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## Can Regional Decentralisation Shift Health Care Preferences?

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# Can Regional Decentralisation Shift Health Care Preferences?

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## ABSTRACT

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# Can Regional Decentralisation Shift Health Care Preferences?\*

Uniform health care delivered by a mainstream public insurer – such as the National Health Service (NHS), seldom satisfies heterogeneous demands for care, and some unsatisfied share of the population either use private health care, or purchase private insurance (PHI). One potential mechanism to partially satisfy heterogeneous preferences for health care, and discourage the use of private health care, is regional health care decentralisation. We find robust estimates suggesting that the development of regional health services shifted both perceptions of, and preferences for, using the NHS, making it more likely individuals would use public health care and, consequently, reducing the uptake of PHI. These results are heterogeneous by income, education, and age groups; and are robust to placebo and other robustness and falsification checks.

**JEL Classification:** H7, I18

**Keywords:** National Health Service (NHS), political decentralization, use of private health care, private health insurance, health system satisfaction, demand for private health care

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## 1. Introduction

The feasibility of tax-funded national health services (in this case the NHS) is compromised when citizens question the quality of uniformly provided health care. Private alternatives to the NHS both purchased out of pocket (OOP), or before the need arises by purchasing private health insurance (PHI), can provide some satisfaction to unsatisfied health care users for whom the NHS falls short of quality expectations (e.g., due to waiting lists) (Besley *et al*, 1999).

An important question for public sector design is how, and whether, to keep individuals using the NHS, especially those who otherwise might contemplate the possibility of using private health care, thus partially opting out from the NH insofar as they still pay for the NHS, but don't use it. This is an important question as an expansion of the use of private health care can potentially decrease NHS congestion, and hence, free resources for those who continue using the NHS, which in turn can improve NHS quality (Besley and Coate, 1991). Alternatively, the expansion of private health care can compromise the political support to improve the NHS in the longer run by those who opt out<sup>1</sup>. If the latter are those more demanding on certain quality dimensions, NHS quality might decline. Hence, whether one or the other prevails is an empirical question, which can be causally established by examining the effect of an exogenous variation in NHS quality.

One potential institutional response to satisfying heterogeneous health care preferences, which in turn can influence some perceived dimensions of NHS quality, is the decentralisation of regional health care. The creation of regional health services, by strengthening the political agency between users (taxpayers) and health care authorities (Besley, 2006), can provide political incentives to deliver the most suitable package of health

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<sup>1</sup> Some studies have examined the effect of attitudes to the NHS after individuals take up private health insurance, and they show evidence consistent with an attitude change after conditioning for a number of key covariates (Costa-Font and Jofre-Bonet, 2008)

care services to regional specific populations (and their median voters). However, it is an empirical question whether such electoral incentives are powerful enough to discourage people from using private alternatives to the NHS. If the decentralisation significantly alters the quality and access to publicly funded health care, one should observe a shift in preferences and health care choices, and, as we hypothesize here, a reduction in both the use of private health care and the uptake of PHI. This paper examines whether the above claims can be empirically substantiated.

Related to this paper, previous studies have established that democracy delivers better health outcomes (Besley and Kudamatsu, 2006, Navia and Zweifel, 2000; Alvarez Dadet and Franco-Giraldo, 2006 and Wigley and Akkoyunlu-Wigley, 2011)<sup>2</sup>. However, we know little about the specific mechanisms that underpin such an association. Reforms bringing health care authorities close to citizens help uncover such mechanisms. Perhaps the main limitation of measuring the effects of institutional reforms is that health care quality, as a credence good, is not fully observable to individuals (to make a completed informed choice), insofar as they rely instead on a subset of observable measures of quality<sup>3</sup> (e.g., waiting times or waiting lists for specific services) which in turn influence the choice of NHS versus private health care<sup>4</sup>. So far, the literature reveals that health care users are more likely to be satisfied with the quality of care they receive when provision is better than what they have been used to in the past (Leonard, 2008)<sup>5</sup>. Newly created regional governments after decentralisation

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<sup>2</sup> In contrast, in systems where there is no responsiveness to the health care quality (e.g., autocracies) there is less interest in providing quality social services, as there is no need of being regarded for them. Sen (1999) notes that there is no famine happening in countries where there are regular elections and free press. Epidemiological research into the social determinants of health suggests that being subordinate to authority can have detrimental effects on mental and physical health (Marmot, 2004) which can be explained by a reduction in the exposure to chronic stress.

<sup>3</sup> Imperfect agency relationship between health providers and patients is replicated by an imperfect agency between citizens and incumbents, and Beslet et al (1999) provide evidence that individuals react to the existence of waiting lists.

<sup>4</sup> Hence, it is not unsurprising that previous work on the impact of measures of governance on health finds only indirect effects (Klomp and deHaan, 2008, 2009).

<sup>5</sup> Descriptive analysis identifies a positive association between health system dissatisfaction and the decision to purchase PHI in the UK (Calnan *et al*, 1993).

would be observed to change, after a reasonable period, perceived quality of care and, more generally, shift preferences for public health care and insurance.

This paper examines the effect of regional health care decentralization on the use of, and satisfaction with, publicly funded (NHS) health care, alongside the uptake of PHI. PHI is a market alternative to some of the health care funded by the NHS. Hence, it qualifies as a ‘partial opting’. We draw upon probably one of the main experiences of countrywide health care decentralization in Europe, which took place in Spain since 1981 and then in 2002<sup>6</sup> (other experiences include United Kingdom’s devolution of health care to Scotland, Wales, and Northern Ireland after 2000; and decentralization in Italy after 1978 and 1997). We examine the second wave of health care decentralisation as a quasi-experiment<sup>7</sup>.

Specifically, we examine the regional transfer of health care responsibilities to the ten regions (out of the seventeen region states or autonomous communities) where health service was centrally run until 2002. The health care authority of the remaining seven regions had already been decentralized by 2002, and hence our treatment group refer to the region states that received health care responsibilities in 2002. All regions, with the exception of two, were subject to the same financial constraints (Lopez-Casasnovas *et al*, 2005). Hence, the differences in access to public health care between regional states are not driven by differences in resources (except for two regions), but by the differences in policy priorities, which are visible to constituents.

We use a difference in difference methodology where we compare the seven regions that had already decentralized before 2002 (control group) to the ones that were decentralized in 2002 (treatment group). In addition, we exploit different sources of heterogeneity that

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<sup>6</sup> Hence funding is uniform and grounded on general taxation, but health care delivery is allowed to differ across the country.

<sup>7</sup> Evidence from Spain is particularly important because decentralisation took place in two different waves, hence, the effects of decentralization can be distinguished from other effects such as the country's democratisation alongside macroeconomic conditions

result from the specific institutional structure as well as socio-economic effects<sup>8</sup>. More specifically, following the conceptual model outlined below, we assume that there is an ‘income threshold’ above which individuals can afford to use private health care. Besley and Coate (1991) argue that if higher-income individuals opt out of using publicly provided private goods but continue to subsidize them through income taxes, the net effect produces redistributive outcomes. However, quality of care is typically left out of such analysis; hence if, as we argue, opting out reduces support for public health care, it might lead to deteriorating the financing and the quality of NHS care, which in turn might incentivise the uptake of private health care. Similarly, we examine heterogeneous effects through age groups that might also erode the quality of the NHS.

In summary, our paper contributes to identifying the causal effect of a change in the quality of care resulting from decentralization reforms, on the individual reliance of publicly funded health care. Our results confirm that decentralization increases the use and satisfaction with public health care and a reduced PHI uptake. However, the latter effect is exclusively driven by a reduced uptake of PHI among the most affluent population groups. Our results survive and mostly become stronger after a long list of robustness checks and falsification tests.

Next, we describe the conceptual framework, followed by a description of the institutional setting in section 3. In section four we describe the data and the empirical strategy. Section five contains the results and section six concludes.

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<sup>8</sup> Given that health care is a normal good (Costa-Font et al, 2011), *ceteris paribus*, one would expect that only more affluent populations groups can afford the significant costs of private health care or PHI



## 2. Political Decentralization and Health Care

Health care is a credence good (Arrow, 1963), through which individuals evaluate the basis of experience when sick, and from others' experience when healthy by updating the information on observable dimensions of health care quality and its provision. Individuals derive utility from a health care quality ( $Q_i$ ) and income ( $Y_i$ ). For simplicity, we assume income comes from labor market participation, and a share is devoted to paying taxes to the government ( $T_i$ ). The government is run by agents interested in re-election and who are knowledgeable of the observable nature of health care quality. Hence, improving observable dimensions of quality ( $Q$ ) should increase the re-election of a regional incumbent, and consistently, a tax expansion is expected to reduce the likelihood of the incumbent's re-election.

### 2.1 Public health care and decentralization

Quality of care in a region  $j$  can be delivered either by a centralized (c) or a decentralized (d) government structure  $j \in (d, c)$ . Under political centralization, the central government delivers a certain health care quality as perceived by an individual  $i$  ( $Q_i^c$ ), and similarly, under political decentralization, the regional government provides the certain quality of care ( $Q_i^d$ ) of such observable dimensions. As a publicly funded health system, it is funded by the abovementioned taxes, so that individuals can estimate their income after taxes  $Y_i^n(Y_i - T_i)$ . We allow for state depending preferences on health statistics, so the utility can be represented by  $U(\cdot)$  when sick, and  $u(\cdot)$  when healthy (as is common practice, see Besley *et al* 1999), and the probability of ill health is represented by  $p$ . Hence, individuals can evaluate the health system both when sick and healthy. Based on the latter, individuals can compare the expected utility of decentralized and centralized health system governance, and health system

decentralization will improve welfare if the combined welfare gain of decentralization under the states of sickness and health exceeds that of centralization as below:

$$pU(Q_i^d, Y_i^n) + (1 - p)u(Q_i^d, Y_i^n) \geq pU(Q_i^c, Y_i^n) + (1 - p)u(Q_i^c, Y_i^n) \quad (1)$$

## 2.2 Private Health Care and decentralization

However, we can introduce a private alternative to the public health care in the analysis, so that we can distinguish public health care ( $Q_i^{c,d}$ ) from private health care quality ( $q_i$ ), which we assume remains the same irrespectively of descentralisation. Using private health care entails out of pocket costs ( $L$ ). Benefits of private health care can encompass prompter access to specialist physicians, avoiding waiting time and waiting lists, personalized health care, choice of GP, being entitled to a second opinion and, in certain circumstances, additional coverage (Ireland, 1990). Individuals will choose to keep using the public health care if their expected utility gain from the quality of care is higher than going private. Hence, if as in (1), health care decentralization increases the quality of care, we expect it to reduce the expected utility gain from using private health care. Since private care implies an income sacrifice  $L$ , this should decline after decentralization:

$$(1 - p)u(Q_i^d, Y_i^n) + p[U(Q_i^d, Y_i^n) - U(q_i, Y_i^n - L)] \leq p(1 - p)u(Q_i^c, Y_i^n) + p[U(Q_i^c, Y_i^n) - U(q_i, Y_i^n - L)] \quad (2)$$

Hence, decentralisation should be expected to increase the utility gain from NHS use, and hence the use of NHS funded care.

### 2.3 Private Health insurance

Before, we assumed private health insurance (PHI) as an ex-ante device which allows individuals to access private healthcare, and hence attain private health care quality ( $q_i$ ), paying a premium ( $k$ ). Theoretical models on the demand for PHI assert that individuals will purchase PHI whenever the net expected utility gain resulting from insuring privately is positive (Besley et al., 1999). That is, whenever the benefits — namely quality, choice, and coverage improvements — outweigh the income loss from paying an insurance premium. Hence, in the presence of PHI, if (1) and (2) holds, then the utility gain from purchasing private health insurance under decentralization should decline as follows:

$$(1 - p)[u(Q_i^d, Y_i^n) - u(Q_i^d, Y_i^n - k)] + p[U(Q_i^d, Y_i^n) - U(q_i, Y_i^n - k)] \leq (1 - p)[u(Q_i^c, Y_i^n) - u(Q_i^c, Y_i^n - k)] + p[U(Q_i^c, Y_i^n) - U(q_i, Y_i^n - k)] \quad (3)$$

and one should expect decentralisation to reduce the probability of PHI uptake.

### 2.4 Concluding remarks

Based on the above simple conceptual framework, two salient results emerge to be tested empirically: namely, that decentralization should give rise to (i), a reduction in the probability of private health care use (ii) and the reduction in the uptake of private health insurance after decentralization. The following section offers the institutional background and the empirical evidence for testing these two propositions.

### **3. Institutional Setting**

#### *3.1 Health Care Decentralization in Spain.*

This study draws on quasi-experimental evidence from Spain. Health care decentralization in Spain was a unique transfer of the political power to regions to regulate and organize the health care system. Together with education, health care is the main political responsibility of regional governments. Health care is funded by general taxation and access is universal, but decentralization modified the nature of the political agency in health care. Regional parliaments with decentralized health care responsibilities enjoyed large legislative capacity (only limited by framework legislation). Coordination has been delivered by the Inter-Territorial Council of the health system — an advisory committee comprising representatives from the central and regional governments — but with limited activity.

It is therefore not surprising that regional parliaments have exerted a significant legislative activity in health care, especially affecting the organization of the delivery of health care (e.g., integration of health and social care, new contractual arrangements with providers, etc). In contrast, the main power to raise most taxes (with the exception of minor taxes, and surcharges on specific taxes e.g. petrol tax surcharges) is in the hands of the central state with the exception of two regions (the Basque Country and Navarre). The central government collects all general taxes and allocates back such resources through block grant in accordance with an unadjusted capitation formula (Lopez-Casasnovas *et al*, 2005).

The Spanish decentralisation is unique given that the dynamics of the transfer of the political agency took place in two steps, or so-called two “decentralization waves”. A first wave (1981-1994) formally began in the early 1980s with the transfer of health care responsibilities 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). Health care in the remaining ten

ACs (Autonomous Communities) remained centrally managed by the National Institute of Health (*Instituto Nacional de la Salud*, INSALUD) and regional governments in those regions only had some restricted powers in the fields of primary and community care.

The second wave of decentralisation took place in 2002. A number of region-states (so-called autonomous communities, henceforth ACs) progressively took over health care responsibilities and in 2002 all remaining regions obtained health care responsibilities (see Appendix). This was largely unexpected and resulted from the first absolute majority of the conservative government in 2000. This paper takes advantage of this exogenous variation produced from this specific transfer of political health care responsibilities to all remaining ten regional states after the election of a new central government in 2001.

### *3.2 Private health care in Spain*

Individuals in Spain are entitled to publicly funded health care, which in some regional states does employ a network of private health care providers as well. However, individuals can use private providers if they perceive that the public health care network falls short of certain dimensions of health care quality, and providers such as doctors are allowed to work both in the public and the private sector. Although the National Health System (NHS) finances the vast majority of healthcare in Spain, a significant and growing number of people subscribe to duplicate private Health Insurance (PHI).

PHI is one of the most traditional mechanisms available to the middle class to be able to ensure access to private health care. Indeed, it is a financial arrangement that gives *ex-ante* access to those benefits at a ‘reasonable price’<sup>9</sup>. Private healthcare accounts for 2.5% of Spain's GDP (26.2% of healthcare spending), mostly from out-of-pocket expenditure, but PHI premiums accounted for approximately 21% of private health expenditure in 2010 and

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<sup>9</sup> 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.

provided coverage to 13% of the population with PHI cover (IDIS Foundation, 2013). PHI can be subscribed to either by voluntary employer group plans, whether it is the public administration (22% of PHI policyholders in 2012) or private companies (35% in 2012), as well as individually (43% of subscribers) (IDIS Foundation, 2013). In the last two cases (78% of privately insured individuals) it gives rise to ‘double coverage’. This is, those individuals that choose to go private do not totally opt out of the NHS, they have to contribute to both, and often use both private and NHS care depending on their preferences for specific health services. This pattern is not unique to Spain but is consistent with what is found in other countries organized under national health systems (NHS) where healthcare is uniform and there is little flexibility to adjust coverage to different preferences as regards quality of care.

### *3.3 The co-existence of public and private health care*

The coexistence of private health insurance with the NHS is not without significant interactions. It is frequently advocated as an option by the relatively better-off who might prefer to pay individually in order to improve the quality of care. Quality has been argued to be one variable explaining the interaction between the public and private health sectors (Besley *et al.*, 1999). Some studies show that demand for PHI is not independent of attitudes towards the public sector, which appear to have a significant influence on the demand for and utilization of health care (Gouveia, 1997; Besley *et al.*, 1996; Hall and Preston, 1999, Costa-Font and Jofre-Bonet, 2008). In the Spanish setting, there is evidence from previous studies that the probability of PHI uptake is associated with a perception of lower health care quality (Costa and Garcia, 2003).

## **4. Data and Identification Strategy**

### *4.1 Data*

Our data is from all the existing waves of the Health Care Barometer (Barometro Sanitario), an annual survey of the health sector that contains standardized questions on intended use and attitudes towards the NHS, private health insurance (PHI), and a set of individual characteristics. The survey is regionally representative of Spain 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 data, we draw upon data running from 1998 to 2010, as previous years do not include the information needed to perform the analysis, and later years use the different definition of the study variables. Besides data limitations, we study the effects of the 2002 decentralization until 2010 for two reasons. First, after 2010, Spain was significantly hit by an economic downturn which could have modified health care preferences. Second, given that the reform we are interested in took place in 2002, our time span is large enough for our purposes. In addition, we could not include 2007 and 2008 because the relevant questions were not asked. Given that the period we are interested in examining refers to an institutional change occurring in 2002, the data (1998-2006; 2009-2010) appears to be adequate for our purposes. We control for non-response by identifying missing information dummies. Specifically, 27% of respondents do not report their income and 5% do not report education attainment. The rest of the independent variables have very few missing observations.

The survey comprises individual data on attitudes to public health care and includes (except for 2005, 2006, and 2010) uptake of private health insurance. In addition, there are measures of income, education, occupation, socio-demographics (age, gender, and marital status), and regional identifiers among other variables such as attitudes towards education and other publicly provided services which we exploit in our falsification tests. We use the following four dependent variables, defined in the survey as follows:

(a) NHS perception (perception health system) refers to a general question about whether the NHS works fairly well. Answers can take values (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. We recorded the variable such that 3 means that the respondent is satisfied with the way in which the health system works and 1 means that the respondents think that the health system works very poorly.

Next, (b). respondents are asked about their hypothetical choice between public and private health system for themselves or a family member in case they needed it. We call this variable *Preference for using public health care*. 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 coded 0 if the respondent chooses private or both, and 1 if they choose public. In this way, we have a measure that takes value 1 if the respondent has a strong preference for the public system for any of the categories. Once the four categories are added together, we end up with an ordered variable that ranges from 0 to 4, where 4 corresponds to having a strong preference for public health in all four categories.

(c) NHS satisfaction (*satisfaction with public health*) refers to a question in which respondents are asked to evaluate from 1 to 10, ten different aspects of the public health system. We cardinalized the answers and took the mean of all answers as a satisfaction index about the public health system. Although the questionnaire includes satisfaction with 15 different aspects, due to many being missing, we finally use only 8 satisfaction questions. The measure used in the paper is an average of the 8 satisfaction answers and it therefore also ranges from 1 to 10. The results are also robust to using principal component analysis (PCA)



to generate the satisfaction measure. In fact, PCA analysis shows that the first eigenvalue takes up 58% of the variance and each of the eight satisfactions has a very similar weight (0.28, 0.34, 0.38, 0.36, 0.33, 0.38, 0.32, and 0.38).

(d) *PHI uptake* refers to a dummy variable indicating when the individual has private health insurance (PHI). *PHI uptake* is assessed in different survey waves 1997 to 2004 and in 2009 and it takes value 1 if individuals have taken up a PHI.

Table 1 summarizes the main variables under study. We disentangle the descriptive estimates between individuals exposed to health care decentralization before the reform (controls) and those individuals in regions that obtained health care responsibilities after the reform in 2002 (treatment). Specifically, the table reports the number of observations, mean, and standard deviation of the four dependent variables and a number of covariates. 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.

**[Insert Table 1 about here]**

#### *4.2 Empirical Strategy*

This paper attempts to empirically model equations (1), (2) and (3), the four dependent variables: (i) perception of the Health System (NHS), (ii) the preference for public health care, (iii) satisfaction with the public health care system, and finally (iv) the uptake of PHI. The uptake of PHI results from comparing the expected utility from two states of nature, one where individuals have access to private health care through PHI, and a competing state of nature where individuals use only NHS coverage. Traditionally, models of health care assume that quality is perceived and that health care provided by the NHS are uniform (Besley *et al*, 1999). However, this paper allows for some heterogeneity in the provision of health care, by allowing the quality of care to be decentralized. Similarly, given that preferences for health

care use vary across the individual's socio-economic distribution, we allow for income and education-related heterogeneity. In addition, and since an individual's health is unobserved but it is correlated with age, we also for age heterogeneity as well.

#### 4.2.1 Difference-in-difference effects

The identification of the decentralization effect is estimated by means of a treatment variable taking the value of 1 after a region state (AC) is transferred health care responsibilities. The control group is regions that already enjoyed health care responsibilities before 2002, and the treated group refers to region states that have health care responsibilities transferred after that. We include vectors of region states (ACs) and years dummy variables so that either region specific or temporal shocks are controlled for. Our dependent variables are different measures of public health care support and use of an individual  $i$  in region  $g$  (perception and preference for NHS care, health system satisfaction, and PHI uptake), and we attempt to control for a number of other confounders. The variable  $POST$  refers to the period after the decentralization of health care services (2002-2010). Time effects are important insofar as decentralization is not only a function of years of exposure, especially for those people who have experienced less contact with the health system. 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:

$$Y_{itg} = \gamma_1 D_{itg} + \gamma_2 \mu_t + \gamma_3 X_{itg} + \gamma_4 Z + \gamma_5 (POST_t \cdot D_{itg}) + \gamma_6 \vartheta_g + \varepsilon_{itg} \quad (4)$$

Where  $D_{itg}$  is the dummy variable indicating treatment,  $X_{itg}$  refers to time-variant covariates of each individual, whilst  $Z$  refers to controls that can potentially affect the value of NHS

care, such as differences in the age and gender composition and education attainment of the sample. We also include regional fixed effects ( $\vartheta_g$ ), time fixed effects ( $\mu_t$ ), and the usual error term ( $\epsilon_{igt}$ ). For the experiment to be credible it is important to show that treatment and controls variables should have similar characteristics and any difference should be conditioned for. Hence, we compare the changes in the treated group of regions with the changes of the control group of regions. The estimation methods correspond to a treatment effects model (differences in differences), which controls for unobservable characteristics that could influence estimates and the decision to decentralize, influencing  $E(\epsilon_{igt}|D_{itg})$   $i$  and hence  $\gamma$  would be biased.

#### *4.2.2 Heterogeneous effects, robustness and falsification*

As mentioned above, we examine heterogeneous effects across both education and income groups to test for the existence of some socioeconomic effects which are consistent with the hypothesis of middle or higher income groups influencing preferences for the NHS. In addition, we test for heterogeneity across age groups so as to capture the intensity of use, whereas we assume that older individuals use health care more frequently. As a falsification test we have examined the effect of decentralization treatment on other public services that are not decentralized to test whether we find a preference towards the public nature of those services. In addition, we use an alternative instrumental variable strategy where decentralization determines satisfaction with and perception of public health services which is then employed to estimate preference for public health care. We also add a trend and trend square so as to relax the assumption of common temporal effects; we include a variable indicating whether there were elections in that year; we interacted the treatment effect with whether the government at the regional and central level were from the same political party (incumbent); and we check our results with the exclusion of two small autonomous regions

with a particular tax system that allows them to collect all the taxes (so-called ‘foral regions’). Finally, we examine the effect of decentralization depending on individuals’ preference for the public system.

#### *4.3. Parallel Trends*

As a preliminary analysis, we graphically examine the existence of parallel trends prior to the treatment. Figure 1 display such trends for the four dependent variables in the study in which respondents are asked for their perception, preferences (demand), and satisfaction with the public health system, as well as uptake of PHI. The blue line represents those regions that were centralized prior to 2002 (treatment), while the red line represents those regions that were decentralized prior to 1999 and therefore were not treated in 2002 (control). The figure indicates that after 2002 (treatment year) those regions that were decentralized (blue line) increased the number of respondents who thought that the health system works properly. The others variables do not show a clear differentiated trend after 2002. Figure 1 shows evidence suggestive of the presence of parallel trends before 2002 for all three variables used in the analysis as explained above, except for PHI where departure points are different and we observe some variation around the period 2000-2001, yet the overall increasing trend is comparable between treatment and control regions.

**[Insert Figure 1 about here]**

## **5. Results**

### *5.1 Baseline results*

Table 2 reports the difference-in-differences (DiD ) estimates of the impact of decentralization on different dimension measures of the preference for public health care. We find evidence of positive and significant effects for all domains on public health care preferences. Although not statistically significant for one of the four dependent variables it

does exhibit the expected sign. In a later section, we will examine whether these two non-significant coefficients arise from heterogeneous effects. These results control for all the variables mentioned above, i.e. time and region fixed effects, income, education level, age, gender, occupation, and a dummy variable for missing income and education level.

Specifically, when we study the effect of health care decentralisation on four dependent variables under analysis we find a 7 pp point increase in the positive perception of the health system (mean value 1.87), an increase in the a preference for public health care (median value 2.56) 13 pp (both significant at 1%), and an increase in NHS satisfaction (median value 0.01) by 0.02 (significant at 10%) alongside a 0.045pp (not statistically significant) effect on the uptake of PHI (median value 0.11). Hence, overall these results are consistent that decentralisation does indeed shift preferences for NHS use.

In interpreting the estimates, a question that emerges is whether the effect is driven by the effect of political decentralization or the fact that two out of the seventeen regions are fully fiscally accountable as they collect their taxes. The latter would tend to indicate that fiscal, as opposed to political, accountability is driving the results. To address this concern, in Table A2 in the appendix we examine the effect after removing the observation referring to the two regions that are fully fiscally accountable (hence, can collect their own taxes) and make up less than 5% of the total Spanish population. Again, results hold and remain virtually unchanged for the four main variables, except that satisfaction with the NHS is now statistically significant at 5% for, but the coefficient remains insignificant for PHI uptake. These results indicate that political, rather than fiscal decentralisation appears to be driving the results.

**[Insert Table 2 about here]**

## 5.2 Robustness Checks

Next, we address some threats to our identification. Indeed, so far, our previous estimates rely on time effects, and one could argue that the effects are deemed to be sensitive to linear and quadratic trends. Another argument can be made that users of the health services might be different from non-users, and one would expect that experience with health care services influences the formation of health care preferences. In Table 3, we present our first two robustness checks. First, we control for both a linear trend and quadratic trend (trend squared) and find consistent results (Panel 1). Next, in the second panel of Table 3, we test whether the effect is driven by the users of public health care by introducing a triple interaction between post\*treatment and individuals' preference (hypothetical demand) for public health.

**[Insert Table 3 about here]**

The first two columns of Panel 2 show the results for a positive perception of and satisfaction with the public health system. As expected, when we interact whether individuals use public health care with the treatment we find a comparable and expected positive effect, whilst the effect of the interaction between treatment and post are negative<sup>10</sup>. Combining the information of the two coefficients we find that for individuals using the public health system for at least two of the four care options (primary care, specialist, hospital, and emergency room), decentralization brings about more satisfaction and good perception of the health system, and importantly, and unlike previous estimates, it reduces the take-up of PHI. All effects are statistically significant at 1%, including the take up of PHI. Those individuals who

<sup>10</sup> In order to interpret the coefficients and also to understand the evolution of public use, we provide the descriptive statistics for this variable.

Year	0 =Never (%)	1 (%)	2 (%)	3(%)	4= always (%)
2002	7.31	2.99	4.4	13.51	71.79
2006	27.68	8.73	11.33	11.31	40.95
2010	24.64	10.15	11.26	12.61	41.35

do not use or use only the public health system for one of the four care options, experience a negative (never use) or small negative effect of decentralization on preferences for public health.

### *5.3 Falsification Tests*

Table 4 reports the results of a DiD but now examining the effect of our treatment on other priorities as a falsification (placebo) test. As expected we find no significant effect for any of the variables (education, housing, and pensions), except for an interest in health. Hence, this leads us to conclude that the effect of decentralization is genuine.

**[Insert Table 4 about here]**

### *5.4 Heterogeneous Effects*

As a potential driver of the results, we first test whether income and education heterogeneity could explain our baseline results. We proceed by dividing the sample into the following four income groups: (i) those who do not report their monthly income, (ii) low income respondents when individuals reporting an 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 for the period. For the education variable, we distinguish four groups, namely 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. Table 5 reports the results of income and education specific effects in four panels for each of the question of health care preferences and PHI take up. Table A3 in the Appendix show the statistical significance of the difference between the interaction of treatment and post across income and education groups. Table 5

below only shows the main interaction term, while the other coefficients are given in tables A4 and A5 in the appendix

**[Insert Table 5 about here]**

The differences in individuals' perception of the health system do not show a statistically significant heterogeneity across income groups. Nevertheless, individuals with an income larger than €1800 a month exhibit a statistically significant higher change on their preference for public health care. In contrast, satisfaction primarily increased among individuals classified as lower income (<€900 a month), which was the income group more likely to have been using public health before the decentralization. Remarkably, decentralization brought a reduction of the PHI take up and was statistically significant (5%) for high-income individuals to a significant magnitude (0.13 pp). Nevertheless, the difference across income groups does not show any statistical significance (Table A3). Hence, overall, lower-income individuals used public health more than the rest and therefore they benefit from the quality improvements that decentralization might have brought (panels three of Table 5). Yet, richer individuals increase their preference for public health (Panel 2) and consequently they reduce their PHI uptake (last panel -4- of Table 5, although the difference is not statistically significant). Individuals in between (between €900 and €1800 a month) are the ones benefiting the least. We also find that those individuals not reporting their income, as expected, do not exhibit some unobserved characteristics that correlate with their preferences for decentralization.

For education, we find robust evidence of an effect of decentralisation circumscribed the middle and highly educated individuals who are found to exhibit a higher preference for using public health care services after decentralization and reducing their PHI take up. These differences are statistically significant for high education versus the rest in preferences for



public health and between middle and high education versus lower education in PHI take up. The satisfaction with public health and perception of health (both related to perceived quality of public health) do not show statistically significant differences across samples.

Next, we examine heterogeneity by age to proxy for health status and intensity of health services use, using the proxy information available in our data. To this end, we divide our sample between people older than 70 and the rest. Table 6 shows that the positive effects of decentralization on perception, preferences, and satisfaction for health are larger for the older sample. While for the total sample (Table 2) we found no statistically significant effect of decentralization on satisfaction with public health, the coefficient is now significant for the older sample. These results show that those individuals who might use health services more intensively (ITT) are the ones for which decentralization has the largest impact. As for the total sample, we find no statistically significant effect (although negative) of decentralization on the probability to take up of private health insurance. Table A6 in the appendix shows other coefficients.

**[Insert Table 6 about here]**

#### *5.5 An alternative specification: effect of decentralization on use*

In Table 7 we report the estimates of an instrumental variable model where preference (stated demand) for public health care depends on the perceptions of health systems and satisfaction with public health, both instrumented by the decentralization treatment. The results suggest a picture that is consistent with all the results above. Perception of the quality of the health system and satisfaction with the health system (both instrumentalized with centralization) have a positive and statistically significant (at 1 and 10%, respectively) coefficient on stated demand (preference) for public health.

**[Insert Table 7 about here]**

### *5.6 Election year and interaction with regional incumbent ('double agency')*

One of the consequences of processes of regional decentralisation lies in that the regional incumbent might not be an agent solely of its own constituents, but might become an agent of the political party. Hence, the effect might well be heterogeneous depending on whether the regional incumbent coincides with the incumbent at the national level. When they do not belong to the same party, there is an incentive for them to engage in vertical competition (Breton, 1996). Table 8 reports evidence suggesting that the regional incumbent reduces the effect of decentralization on all dependent variables, although it is not significant for preference for public health. Another potential concern to the identification is whether the political cycle is driving our results. In the same table, we introduce election year as an additional control. Election year as expected exhibits a statistically significant effect in almost all regression estimates, but it does not change the coefficients of the treatment effects (the interaction between treated and post), which are similar to the ones in Table 2. These estimates result from adding an additional variable that takes value 1 in the year that there were general elections: 2000, 2004, and 2008. Table 8 only shows the main results; the other coefficients are presented in Table A7.

**[Insert Table 8 about here]**

## **6. Conclusion**

This paper has examined whether health care decentralisation changes the preferences for publicly funded health care. More specifically, we empirically examine whether the transfer of health care responsibilities to regional governments, by changing the uniformity of health care provision, increases both the probability of using, and the satisfaction with NHS care, alongside the uptake of PHI. Newly created regional government might face electoral

incentives to improve visible dimensions of health care quality, however empirical evidence substantiating these effects are limited. This paper draws on quasi-experimental data from the decentralization of health care services taking place in Spain in 2002 to test such a claim.

Our results suggest that political decentralization indeed increases for the probability of public health care and PHI take up and NHS satisfaction for some groups. The results are, as expected, heterogeneous across income and education groups. Results are robust to falsification tests and controls for electoral years and time trends, and depend on individuals' use of the NHS. Nonetheless, our evidence supports that decentralization shifts the demand for private health care insurance only for higher income and educated individuals.

Overall, the results are consistent with the thesis that 'decentralization' provides an alternative to the 'build in accountability mechanisms' of the health care market (Tanzi, 2001). That is, regional decentralization reforms such as those taking place in several European countries (e.g., the Manchester health authority in England) can potentially change certain dimensions of health care quality and further expand the use and support of the NHS, reducing the uptake of PHI. That is, political decentralization can reduce health system opting out.

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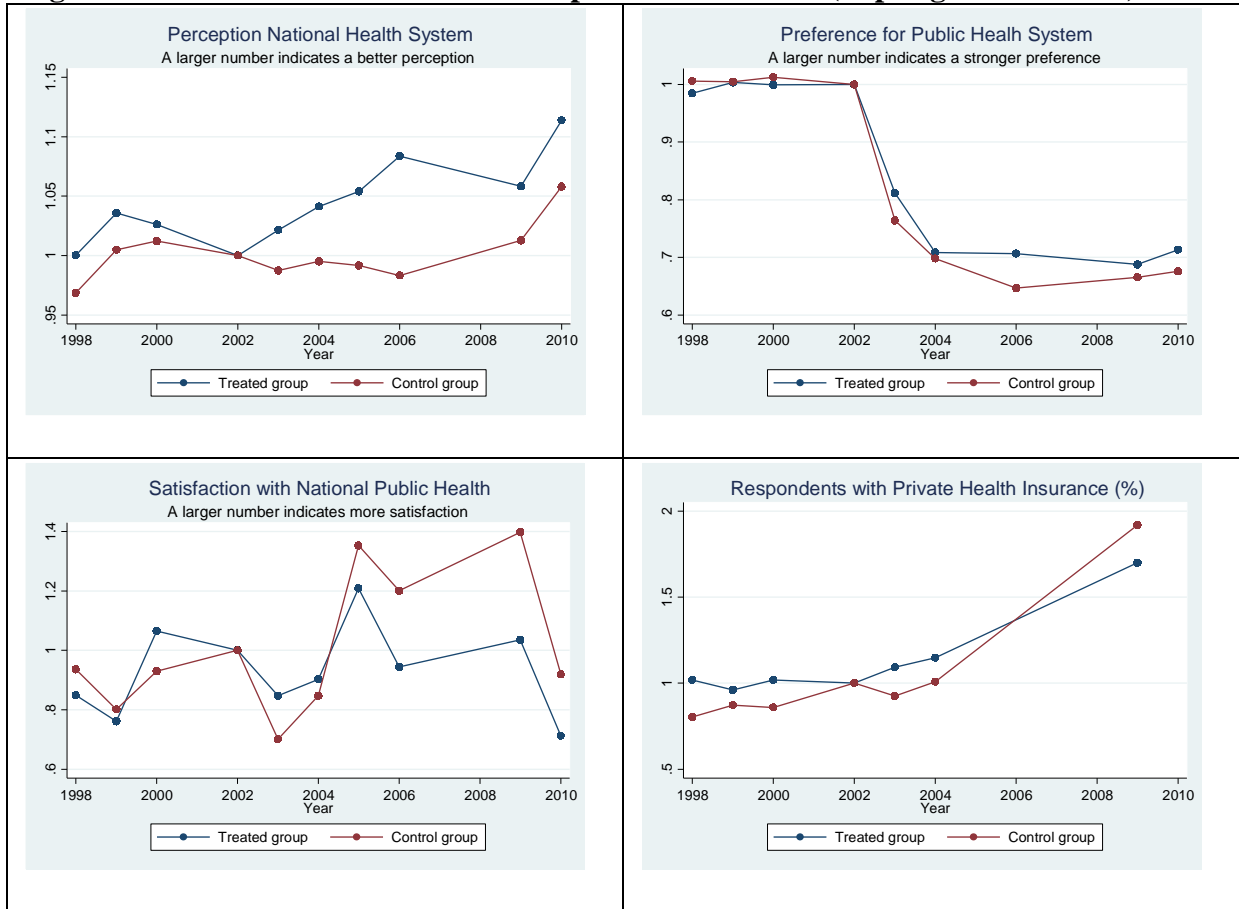
## Tables and Figures

**Table 1. Descriptive Statistics**

	Total			Treatment		Control	
	# Obs.	Average	(SD)	Average	SD	Average	SD
<i>Dependent variables</i>							
Perception Health System	67828	1.87	0.82	1.92	0.82	1.83	0.81
Preference for Public Health	67778	2.56	1.70	2.59	1.69	2.53	1.71
Satisfaction with Public Health	55402	0.01	0.73	0.09	0.71	-0.06	0.73
Private Health Insurance	47824	0.11	-	0.13	-	0.10	-
<i>Treatment and Controls</i>							
Years of exposure	68591	10.50	8.39	3.00	3.06	17.27	5.38
Female	68589	0.51	0.50	0.51	0.50	0.51	0.50
Age	68568	46.25	18.28	46.76	18.44	45.78	18.13
Income, if income not missing	49766	3.40	1.27	3.41	1.28	3.38	1.27
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	1.23
Missing education level	68591	0.05	-	0.04	-	0.06	-
Retired	68475	0.21	-	0.21	-	0.20	-
Unemployed	68475	0.08	-	0.07	0.26	0.08	-
Student	68475	0.06	-	0.05	0.23	0.07	-
At home	68475	0.09	-	0.10	0.30	0.09	-
Other	68475	0.03	-	0.04	0.18	0.03	-

ote: The table above provides the number of observations, means and standard deviations (only for continuous variables) for the total sample employed, the sample used as treatment ( 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. Parallel Trends in the Four Dependent Variables ('Opting Out' Proxies)**



Note: This figure display the parallel trends 1998-2010 for the four dependent variables of our study. The figure shows the evolution of this variable for those regions that were decentralized prior to 1999 (red line) and for those that were decentralized in 2002 (blue line), standardized at 1 in 2002.

**Table 2. Effect of Political Decentralization on ‘Opting –Out’ proxies**

	Perception health system [0 bad - 3 excellent]		Preference for public health [0 never use–4 use it always]		Satisfaction with public health care [0 unsatisfied - 10 very satisfied]		PHI [1 yes – 0 no] Probit	
	No controls	Controls	No controls	Controls	No controls	Controls	No controls	Controls
Treated	0.285*** (0.021)	0.282*** (0.021)	-0.099*** (0.036)	-0.064** (0.036)	0.200*** (0.021)	0.185*** (0.020)	0.155*** (0.054)	0.059 (0.057)
Post 2002	0.141*** (0.015)	0.129*** (0.015)	-1.088*** (0.026)	-1.103*** (0.026)	-0.017 (0.015)	-0.031** (0.014)	0.509*** (0.032)	0.580*** (0.035)
Treated*Post	0.070*** (0.012)	0.076*** (0.012)	0.129*** (0.022)	0.127*** (0.021)	0.015 (0.012)	0.021* (0.012)	-0.039 (0.032)	-0.045 (0.033)
Controls	Not incl.	Included	Not incl.	Included	Not incl.	Included	Not incl.	Included
<i>N</i>	67828	67692	67778	67641	55402	55297	47824	47723

Note: the estimates above report the baseline effect of political decentralization on four ‘opting out proxies’, namely health system perception, preference for public health care, satisfaction with public health care and uptake of private health insurance (PHI) Controls: female, age, income, education level, occupation, and a dummy for missing income and education level. Year an region fixed effects included. Excluding year FE does not change the results. Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 3 Robustness Tests (I): Trend and Trend Square; (II): Triple Interaction Effect)**

	(I)				(II)		
	Robustness: includes trend and trend square				Robustness: control for preference		
	Perception health system	Preference for public health	Satisfaction with public health	PHI	Perception health system	Satisfaction with public health	PHI
Treated	0.281*** (0.021)	-0.067* (0.040)	0.185*** (0.020)	0.059 (0.057)	0.293*** (0.021)	0.193*** (0.020)	0.017 (0.058)
Post 2002	-0.051*** (0.014)	-1.379*** (0.028)	-0.010 (0.014)	0.179 (0.345)	0.114*** (0.015)	-0.046*** (0.014)	0.584*** (0.035)
Treated*Post	0.075*** (0.012)	0.144*** (0.024)	0.021* (0.012)	-0.045 (0.033)	-0.103*** (0.014)	-0.121*** (0.014)	0.427*** (0.039)
Treated*Post* Preference for public system (0 to 4)					0.086*** (0.003)	0.068*** (0.003)	-0.228*** (0.011)
Trend	0.001 (0.005)	-0.182*** (0.009)	0.001 (0.004)	-0.062 (0.106)			
Trend Square	0.001** (0.000)	0.013*** (0.001)	-0.000 (0.000)	0.008 (0.006)			
<i>N</i>	67692	67641	55297	47723	66914	54776	47112

Note: We report the estimates of two sets of regressions which reproduce Table 2 but controlling for a quadratic trend in the panel (I), and examining the heterogeneous effect of political decentralisation on the use of health care. The control variables employed include demographics (female, age), income, education level, occupation, and a dummy for missing income and education level, and region fixed effects. In addition, panel 2 includes year fixed effects. Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



**Table 4. Falsification Tests: Effect on health and other government priorities**

	Interested in Education	Interested in Health	Interested in Housing	Interested in Pensions
Treated	-0.052*** (0.011)	0.001 (0.012)	-0.005 (0.009)	0.028*** (0.008)
Post 2002	0.027*** (0.008)	-0.017* (0.009)	0.031*** (0.007)	-0.020*** (0.006)
Treated*Post	-0.003 (0.006)	0.023*** (0.007)	-0.007 (0.006)	0.003 (0.005)
<i>N</i>	66633	66633	66633	66633

Note: We report the estimates of political decentralisation on government priorities including education, health, housing and pensions. Only health was affected by political decentralization. Controls include year and region fixed effects, female, age, income, education level, occupation, and a dummy for missing income and education level. Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5. Heterogeneous effects across income and education groups**

<b>Perception health system</b> [0 bad - 3 excellent]				
	<i>missing income</i>	<i>Income &lt; 900</i>	<i>900 &lt; inc. &lt; 1800</i>	<i>Income &gt; 1800</i>
Treated*Post	-0.008 (0.024)	0.130*** (0.029)	0.084*** (0.021)	0.123*** (0.027)
	<i>Missing edu.</i>	<i>Low education</i>	<i>Middle edu.</i>	<i>High education</i>
Treated*Post	0.199** (0.079)	0.060*** (0.017)	0.099*** (0.022)	0.047 (0.035)
<b>Preference for public health</b> [0 never use - 4 use it always]				
	<i>missing income</i>	<i>Income &lt; 900</i>	<i>900 &lt; inc. &lt; 1800</i>	<i>Income &gt; 1800</i>
Treated*Post	0.063 (0.043)	0.142*** (0.043)	0.067* (0.036)	0.290*** (0.053)
	<i>Missing edu.</i>	<i>Low education</i>	<i>Middle edu.</i>	<i>High education</i>
Treated*Post	0.140 (0.128)	0.085*** (0.027)	0.140*** (0.041)	0.213*** (0.073)
<b>Satisfaction with public health</b> [0 unsatisfied - 10 very satisfied]				
	<i>missing income</i>	<i>Income &lt; 900</i>	<i>900 &lt; inc. &lt; 1800</i>	<i>Income &gt; 1800</i>
Treated*Post	-0.047* (0.024)	0.121*** (0.028)	0.018 (0.020)	0.020 (0.027)
	<i>Missing edu.</i>	<i>Low education</i>	<i>Missing educ.</i>	<i>High education</i>
Treated*Post	0.024 (0.080)	0.014 (0.016)	0.043** (0.021)	-0.017 (0.037)
<b>PHI (Probit)</b>				
	<i>missing income</i>	<i>Income &lt; 900</i>	<i>900 &lt; inc. &lt; 1800</i>	<i>Income &gt; 1800</i>
Treated*Post	0.012 (0.061)	-0.038 (0.115)	-0.028 (0.061)	-0.131** (0.060)
	<i>Missing edu.</i>	<i>Low education</i>	<i>Missing educ.</i>	<i>High education</i>
Treated*Post	0.210 (0.304)	0.038 (0.050)	-0.095* (0.054)	-0.140* (0.084)
<i>N</i>	13093	8375	16112	10143

Note: tables above provide for each of the four 'opting out' measures, the heterogeneous effect by income and education group. Controls include year and region fixed effects, female, age, education level, occupation, and a dummy for missing education level. Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 6. Heterogeneous effects by Age – Old Age and Non-Old Age**

	Perception health system [0bad-3excellent]	Preference for public health [0never use–4 use it always]	Satisfaction with public health [0 unsatisfied - 10 very satisfied]	PHI [1 yes – 0 no] Probit
Treated*Post	0.061*** (0.013)	0.101*** (0.022)	0.014 (0.012)	-0.039 (0.034)
Tr'd*Post*Old	0.099*** (0.017)	0.162*** (0.030)	0.049*** (0.018)	-0.064 (0.062)
<i>N</i>	67692	67641	55297	47723

Note: table above reports heterogeneous effect between older age and younger age groups. Controls include year and region fixed effects, female, age, income, occupation, and a dummy for missing income level. Old =1 if individuals older than 70. : Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 7 Preference for public health instrumented (IV)**

	Preference for public health [0never use–4 use it always]	Preference for public health [0never use–4 use it always]
Perception health system (instrumented with centralized)	1.665*** (0.359)	
Satisfaction with public health (instrumented with centralized)		5.406* (2.769)
<i>N</i>	66914	54776
	First Stage (Perception health system)	First Stage (Satisfaction with NHS)
Centralized	-0.076*** (0.012)	-0.021* (0.012)
<i>N</i>	67692	55297

Note: the table above reports the effect of health system perceptions and the satisfaction on the health system on the preference for public health care but now using decentralization as an instrumental variable (IV). Controls include year and region fixed effects, female, age, income, occupation, and a dummy for missing income level Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 8. Interaction with a regional incumbent**

	Perception health system [0 bad-3excellent]	Preference for public health [0never use–4 use it always]	Satisfaction with public health [0 unsatisfied - 10 very satisfied]	PHI [1 yes – 0 no] Probit
<b>Interaction with a regional incumbent</b>				
Treated*Post	0.142*** (0.016)	0.133*** (0.028)	0.074*** (0.016)	-0.119*** (0.046)
Treated*Post*Incumbent	-0.101*** (0.017)	-0.026 (0.029)	-0.062*** (0.016)	0.146*** (0.047)
Incumbent	0.048*** (0.008)	-0.015 (0.015)	0.060*** (0.008)	-0.008 (0.025)
<b>Election Year</b>				
Treated*Post	0.076*** (0.012)	0.127*** (0.021)	0.021* (0.012)	-0.045 (0.033)
Election year	-0.096*** (0.013)	0.036 (0.023)	0.028** (0.013)	-0.411*** (0.029)
<i>N</i>	67692	67641	55297	47723

Note: the table above reports the effect of political decentralisation but in these regions run by an incumbent of the same party as that of the central government (‘double agents’). Regressions include same controls as Table 2, and election year Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Appendix

**Table A1. Time of Decentralization 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. Eliminating the effect of Navarra and Basque Country**

	Perception health system [0 bad - 3 excellent]	Preference for public health [0never use-4 use it always]	Satisfaction with public health [0 unsatisfied - 10 very satisfied]	PHI [1 yes – 0 no] Probit
Treated	0.286*** (0.021)	-0.073** (0.036)	0.183*** (0.020)	0.057 (0.057)
Post 2002	0.140*** (0.016)	-1.107*** (0.028)	-0.048*** (0.016)	0.564*** (0.037)
Treated*Post	0.067*** (0.013)	0.141*** (0.023)	0.028** (0.013)	-0.038 (0.034)
<i>N</i>	61693	61617	50208	43504

Notes: Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Controls: year and region fixed effects, female, age, income, education level, occupation, and a dummy for missing income and education level. Regressions exclude the Bask Country and Navarra

**Table A3. t-test differences coefficients across subsamples**

	Perception Health System	Preference for Public Health	Satisfaction with public health	PHI uptake
Prob > chi2				
High income to Low income	0.8555	0.0233	0.0087	0.4731
Low income to Median income	0.2024	0.1395	0.0023	0.937
High income to mid income	0.2538	0.0004	0.9531	0.225
High education to Low education	0.7515	0.0994	0.4498	0.0687
Low education to Median education	0.1567	0.2431	0.2814	0.069
High education to mid education	0.2116	0.3817	0.1673	0.6565

**Table A4. Heterogeneous effects across income groups**

Income in euros/month	Perception health system [0 bad - 3 excellent]			
	missing income	Income<900	900<inc.<1800	Income>1800
Treated	0.404*** (0.038)	0.243*** (0.049)	0.228*** (0.034)	0.219*** (0.052)
Post 2002	0.177*** (0.029)	0.082** (0.034)	0.135*** (0.026)	0.111*** (0.034)
Treated*Post	-0.008 (0.024)	0.130*** (0.029)	0.084*** (0.021)	0.123*** (0.027)
<i>N</i>	18435	13305	23103	12849
Preference for public health [0 never use -4 use it always]				
	missing income	Income<900	900<inc.<1800	Income>1800
Treated	0.142** (0.068)	-0.084 (0.072)	-0.203*** (0.059)	-0.067 (0.105)
Post 2002	-1.156*** (0.052)	-1.140*** (0.050)	-1.117*** (0.044)	-0.866*** (0.069)
Treated*Post	0.063 (0.043)	0.142*** (0.043)	0.067* (0.036)	0.290*** (0.053)
<i>N</i>	18467	13316	23059	12799
Satisfaction with public health [0 unsatisfied - 10 very satisfied]				
	missing income	Income<900	900<inc.<1800	Income>1800
Treated	0.260*** (0.038)	0.147*** (0.046)	0.149*** (0.032)	0.169*** (0.054)
Post 2002	-0.046 (0.029)	-0.103*** (0.033)	-0.026 (0.024)	0.040 (0.034)
Treated*Post	-0.047* (0.024)	0.121*** (0.028)	0.018 (0.020)	0.020 (0.027)
<i>N</i>	14331	10813	19555	10598
PHI (Probit)				
	missing income	Income<900	900<inc.<1800	Income>1800
Treated	0.004 (0.095)	-0.234 (0.229)	0.032 (0.103)	0.253** (0.115)
Post 2002	0.724*** (0.065)	0.592*** (0.111)	0.468*** (0.062)	0.537*** (0.068)
Treated*Post	0.012 (0.061)	-0.038 (0.115)	-0.028 (0.061)	-0.131** (0.060)
<i>N</i>	13093	8375	16112	10143

Note: Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Controls: Year and region fixed effects, female, age, education level, occupation, and a dummy for missing education level.

**Table A5. Heterogeneity across education groups**

<b>Perception health system [0 bad - 3 excellent]</b>				
	missing education	Low education	Middle education	High education
Treated	0.097 (0.130)	0.313*** (0.028)	0.282*** (0.037)	0.195*** (0.058)
Post 2002	0.129 (0.224)	0.116*** (0.021)	0.152*** (0.026)	0.213*** (0.044)
Treated*Post	0.199** (0.079)	0.060*** (0.017)	0.099*** (0.022)	0.047 (0.035)
<i>N</i>	3305	42051	18500	3836
<b>Preference for public health [0 never use -4 use it always]</b>				
	missing education	Low education	Middle education	High education
Treated	-0.196 (0.209)	-0.068 (0.046)	-0.040 (0.069)	-0.174 (0.121)
Post 2002	-0.967*** (0.366)	-1.174*** (0.033)	-1.093*** (0.049)	-0.457*** (0.090)
Treated*Post	0.140 (0.128)	0.085*** (0.027)	0.140*** (0.041)	0.213*** (0.073)
<i>N</i>	3340	42059	18445	3797
<b>Satisfaction with public health [0 unsatisfied - 10 very satisfied]</b>				
	missing education	Low education	Middle education	High education
Treated	-0.146 (0.134)	0.219*** (0.027)	0.166*** (0.036)	0.161*** (0.062)
Post 2002	-0.409* (0.214)	-0.030 (0.019)	-0.051** (0.026)	0.068 (0.046)
Treated*Post	0.024 (0.080)	0.014 (0.016)	0.043** (0.021)	-0.017 (0.037)
<i>N</i>	2468	34733	15060	3036
<b>PHI (Probit)</b>				
	missing education	Low education	Middle education	High education
Treated	0.195 (0.426)	0.071 (0.086)	0.055 (0.095)	-0.004 (0.139)
Post 2002	0.326 (0.584)	0.579*** (0.054)	0.609*** (0.057)	0.557*** (0.087)
Treated*Post	0.210 (0.304)	0.038 (0.050)	-0.095* (0.054)	-0.140* (0.084)
<i>N</i>	1868	31052	12414	2226

Note: Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Controls: year and region fixed effects, female, age, income, occupation, and a dummy for missing income level.

**Table A6. Heterogeneous effects by age**

	Perception health system [0bad-3excellent]	Preference for public health [0never use-4 use it always]	Satisfaction with public health [0 unsatisfied - 10 very satisfied]	PHI [1 yes – 0 no] Probit
Treated	0.279*** (0.021)	-0.088** (0.036)	0.181*** (0.020)	0.058 (0.057)
Post 2002	0.134*** (0.015)	-1.067*** (0.026)	-0.023 (0.014)	0.581*** (0.035)
Treated*Post	0.061*** (0.013)	0.101*** (0.022)	0.014 (0.012)	-0.039 (0.034)
Tr'd*Post*Old	0.099*** (0.017)	0.162*** (0.030)	0.049*** (0.018)	-0.064 (0.062)
<i>N</i>	67692	67641	55297	47723

Note: Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Controls: year and region fixed effects, female, age, income, occupation, and a dummy for missing income level. Old =1 if individuals older than 70.

**Table A7. Interaction with a regional incumbent**

	Perception health system [0 bad-3excellent]	Preference for public health [0never use-4 use it always]	Satisfaction with public health [0 unsatisfied - 10 very satisfied]	PHI [1 yes – 0 no] Probit
<b>Interaction with a regional incumbent</b>				
Treated	0.251*** (0.021)	-0.066* (0.037)	0.160*** (0.021)	0.077 (0.059)
Post 2002	0.123*** (0.015)	-1.102*** (0.026)	-0.039*** (0.014)	0.589*** (0.035)
Treated*Post	0.142*** (0.016)	0.133*** (0.028)	0.074*** (0.016)	-0.119*** (0.046)
Treated*Post*Incumbent	-0.101*** (0.017)	-0.026 (0.029)	-0.062*** (0.016)	0.146*** (0.047)
Incumbent	0.048*** (0.008)	-0.015 (0.015)	0.060*** (0.008)	-0.008 (0.025)
<b>Election Year</b>				
Treated	0.282*** (0.021)	-0.064* (0.036)	0.185*** (0.020)	0.059 (0.057)
Post 2002	0.129*** (0.015)	-1.103*** (0.026)	-0.031** (0.014)	0.580*** (0.035)
Treated*Post	0.076*** (0.012)	0.127*** (0.021)	0.021* (0.012)	-0.045 (0.033)
Election year	-0.096*** (0.013)	0.036 (0.023)	0.028** (0.013)	-0.411*** (0.029)
<i>N</i>	67692	67641	55297	47723

Note: Standard errors in parentheses: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Regressions include same controls as Table 2, and election year