table 2. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 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 use–4 use it always] | Satisfaction with public health [0 unsatisfied - 10 very satisfied] | PHI [1 yes – 0 no] Probit |
|---|---|---|---|---|
| Treated | -0.126*** | -0.672*** | 0.357*** | 0.951*** |
| | (0.037) | (0.070) | (0.071) | (0.050) |
| Post | 0.035 | -1.233*** | 1.717*** | 0.479*** |
| | (0.035) | (0.070) | (0.058) | (0.073) |
| Treated*post | 0.117*** | 0.323*** | 0.080 | -0.138*** |
| | (0.036) | (0.065) | (0.056) | (0.053) |
| N | 25543 | 25502 | 20606 | 20086 |

Note: Same specification as in Table 2. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$. 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 use–4 use it always] | Satisfaction with public health [0 unsatisfied - 10 very satisfied] |
|---|---|---|---|
| Treated | 0.321*** | 0.049 | 0.362*** |
| | (0.040) | (0.074) | (0.047) |
| Post | 0.043 | -1.198*** | 1.694*** |
| | (0.030) | (0.054) | (0.051) |
| Treated*post | 0.082*** | 0.124** | 0.087* |
| | (0.025) | (0.055) | (0.045) |
| N | 53350 | 53386 | 43501 |

Note: Same specification as in Table 2, but regression are run with an Ordered Probit.. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.