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HEALTH, ECONOMETRICS AND DATA GROUP

WP 19/21

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October 2019

http://www.york.ac.uk/economics/postgrad/herc/hedg/wps/

THE EFFECT OF FREEDOM OF CHOICE ON HEALTH SYSTEM RESPONSIVENESS. EVIDENCE FROM SPAIN

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ABSTRACT

Public policies fostering the freedom of choice in the healthcare sector are becoming increasingly usual in Europe in order to boost patient empowerment and improving health system responsiveness. However, there is limited evidence regarding the effects of freedom of choice policies. The goal of this study is to contribute to this literature by analysing the impact of the implementation of the Single Health Area in the Spanish region of Madrid in 2009. This reform allowed citizens to freely choose among any General Practitioner and Specialist of any health centre of the region. We focus on studying the effect on the health services responsiveness -as defined by the World Health Organization - drawing on cross-section microdata from the Spanish Healthcare Barometer for 2002-2016 and making use of the synthetic control estimation techniques. The findings show that the reform caused a strong positive impact on the Prompt Attention domain in specialised care. By contrast, the reform caused a drop in the responsiveness with Communication and Dignity domains in primary care. The results of this paper could provide policy-makers with empirical evidence about the impact of the freedom of choice policies on the quality of care provided by the health services.

Keywords:
Health System Responsiveness; Synthetic Control Method; Freedom of Choice

1. Introduction

In November 2009, the regional government of Madrid (Spain) enacted a law extending the right to choose health providers in primary and specialised care. A Single Area Healthcare system was implemented, enabling citizens to choose their GP or medical specialist from those practicing throughout the region, and not just from those in the corresponding health referral area. Madrid was the first Spanish region to remove all barriers to freedom of choice in this respect.

Such policies are becoming increasingly common in many countries and regions across Europe (Greve, 2017; Miani, Pitchforth & Nolte, 2013). Portugal, the UK, Sweden, Finland, Norway and Denmark, among others, have implemented reforms to increase the freedom of choice in healthcare provision within their respective national health systems (Miani et al., 2013; Ringard, Hagen & Rico, 2006; Simões, Augusto & Fronteira, 2017).

In addition to being a basic citizens' right in some countries (European Commission, 2015), policies to increase freedom of choice of healthcare provider are also intended to improve the efficiency, quality and responsiveness of care by reducing waiting times and inequality of access (Cooper, Gibbons, Jones & McGuire, 2011; Ringard & Hagen, 2011; Siciliani, 2005). However, to date only limited evidence has been provided on the potential consequences of such policies (Fotaki et al., 2008; Miani et al., 2013; Ringard & Hagen, 2011). Furthermore, most previous studies of this question have focused on the situation in the US and/or the UK (Siciliani, Chalkley & Gravelle, 2017).

In this paper, we analyse the effects of the health system reform carried out in the Madrid region (or Community) in 2009, taking into account the 2000 World Health Organisation (WHO) report in which responsiveness was defined as a fundamental objective of health systems (WHO, 2000). Health system responsiveness concerns how individuals are treated by the health system and the environment in which they are treated, and it is not directly related to health outcomes (Valentine et al., 2003). It is considered important to study this concept because it is closely associated with questions of human and patients' rights (Gostin, Hodge, Valentine & Nygren-Krug, 2003) and, especially, because of its potentially very positive connection with public health (Bleich, Özaltin & Murray, 2009; Valentine, Bonsel & Murray, 2007). Some authors have pointed out that low levels of responsiveness could be associated with an under-utilisation of public health services and hence with the danger of worsening public health (Banerjee & Duflo, 2011). The present study is intended to contribute to the emerging literature on freedom of choice

policies in the health field. To our knowledge, it is the first study to analyse the influence of freedom of choice policies on the responsiveness concept, as presented in the WHO framework (Murray & Frenk, 2000). In consequence, the results obtained could usefully inform public policy recommendations made to other regions or countries that are currently planning to implement such policies.

This analysis is based on cross-section microdata obtained from the Spanish Healthcare Barometer (SHB) survey for the period 2002-2016. In it, the Synthetic Control Method (SCM) (Abadie, Diamond & Hainmueller, 2010, 2015; Acemoglu, Cantoni, Johnson & Robinson, 2009; Kleven, Landais & Saez, 2016; Pinotti, 2015) is used to evaluate the effects produced on non-clinical health-enhancing factors by political reform in Madrid promoting the freedom of choice regarding healthcare provider. The study findings show that this extension of freedom of choice in health provider has had a considerable impact on health system responsiveness within the region considered. The reform produced a negative impact on responsiveness as concerns the *Communication* and *Dignity* domains of primary care, but a strongly positive and lasting impact on that of *Prompt attention* in specialised care. Average waiting times for attention from a specialist doctor fell by around 22%, and average levels of satisfaction with waiting times were 7% higher than before the reform.

The rest of this paper is structured as follows. In section 2, we review the background to the study. Section 3 then describes the empirical strategy employed, detailing the dataset, the variables and the method applied. In section 4, we present the main results of our analysis. These are discussed in section 5, after which the main conclusions drawn are summarised in section 6.

2. Background

2.1. Freedom of choice policies in the health sector

Freedom of choice in healthcare is considered a basic right in many European countries (European Commission, 2015). Although there are several areas in which patients can exercise this right, the choice of healthcare provider has received particular attention in recent years (Dixon et al., 2010; Gaynor, Propper & Seiler, 2016). Thus, public policies aimed at guaranteeing citizens' right to freely choose their healthcare provider have sought to remove any administrative barrier which might prevent or hinder its exercise (Beukers, Kemp & Varkevisser, 2013; Miani et al., 2013). For instance, after conducting

several pilot projects, between 2006 and 2008, the British government extended patients' right to freely choose their specialist doctor. In the new system, after referral by the GP for specialised treatment, UK citizens are entitled to choose from among the specialists available at any hospital (public or private) in the country. The main objective of this reform was to induce hospitals to compete on quality and to improve efficiency (Cooper et al., 2011; Coulter, 2010; Longo, Siciliani, Moscelli & Gravelle, 2017). Similarly, in 2016, a new law allowed users of the Portuguese NHS to freely choose any hospital within or outside their referral area for outpatient consultations (Simões et al., 2017). An extended freedom of choice has also been facilitated in Norway, Finland, Denmark and Sweden, where similar reforms have been implemented (Glenngård, Anell & Beckman, 2011; Miani et al., 2013).

Policymakers promoting the freedom of choice of healthcare provider cite goals such as improving the responsiveness and quality of the health system, increasing efficiency and even achieving more favourable health outcomes (Dixon et al., 2010; Siciliani et al., 2017; Thomson & Dixon, 2006). It is argued that when patients can freely choose any doctor within their region or country of residence, providers will become more responsive to patients' demands. Accordingly, their performance will be improved, in order to maintain or increase users' satisfaction, and demand for the provider's services will be supported. However, the existence of more choice for patients does not automatically mean there will be greater competition among healthcare providers (Barros, Brouwer, Thomson & Varkevisser, 2016). Some authors have pointed out that other parallel mechanisms are necessary to achieve effective improvements in the health systems, such as implementing economic incentives linked to providers' activities; expanding the capacity of the health system; and providing performance-related information to help users make informed decisions (Beukers et al., 2013; Cooper et al., 2011; Coulter, 2010; Miani et al., 2013; Ringard & Hagen, 2011).

Empirical evidence on the effects of freedom of choice reflects mixed results in terms of health care quality and waiting times. In an analysis of the London Patient Choice Project, one of the first pilot projects implemented in the British NHS in 2002, Dawson, Gravelle, Jacobs, Martin & Smith (2007) found that greater freedom of choice of hospital care led to a slight reduction in average waiting times at London hospitals. A more pronounced reduction in waiting times was found by Ringard & Hagen (2011) after the 2001 entry into force of the Patients' Rights Act in Norway. On the other hand, in a merely

descriptive analysis, Simões et al. (2017) found that allowing Portuguese citizens to freely choose any hospital in the country led to an overall increase in average waiting times for first consultations at hospitals in Lisbon and Oporto.

Regarding hospital quality, Cooper et al. (2011) reported that reforms extending the freedom of choice of hospital within the British NHS in 2006 improved the acute treatment provided for myocardial infarction, especially in areas where there was a greater concentration of hospitals, i.e., where there was more competition among centres. Similarly, Gaynor et al. (2016) estimated that the mortality rates following heart bypass surgery decreased by 3% in UK hospitals after the freedom of choice policy was implemented in 2006. The same study identified the increased level of competition as a potential explanatory factor of this improvement in hospital quality. However, a recent study by Moscelli, Gravelle & Siciliani (2016) found that the UK freedom of choice reform worsened health care quality in terms of emergency readmissions after hip and knee replacements, by 8.5% and 7.7%, respectively. Therefore, the literature in this field does not, a priori, allow us to draw firm conclusions regarding the effect of freedom of choice on waiting times and hospital quality.

2.2. The Spanish National Health System and the Single Healthcare Area in the Community of Madrid

Under the Spanish NHS, health cover is essentially universal, funded by taxation and provided free of charge at the point of delivery. In 2015, public expenditure represented 71.1% of total health expenditure.

The Spanish health system is highly decentralised, with responsibility for budget management and territorial organisation having been devolved to the regions since 2002 (in the Community of Madrid to the Madrid Health Service, SERMAS). Health care funding is regulated by an agreement by which the central government devolves tax revenues to the regions according to their needs. Within each region, the system is based on a contractual agreement between the regional administration and the individual providers. Hence, the services provided and the overall cost are regulated by means of management contracts. Hospital budgets are determined according to a formula reflecting the number of patients discharged, the case-mix weight and a structure-related tariff.

Although some procedures are paid via a fee-for-service mechanism, the Spanish NHS budget does not depend on the number of patients treated.[1]

Health care in Spain is organised as follows: each region is divided into Health Areas (regulated by the regional government), each of which is composed of several Basic Health Zones (BHZs), the smallest units of the organisational structure. Each BHZ is composed of one or more health centres staffed by primary care teams, who exercise the gatekeeper function. A primary care team is automatically assigned to each citizen according to his/her place of residence within the region.

National legislation allows patients to choose among GPs/specialists within their referral health area/hospital. However, the regions are responsible for the implementation, development and enhancement of the essential state-wide legislation on patients' right to freely choose their health provider, although to date this legislation has not been fully developed in any of the regions.

A special case is that of the Community of Madrid. In 2009, a regional health law was passed developing the national legislation regarding patients' right to freely choose health providers in primary and specialised care.[2] The new regulation replaced the former eleven Health Areas with a new Single Health Area. Accordingly, since 2009, citizens of the Community of Madrid have been able freely choose from any GP, paediatrician or nurse available in the primary care service, and from any specialist at any hospital in the whole region, with respect to specialised health care. Madrid is the only region in Spain to have abolished the former Health Areas, thus overcoming a major normative barrier to achieving freedom of choice for patients. The new structure locates the patient at the centre of the health system, underpins the right of citizens to take part in decision making related to their health, and provides health authorities with valuable information enabling them to improve the quality of healthcare services.

The health authorities have adopted measures to facilitate patient choice. Thus, in primary care, the patients need only communicate their choice of doctor to the health centre where the GP in question delivers the service. In specialised care, after being referred for specialist treatment by their GP, patients are given an appointment request receipt with which they can choose the specialist preferred without any further action

[1] For more information on the Spanish National Health System, see Bernal-Delgado et al. (2018).

[2] 6/2009 Act, of 16 November, on freedom of choice in healthcare in the Community of Madrid.

required by the GP. The appointment can be obtained by internet, mobile app, digital facilities within the health centre or via the Appointment Management Centre, a call centre which since 2010 has been helping users make appointments with specialists and informing them of waiting lists and alternative providers.

The patient choice system adopted in the region of Madrid is innovative in Spain, providing patients with the information and means necessary to exercise their right to freedom of choice in health care. In this respect, too, since 2014 the health authorities have been publishing indicators of the performance and speciality-specific waiting lists for hospitals in the region, in order to facilitate patients' decision making[3] and thus ensure the effective exercise of the right to choose freely. In 2018, the citizens of the Community of Madrid made 2,292 changes of specialist doctor per 100,000 consultations, 83% more than in 2011. In primary care, however, the trend remained more stable during the period 2012-2018 (see Figure 1).

3. Empirical strategy

3.1. Dataset

This study is based on cross-section microdata obtained from the Spanish Healthcare Barometer (SHB) survey for the period 2002-2016. The SHB has been conducted since 1993 by the Spanish Centre for Sociological Research in coordination with the Ministry of Health. This survey is addressed to citizens aged over 18 years to determine their opinions and perceptions regarding health services in Spain. The survey takes the form of a questionnaire administered by personal interview. It is conducted three times a year with a total sample of about 7,800 respondents, representative of the Spanish adult population. Therefore, our analysis is based on pooled data with a total sample size of 109,601 observations.

One of the main features of this survey is that the respondents are asked to assess the degree to which each health service achieves a series of non-clinical objectives. In addition, respondents are asked to provide socioeconomic data and information about whether they have recently used any (public or private) health service. In this paper, we focus exclusively on respondents who reported experience with the public health system

[3] The official webpage of the Community of Madrid providing the information necessary to exercise the freedom of choice is http://www.comunidad.madrid/servicios/salud/libre-eleccion-sanitaria.

during the last twelve months.[4] As the Spanish healthcare system is mainly publicly funded, a high proportion of respondents recognised having made use of it during this period.[5] Other regional-wide level data were collected from external sources such as the National Statistics Institute and the Ministry of Health, Social Services and Equality.

3.2. Study variables

The SHB survey gathers information about citizens' opinions of and experiences with the performance of the health services, in terms of various non-clinical factors, such as the information received about their health problems; the time devoted by the doctor to each patient; the respect with which they are treated by the health provider; and the waiting time to be seen by the doctor from when an appointment was made. These items are related to the responsiveness concept developed by the WHO. Health system responsiveness is defined as the system's ability to respond to patients' legitimate expectations regarding a set of factors related to how individuals are treated and to the environment established by the health system (Valentine et al., 2003). Specifically, the WHO defines responsiveness as being composed of two dimensions and eight domains. The respect-for-persons dimension includes the domains of *Dignity*, *Autonomy*, *Confidentiality* and *Communication*, and the client-orientation dimension spans the domains of *Choice*, *Prompt attention*, *Quality of basic amenities* and *Access to social support* (Valentine et al., 2008). Due to the difficulty of finding more objective indicators, the responsiveness of the health care services in each of these domains is usually measured subjectively, by inquiring into individuals' perceptions about their experience with the health systems (Valentine et al., 2003).

Tables 1 and 2 show the degree of correspondence between the WHO responsiveness domains and the items included in the SHB questionnaire for primary and specialised care, respectively. In the latter, respondents are asked to rate the level of responsiveness of each health service, for each non-clinical factor, on a scale from 1 to 10, where 1 means *"totally unsatisfactory"* and 10 *"totally satisfactory"*. In the present study we were able

[4] We use this approach in order to standardise the type of user analysed since, for some of our key variables, we can only take into account respondents who report having used public health services.

[5] According to our data, from 2002 to 2016, in primary care, around 70% of the respondents in our sample had made use of the public service in the last twelve months at least once, and of these, around 95% had used the public service. In specialised care, around 40% of the respondents in our sample had used the public service in the last twelve months at least once and, of these, approximately 82% had used the public service.

to analyse three of the eight WHO responsiveness domains: *Communication*, *Dignity* and *Prompt attention*. We also applied Pearson's correlation coefficient to determine whether the items were properly grouped in their corresponding domains (Fiorentini, Robone & Verzulli, 2018). This analysis revealed a strong and statistically significant association in every case. In a later stage of the analysis, the non-clinical factors were merged with the corresponding domains, following the procedure described by Fiorentini et al. (2015) and Fiorentini et al. (2018).

In addition to the above-mentioned factors, the respondents were asked to indicate the waiting times elapsed (in days) to be seen by the GP (primary care) and specialist (specialised care) since the appointment was made. These self-reported waiting times are linked to the *Prompt attention* domain but are measured in a more objective way than the previous domain. Therefore, this domain is termed *Prompt attention (objective)* in order to distinguish it from the *Prompt attention (subjective),* which is measured according to the satisfaction-scale ranging from 1 to 10.

Finally, the microdata were transformed into macrodata by taking the arithmetic mean of each domain by region and year.

3.3. Method

3.3.1. The synthetic control method

In this study, our empirical strategy is based on the synthetic control method (SCM), a technique which focuses on analysing the impact of a certain event or policy intervention, which takes place in units at an aggregate level, on a variable of interest (Abadie et al., 2010, 2015; Abadie & Gardeazabal, 2003).

The main objective of the SCM is to create a *synthetic unit* showing the evolution of a certain variable of interest in the treated unit in the absence of policy during the intervention period in order to compare it to the real evolution of the same variable. The synthetic unit is created through a weighted combination of the potential comparisons with units where the policy did not take place. The SCM employs data-driven procedures to calculate the most suitable comparison group for the unit treated, using observed quantifiable characteristics to determine the affinity between treated and non-treated units. This method overcomes the limitations of standard comparative case studies in which potential comparison units are chosen in a more arbitrary way.

In this study, the other Spanish regions are the potential comparison units for the Community of Madrid, since none of them implemented an identical policy during the study period. Assume a sample of J regions among which the first ($j = 1$) has experienced a policy intervention (*treated region*). The remaining regions from $j = 2$ to J have not been affected by the same policy intervention (*donor pool*). Let us also assume the presence of a positive number of pre-intervention (T_0) and post-intervention (T_1) periods where $T_0 + T_1 = T$.

Let Y_{jt}^N be the result of the variable of interest which would be observed for region j at time t in the absence of intervention for the period $t = 1,\ldots, T$. Let Y_{jt}^I be the result of the variable of interest which would be observed for region j at time t if the intervention is implemented in this region during the period $t = T_0 + 1,\ldots, T$. The effect of the intervention on the variables of interest for region j at time t is then $\alpha_{jt} = Y_{jt}^I - Y_{jt}^N$.

The observed result of the variable of interest for region j at time t could be expressed as:

$$Y_{jt} = Y_{jt}^N + \alpha_{jt} D_{jt} \tag{1}$$

where D_{jt} is a dummy variable taking the value 1 if region j is exposed to the intervention at time t. As we have assumed that the first region is the only one exposed to the intervention:

$$D_{jt} = \begin{cases} 1 & \text{if } j = 1 \text{ and } t > T_0 \\ 0 & \text{otherwise} \end{cases}$$

The effect of the policy intervention in the treated region during the post-intervention period ($t > T_0$) would be:

$$\alpha_{1t} = Y_{1t}^I - Y_{1t}^N = Y_{1t} - Y_{1t}^N \tag{2}$$

Since it is assumed that Y_{1t} is observed during the whole period (T), the effect of the policy intervention (α_{jt}) can be taken as that of the results of the variable of interest that would have been observed on the treated region in the absence of intervention (Y_{1t}^N) during the post-intervention period ($t > T_0$).

The SCM assumes that Y_{jt}^N is given by a factor model:

$$Y_{jt}^N = \delta_t + \boldsymbol{\theta}_\mathbf{t}\mathbf{Z}_\mathbf{j} + \boldsymbol{\lambda}_\mathbf{t}\boldsymbol{\mu}_\mathbf{j} + \varepsilon_{jt} \tag{3}$$

where δ_t is an unknown common factor with constant factor loadings across regions; Z_i is an ($r \times 1$) vector of observed covariates (unaffected by the intervention); θ_t is a ($1 \times r$) vector of unknown parameters; λ_t is a ($1 \times$ F) vector of unobserved common factors; μ_j is an (F $\times$ 1) vector of unknown factor loadings; and the error terms ε_{jt} are unobserved transitory shocks at the region level with zero mean.

The SCM assumes a ($J - 1 \times 1$) vector of weights W = (w_2,…,w_J)', with $w_j \geq 0$ for j = 2,…, J and $w_2 + \ldots + w_j = 1$, representing a potential synthetic control, namely, a particular weighted average of regions in the donor pool, such that:

$$\sum_{j=2}^{J} w_j^* Y_{j1} = Y_{11}, \quad \sum_{j=2}^{J} w_j^* Y_{j2} = Y_{12}, \ldots, \quad \sum_{j=2}^{J} w_j^* Y_{jT_0} = Y_{1T_0} \tag{4}$$

Under standard conditions[6], $\sum_{j=2}^{J} w_j^* Y_{jt}$ is a suitable estimator of Y_{1t}^N during the post-intervention period ($t \in [T_0 + 1, \ldots, T]$), and therefore:

$$\hat{\alpha}_{1t} = Y_{1t} - \sum_{j=2}^{J} w_j^* Y_{jt} \tag{5}$$

The SCM seeks to obtain the weight vector W*, i.e., the synthetic control taking into account a series of characteristics for the region. Let X_1 be a ($k \times 1$) vector containing the values of the k pre-intervention characteristics of the treated region, and let X_0 be the ($k \times J - 1$) vector containing the values of the same k characteristics of the $J - 1$ regions in the donor pool.

The method selects the synthetic control (W*) minimising the difference between the pre-intervention characteristics of the treated region and the synthetic region ($X_1 - X_0 \cdot W^*$) as follows:

[6] More details about the standard conditions and the suitability of $\hat{\alpha}_{1t}$ as an estimator are given in Abadie et al. (2010).

$$\sum_{m=1}^{k} v_m (X_{1m} - X_{0m} W^*)^2 \quad (6)$$

where X_{1m} is the value of the *m*-th variable included in the (k × 1) vector of the *k* characteristics of the treated region; X_{0m} is a $(1 \times J - 1)$ vector containing the values of the *m*-th variable for each region in the donor pool; and V_m is a weight that reflects the relative importance assigned to the *m*-th variable, that is, to the characteristics included in the vectors. The weights of the vector V_m can also be obtained by data-driven procedures (Abadie et al., 2010), i.e. the nested approach, which leads to a better performance when the intervention period is not too large.

The variables included in the X_0 and X_1 vectors must be predictor characteristics of the variables to be analysed (Abadie et al., 2015). The explanatory variables were selected following the empirical literature on responsiveness and determinants of waiting times (Malhotra & Do, 2017; Ringard & Hagen, 2011; Robone, Rice & Smith, 2011; Siciliani & Martin, 2007). Table 3 shows the characteristics included in the X_0 and X_1 vectors. The study variables are related to health expenditure, the size of the health service, national GDP and ageing. In addition, several lagged values for the pre-intervention period are included.[7]

3.3.2. Statistical inference for the SCM

In order to determine the robustness of the results, placebo tests were applied as an inferential technique, akin to the classical framework for permutation inference (Abadie et al., 2010). Specifically, we used the in-space placebo test, which consists in applying the SCM to each of the units in the donor pool as if the policy had really been implemented in these units (Abadie et al., 2015; Galiani & Quistorff, 2017). By this means we obtain an exact distribution of the estimated effects of the placebo interventions, which in turn allows us to examine whether the estimated effect for the treated region is large in relative to the estimated effects for the regions not exposed to the intervention. If the estimated effect of our real synthetic control lies well within the distribution of placebo effects, our confidence about its effect would be undermined. By contrast, if the main effect is abnormally large, it is unlikely to be observed by chance.

[7] Although some pre-intervention values of the study variables could be included in the X_1 and X_0 vectors as pre-intervention characteristics, we have not included all the years as this would make the remaining covariates irrelevant in the characteristic vector (Kaul, Klößner, Pfeifer & Schieler, 2018).

A quantitative comparison between the distribution of placebo effects and the synthetic control estimate can be operationalised using p-values (Abadie et al., 2015). These are obtained by performing the in-space placebo test and then calculating the fraction of the effects greater than or equal to that estimated for the treated region.

If the estimated effect for a particular t time within the post-treatment period is $\hat{\alpha}_{1t}$, and the distribution of the corresponding placebo test is $\hat{\alpha}_{1t}^{PL} = \{\hat{\alpha}_{jt} : j \neq 1\}$, then the two-side p-values will be:

$$p - value = \Pr\left(\left|\hat{\alpha}_{1t}^{PL}\right| > \left|\hat{\alpha}_{1t}\right|\right) = \frac{\sum_{j \neq 1} 1\left(\left|\hat{\alpha}_{1t}^{PL}\right| > \left|\hat{\alpha}_{1t}\right|\right)}{J} \tag{7}$$

In this context, the p-value can be interpreted as representing the proportion of control units that have an estimated effect at least as large as that of the treated unit (Galiani & Quistorff, 2017). In other words, this is the probability of finding a region with an effect larger than that of the treated unit (Abadie et al., 2010, 2015).

However, apart from the policy effects, it is also necessary to consider how closely the trends of the study variables in the synthetic region fit those of the treated region during the pre-intervention period (Abadie et al., 2015). For this purpose, Galiani & Quistorff (2017) calculate a pseudo t-statistic where all effects are controlled by the pre-intervention fit, using the root mean squared prediction error (RMSPE)[8] as follows:

$$pseudo - tstat = \Pr\left(\left|\frac{\hat{\alpha}_{1t}^{PL}}{RMSPE_1^{PL}}\right| > \left|\frac{\hat{\alpha}_{1t}}{RMSPE_1}\right|\right) = \frac{\sum_{j \neq 1} 1\left(\left|\frac{\hat{\alpha}_{1t}^{PL}}{RMSPE_1^{PL}}\right| > \left|\frac{\hat{\alpha}_{1t}}{RMSPE_1}\right|\right)}{J} \tag{8}$$

Thus, large effects become smaller if the pre-intervention fit of the synthetic region is poor, while small effects tend to become enlarged with a good pre-intervention fit, presenting a higher value in the distribution.

[8] The RMSPE is the square root of the average of the squared discrepancies of the values of the variables of interest between the real region and its synthetic counterpart. The pre-intervention RMSPE is defined as follows (Abadie et al., 2015):

$$RMSPE = \left(\frac{1}{T_0}\sum_{t=1}^{T_0}\left(Y_{1t} - \sum_{j=2}^{J} w_j^* Y_{jt}\right)^2\right)^{1/2}.$$

Abadie et al. (2010) suggest a way to test the overall significance of the effects, by calculating the distribution of the ratios of post/pre-intervention RMSPE in order to determine how many times the effect of the post-intervention RMSPE is larger than that of the pre-intervention period. Accordingly, we calculated the ratios for all the placebos, and then calculated the probability of finding a region at random from the sample with a post/pre-intervention RMSPE ratio as high as that of the real treated region.

4. Results

4.1. The synthetic control method

Figures 2 and 3 show the trends observed in the responsiveness domains in the Community of Madrid, together with the synthetic version for primary and specialised care, respectively. As expected, the trends of the study variables in the synthetic Community of Madrid are similar to those of the treated unit during the pre-intervention period. This suggests that the synthetic region provides a good approximation of how the responsiveness of the Madrid health system would have evolved in the absence of the policy reform. The weights used to build the synthetic unit in each domain and the characteristics of such region are shown in the supplementary material. The effect of the policy in each domain is measured by the difference between the responsiveness in Madrid and that in its synthetic counterpart after the policy implementation in 2009.[9]

For primary care, a negative effect was observed for responsiveness in the *Communication, Dignity* and *Prompt attention (objective)* domains, while the effect was unclear for the *Prompt attention (subjective)* dimension (see Figure 2). With regard to the *Communication* domain, the synthetic Community of Madrid presented a sharp increase after the policy implementation, whereas the treated region underwent a more moderate increase. This suggests that the policy was responsible for limiting the expansion of the responsiveness with the *Communication* domain. On average, the responsiveness was around 5% lower than it would have been with no policy implementation during the period 2010-2016. In the *Dignity* domain, the effects were similar but not as strong as in the *Communication* dimension. For *Dignity*, on average during the post-intervention

[9] For the *Communication, Dignity and Prompt attention (subjective)* domains, higher values mean greater responsiveness in the domain, i.e. higher average levels of satisfaction. On the contrary, for the *Prompt attention (objective)* domain, higher values mean poorer responsiveness, since the domain is measured by waiting times.

period, implementation of the policy meant that responsiveness in the Community of Madrid was 1% lower than it would have been in the absence of reform.

Regarding the *Prompt attention* domain and the subjective measure, the effect on responsiveness was ambiguous, producing marginally positive and negative effects during the post-intervention stage. By contrast, in the objective measure, the impact was negative. Since 2009, waiting times in Madrid have been slightly greater (by around one day) than in its synthetic counterpart. However, this difference is of scant importance, as waiting times for primary care in Madrid are very low in any case (on average, 2.5 days in Madrid against 4 days in the other Spanish regions). The very slight variation in objective waiting times after the reform could explain why the effect of the policy on the subjective dimension of *Prompt attention* is unclear.

For specialised care, we observed no clear impact of the policy on responsiveness for the *Communication* and *Dignity* domains. This suggests that the policy had little or no effect on overall average responsiveness in these domains (see Figure 3).

With regard to the subjective dimension of *Prompt attention*, our study results show that the reform contributed to a stronger increase in responsiveness during the post-intervention period. In 2014, the level of responsiveness for *Prompt attention (subjective)* was almost 0.6 higher than it would have been in the absence of the policy.

The results for "objective" *Prompt attention* are in line with those for "subjective" *Prompt attention*, and these reflect the largest effects of the policy. As shown in the fourth graph of Figure 3, the policy examined provoked a sharp reduction in waiting times for specialist health care in Madrid. Our results show that, without the reform, these waiting times would have remained constant, at an average of 90 days, throughout the post-intervention period. In fact, during this period, waiting times were 22% lower than they would have been in the absence of the freedom of choice policy. The close agreement between our findings for the "subjective" and "objective" measures of *Prompt Attention* suggests that, in the absence of more objective variables, self-reported measures of responsiveness could be good proxy variables of how patients are treated by health care authorities. Similar results were reported by Fiorentini et al. (2018) in their study of *Prompt attention* in hospital care.

4.2. Placebo tests

Figures 4 and 5 display the main results for p-values, pseudo t-stats (left-side graphs) and RMSPE ratios (right-side graphs) for primary and specialised care, respectively. The non-significant placebo findings are provided in the supplementary material.

For primary care, according to the RMSPE ratio, the overall effects are significant in the *Communication*, *Dignity* and *Prompt attention (objective)* domains[10]. Observation of the robustness of the effects year by year (pseudo t-stats), shows that the probability of finding by chance an effect as large as that of the Community of Madrid is practically zero for any year.

For specialised care, the overall effects are significant for the *Communication, Prompt attention (subjective)*, and *Prompt attention (objective)* domains[11]. In consequence, it seems that the results reported by the synthetic method for these domains are generally reliable. With regard to the annual effects, the results of the pseudo t-stats show that most of these effects are also significant, above all in the *Communication* and *Prompt attention* domains.

5. Discussion

One of the most striking findings of this study is the strong and significant reduction in average waiting times for specialised care following the implementation of the freedom of choice policy in the Community of Madrid. Although this reform, which included a very efficient system of appointment scheduling, on the basis of waiting times and a progressive strengthening of patient knowledge of provider characteristics, was the main factor underlying the improvement, the presence of economic incentives among some

[10] In the first of these, the post-intervention RMSPE in the Community of Madrid is 10 times that for the pre-treatment period; in the second, it is more than eight times that for the pre-treatment period; and in the third, more than 60,000 times, since the pre-intervention fit is almost perfect. In all three domains, the Community of Madrid stands out in the distribution. In consequence, if the intervention were assigned at random in the data, the probability of obtaining a RMSPE ratio as large as that of the Community of Madrid would be 1/16=0.0625, a value lower than the level of 10% usually used in tests of statistical significance.

[11] The post-intervention RMSPE in the Community of Madrid is around 10 times larger than that of the pre-intervention in the first domain; around three times that in the second one; and more than 800 times that in the third. This means that the probability of such effects being caused by chance is 1/16=0.0625 for the *Communication* and *Prompt attention (objective)* domains, and 1/15=0.0667 for the *Prompt attention (subjective)* domain. All these values are below the 10% confidence level applied in most tests of statistical significance.

Madrid hospitals could also have played an important role in generating the positive effects observed.

After the 2009 policy implementation, and assuming that waiting time is among the most important factors considered when choosing a health care provider (Varkevisser & van der Geest, 2007; Varkevisser, van der Geest & Schut, 2010), we suggest that patients originally registered at hospitals with long waiting times would switch to others where waiting times are shorter. Therefore, theoretically, average waiting times in Madrid should have remained fairly stable after the introduction of the freedom of choice policy. However, the fact that certain hospitals received economic incentives to attract patients could have meant that waiting times at the most in-demand hospitals (i.e., those where pre-reform waiting times were shortest) might not have increased or could even have decreased, despite their receiving more patients, switching from elsewhere. In Figure 6, we see that the Madrid hospitals that presented the largest increase in patient demand from other centres, during the period 2011-2018, were *Fundación Jiménez-Díaz, Rey Juan Carlos, Villalba, Torrejón* and *Infanta Elena* (solid black line), whereas the remaining hospitals experienced a more moderate growth or even a decrease (solid grey line). Although the first-named group of hospitals received the largest number of patients in 2018, four of these five had the shortest average waiting times in November 2018 (see supplementary material).

The above findings suggest that, after the policy implementation, these five hospitals might be responsible for the observed reduction in average waiting times for specialised care in the Community of Madrid, in two directions: 1) by reducing the waiting times at hospitals with a poor record in this respect before the reform, by absorbing their patient demands; 2) by maintaining relatively short waiting times despite receiving additional patients originally assigned elsewhere.

One of the main features of the above five hospitals is that they are managed by means of indirect management formulas (*Public Private Partnership* (PPP). While four of the five PPP hospitals in Madrid opened after the reform (Sevillano, 2012), and others were created under a Private Finance Initiative (PFI) that began operating in 2008, it is interesting to note that the number of health staff per capita in all hospitals (PPP, PFI and others) in this region remained constant during the study period, at a very similar level to that in the rest of Spain (SIAE, 2019). Therefore, it might not be the higher supply per se that is driving our results with respect to waiting times.

In the concession contracts of these hospitals, reimbursements are composed of a fixed part according to the population size assigned to the hospital, and a variable part which depends on the number of patients treated from other centres. Increasing the income of the concessionary companies provides them with a strong incentive to attract patients from other hospitals. Accordingly, they will seek to keep waiting times short in order to be more attractive to these other patients.

Precisely, it is the lack of incentives in primary care that might be generating the negative effects observed for the freedom of choice policy with respect to the *Communication* and *Dignity* domains in the Community of Madrid. Unlike some of the hospitals, the health centres in primary care have no incentive to attract more patients. In consequence, as the reputation of individual GPs could be an important factor underlying patients' choice of primary care provider (Miani et al., 2013), we would expect patients to swap the "grumpy" GP for the "nice" one (perceived as a good communicator and with a good reputation) after the reform. This switch would mean the "nice" GPs having to treat more patients than before the reform, thus experiencing work overload and stress. This negative consequence would tend to harm the doctor-patient relationship, inducing GPs to pay less attention to questions such as providing full, comprehensible information to their patients, or changing the way in which patients are treated. As a result, patient satisfaction would decrease. Indeed, there is evidence in the literature that the pressure on health staff subjected to a heavy workload could lead them to be less responsive in terms of the quality of communication and the respect afforded to patients (Fiorentini et al., 2018). Moreover, in the absence of incentives to GPs to attract patients, the personality of "grumpy" GPs would not magically become "nice" even with a reduced patient demand, and the remaining patients would still be dissatisfied with their "grumpy" GP. In short, the overall satisfaction of patients with the *Communication* and *Dignity* domains of responsiveness in primary care is expected to decrease after the reform.

6. Conclusions

In this paper, we analyse the effects on health system responsiveness produced by the freedom of choice policy carried out in the Community of Madrid in 2009. We find that the reform had a positive effect on responsiveness with respect to the *Communication* and *Prompt attention* domains in specialised care, whereas it impacted negatively on the *Communication, Dignity* and *Prompt attention (objective)* domains in primary care. Our analysis indicates that increasing patients' freedom of choice of health provider is not

only a valuable aim per se, but it could also have important positive consequences on the responsiveness of the health system. In particular, our results suggest that if the policy had not been implemented, the waiting times for specialised care would not have been reduced as they were in practice. However, in the absence of adequate financial incentives, the policy might not have had such positive effects.

A potential means of generating incentives in directly-managed hospitals would be to increase their budgetary flexibility. This would enable hospitals to receive funds directly from the variable part of their budget, which depends on the number of patients referred from other centres. Hospital CEOs would then have more incentives to compete, by increasing budgetary availability, and this could have a positive impact on the responsiveness achieved.

This paper presents certain limitations. In the *Prompt attention (objective)* domain for primary care, the pre-treatment period is only composed of one year. According to Abadie et al. (2015), in cases where the number of pre-intervention years is very small, the conclusions with regard to the effects of the policy should be taken very carefully. Furthermore, we were unable to analyse the effect of the reform on responsiveness in the *Choice* domain, due to the lack of non-clinical factors related to this domain in the SHB survey.

In the future it would be helpful to conduct a more detailed investigation of the effects of the implementation of freedom of choice policies, in particular the role played by financial incentives and information systems in how freedom of choice might affect responsiveness. Due to data and space limitations we were unable to fully explore the channels underlying our results. For instance, it would have been interesting to establish the precise reasons why waiting times decreased at such a considerable rate after the reform. We hypothesise that financial incentives offered to the PPP hospitals may be one reason for this, but it would be interesting to determine, for instance, whether staff at these hospitals have a higher workload than those elsewhere, or whether staff numbers at PPP hospitals have increased faster than in other types of hospitals. In addition, it could be helpful to examine whether the ability of PPP hospitals to absorb patients from other centres by keeping waiting times short is achieved at the expense of patients' health. Finally, research should be undertaken to investigate the impact of these reforms on other health indicators, and also on the relation between health system responsiveness and overall population health.

Nevertheless, this study provides helpful insights for policy makers, particularly in areas that are currently involved in freedom of choice reforms. Other Spanish regions, for instance, have recently moved or are planning to move in the same direction as the Community of Madrid. According to our results, if these policies provide patients with the necessary information and offer them real freedom of choice, they are likely to achieve positive effects on health system responsiveness.

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TABLES

Table 1

Primary care: WHO responsiveness domains and the corresponding non-clinical factors associated in the SHB survey

Responsiveness domains	**Items in the SHB survey:** Given your own experience or idea that you have, I would like you to assess the following factors:	**Time period**
Communication Pearson's Correlation: $r(57,752) = 0.74$, $p < 0.001$	- The information received about your health problem	2002-2016
	- The advice of the doctor about exercise, food, tobacco, alcohol, etc.	2003-2016
Dignity Pearson's Correlation: $r(9,257) = 0.68$, $p < 0.001$	- The respect with which you are treated by the health provider	2002-2016
	- The attention paid by the nurse	2015-2016
Prompt attention Pearson's Correlation: $r(40,913) = 0.63$, $p < 0.001$	- The waiting time from when you made the appointment until you were seen by the doctor	2004-2016
	- The waiting time until diagnostic tests were performed	2007-2016

Note: The time period column indicates the years when the non-clinical factor was included in the SHB survey. This means that the item is taken into account in building the corresponding domain from the first year in which it appeared in the survey. Adapted from Valentine et al. (2003) and SHB survey.

Table 2

Specialised care: WHO responsiveness domains and the corresponding non-clinical factors associated in the SHB survey

Responsiveness domains	**Items in the SHB survey:** Given your own experience or idea that you have, I would like you to assess the following factors:	**Time period**
Communication Pearson's Correlation: $r(33,913) = 0.75$, $p < 0.001$	- The information received about your health problem	2002-2016
	- The advice of the doctor about exercise, food, tobacco, alcohol, etc.	2003-2016
Dignity	- The respect with which you are treated by the health provider	2002-2016
Prompt attention Pearson's Correlation: $r(27,615) = 0.75$, $p < 0.001$	- The waiting time from when you made the appointment until you were seen by the doctor	2004-2016
	- The waiting time until diagnostic tests were performed	2006-2016

Note: The time period column indicates the years when the non-clinical factor was included in the SHB survey. This means that the item is taken into account in building the corresponding domain from the first year in which it appeared in the survey. Adapted from Valentine et al. (2003) and SHB survey.

Table 3

Explanatory variables of the variables of interest by type of health service

Factors	**Variable**	**Health service**	**Source**
Health Expenditure	Ln (Public expenditure in primary care per capita)	Primary	Ministry of Health
	Ln (Public expenditure in specialised care per capita)	Specialised	
Size of health services	General practitioners per 100,000 inhabitants	Primary	Ministry of Health
	Nurses per 100,000 inhabitants	Primary	
	Public non-health staff per 100,000 inhabitants	Primary	
	Public health staff per 100,000 inhabitants	Specialised	
Country wealth	Ln (GDP real per capita)	Primary	National Statistics Institute
		Specialised	
Ageing	% population aged ≥ 65 years	Primary	National Statistics Institute
		Specialised	

Note: The public health expenditure and GDP per capita are measured in real terms. Adapted from SHB survey, National Statistics Institute, and Ministry of Health, Social Services and Equality.

FIGURES

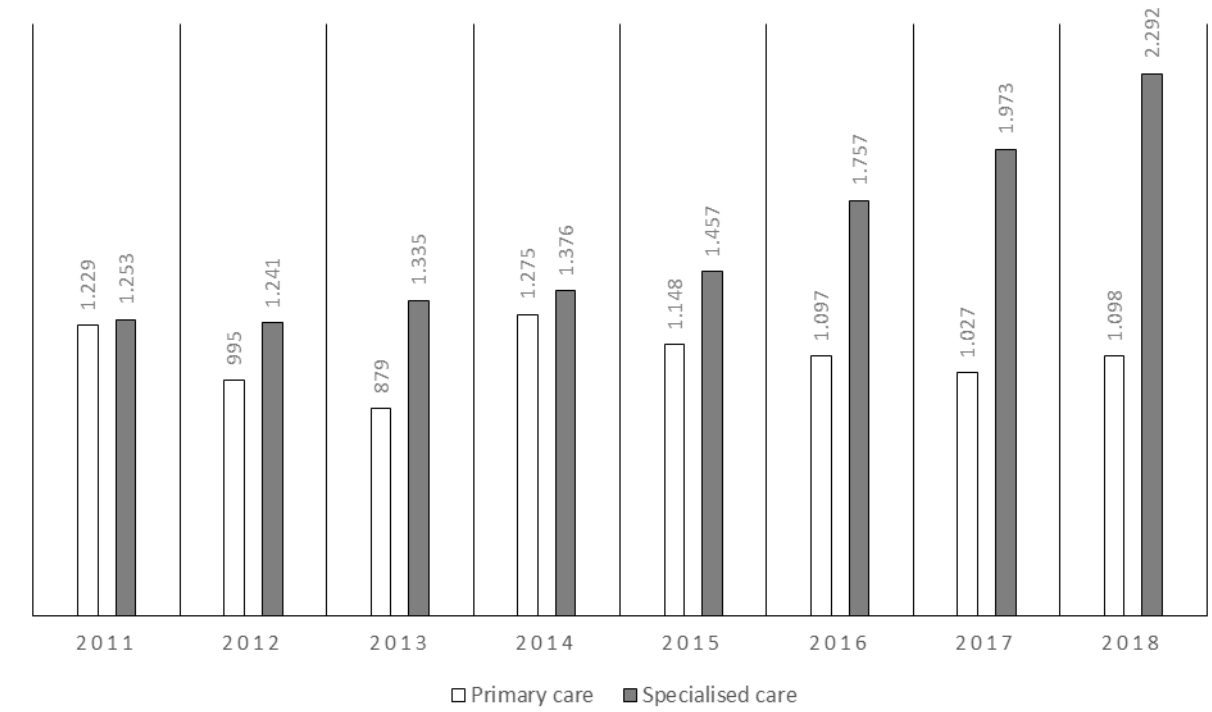


Figure 1. Number of times that citizens exercise the freedom of choice per 100,000 consultations in primary and specialised care in the Community of Madrid (2011-2018). For primary care, the amounts include number of changes of GP, nursing and paediatric care, either in the same or in another health centre. Annual reports of the Madrid Health Service (SERMAS)

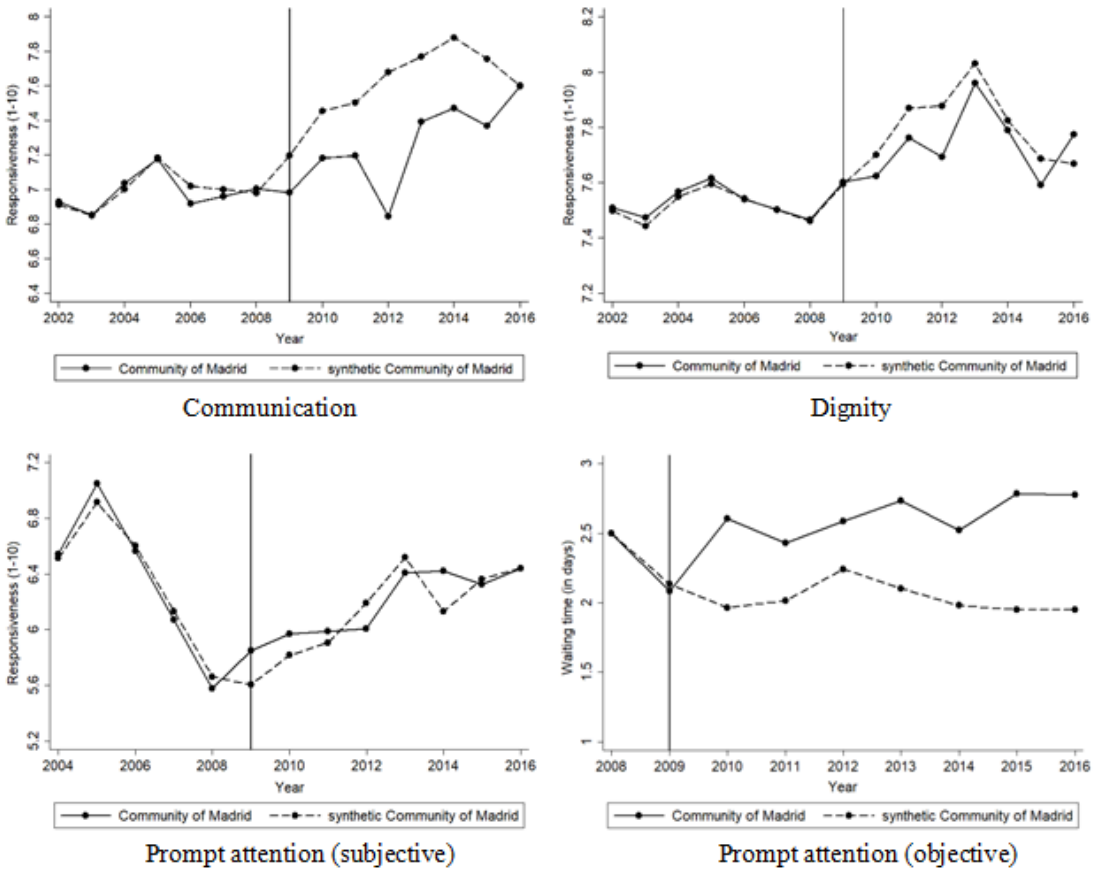


Figure 2. Trends in responsiveness domains for primary care: Community of Madrid vs. synthetic Community of Madrid

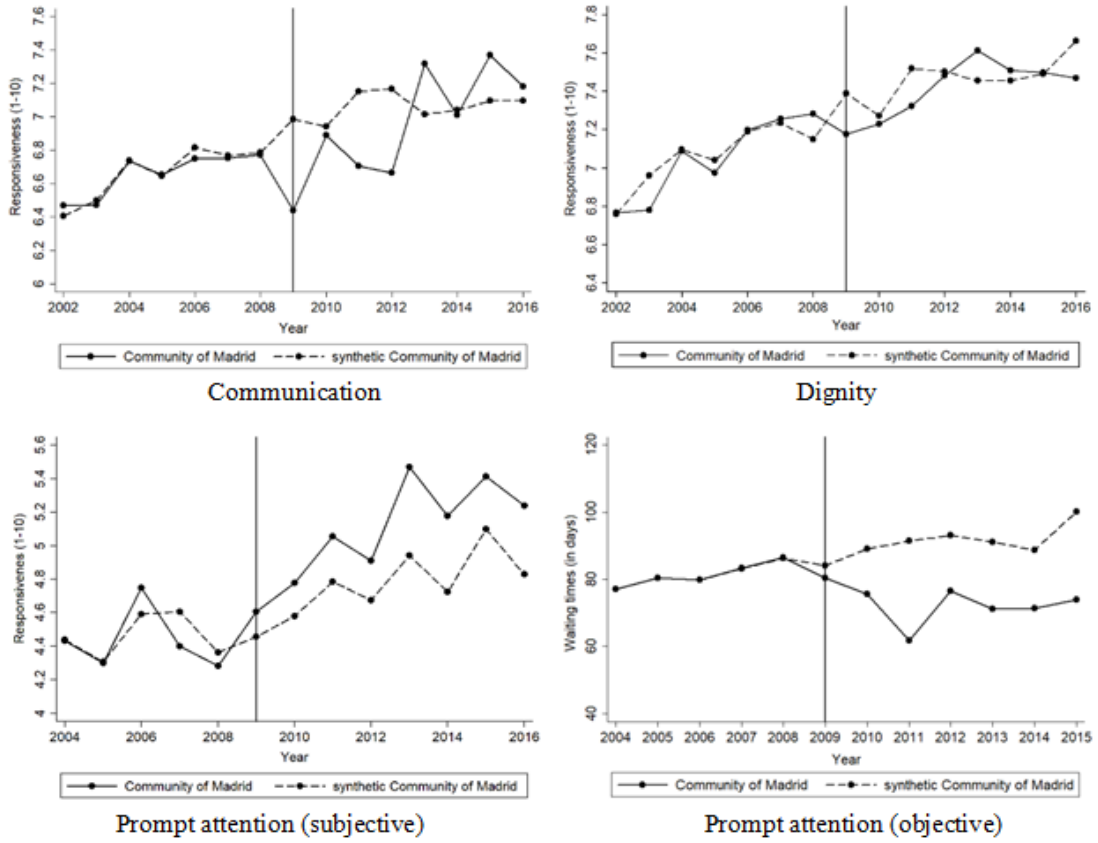


Figure 3. Trends in responsiveness domains for specialised care: Community of Madrid vs. synthetic Community of Madrid

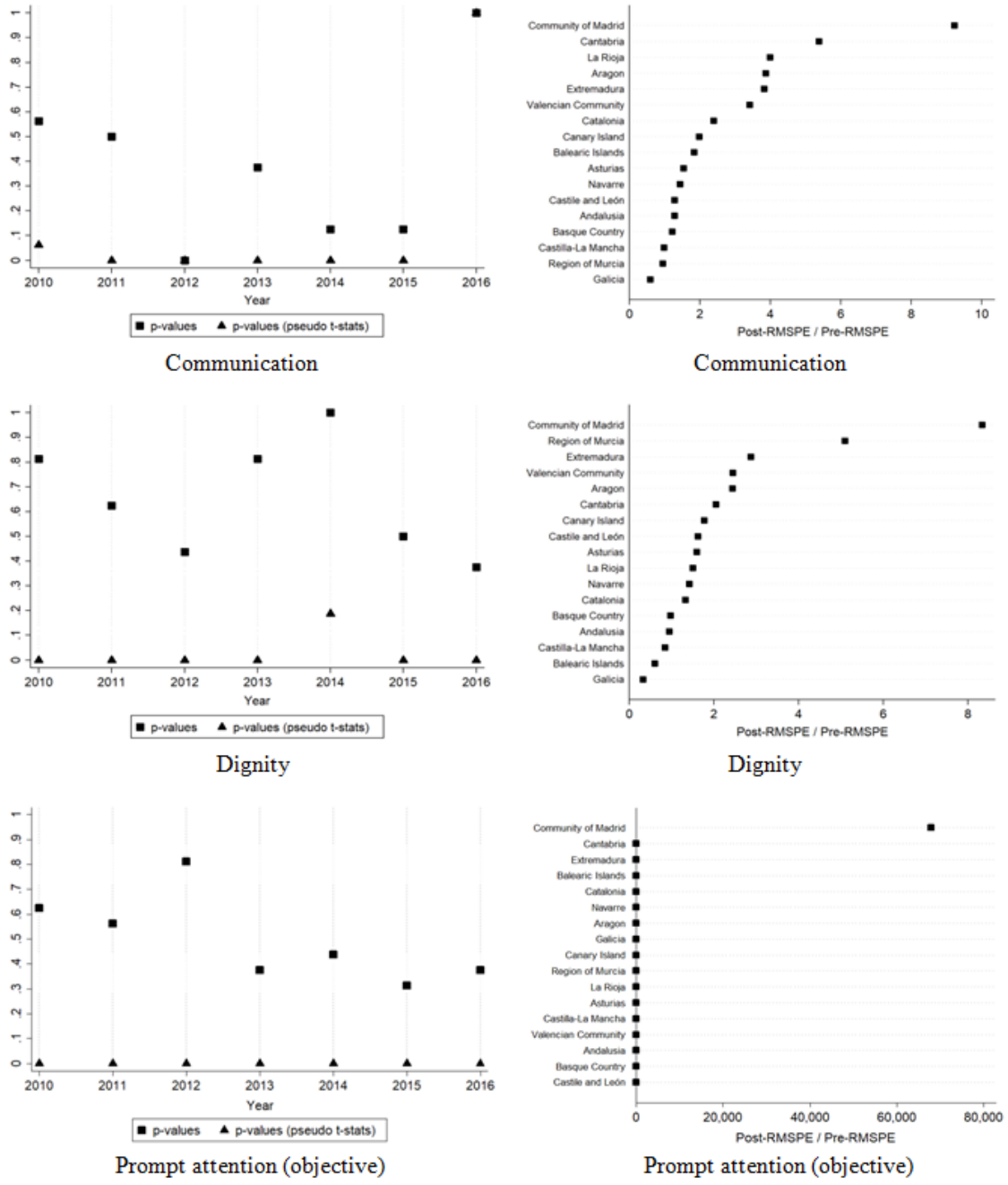


Figure 4. Placebo tests for primary care: p-value and pseudo t-stats (left-side graphs); and RMSPE ratio (right-side graphs)

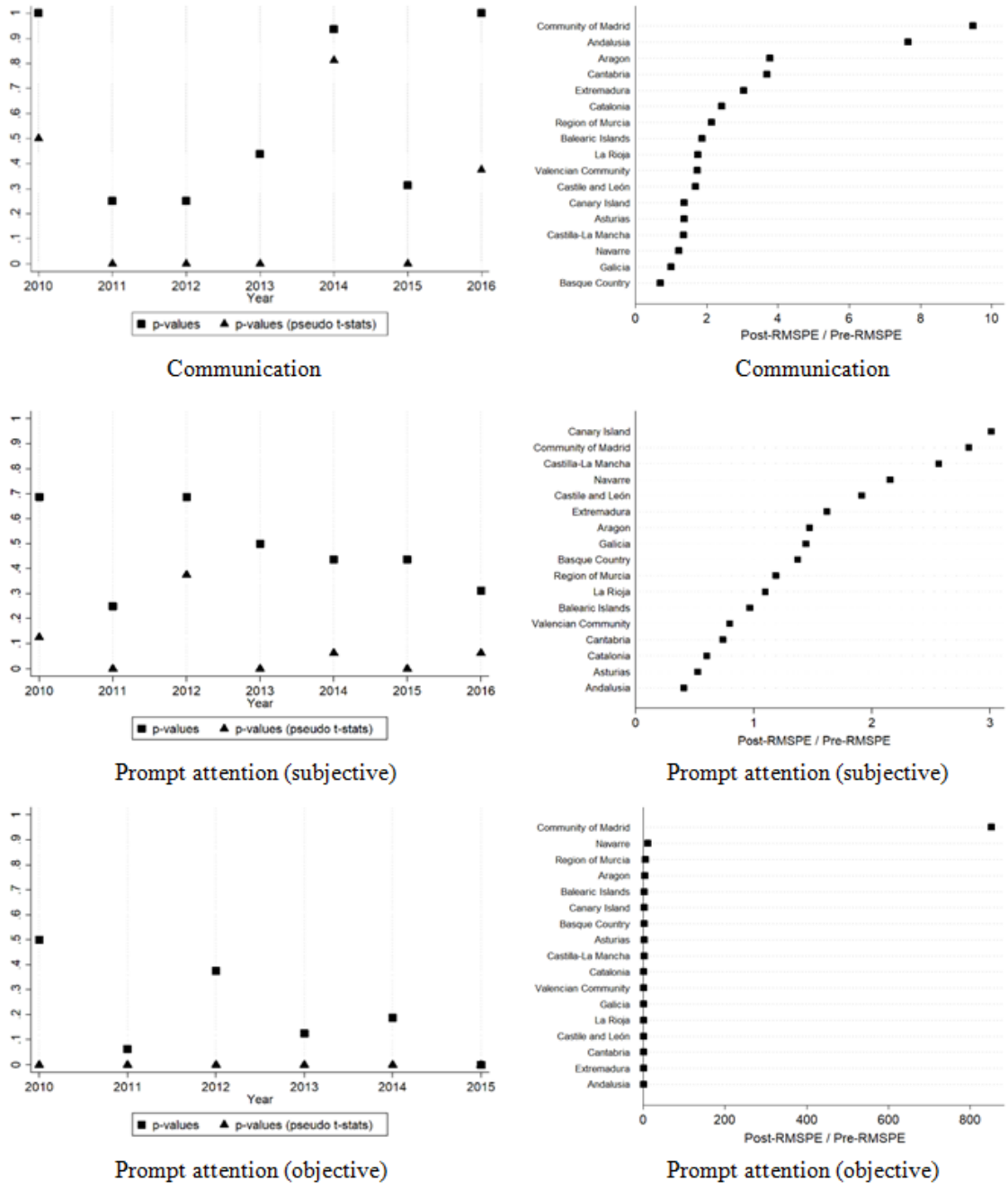


Figure 5. Placebo tests for specialised care: p-value and pseudo t-stats (left-side graph); and RMSPE ratio (right-side graph)

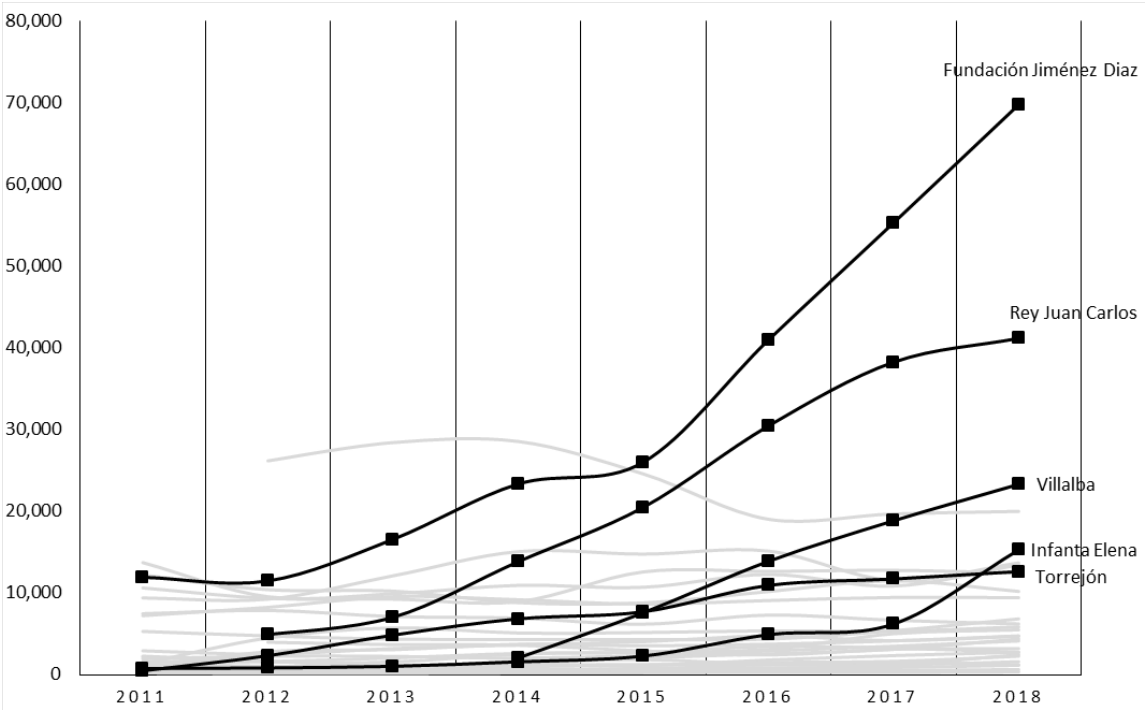


Figure 6. Number of patients that hospitals receive from other centres in the Community of Madrid under the freedom of choice policy. The black line highlights the hospitals that underwent the largest increase in the number of patients received in the period 2011-2018. Annual report of the Madrid Health Service (SERMAS). 2011-2018

Supplementary Material 1

Table 1

Primary care: Region weights for the synthetic Community of Madrid by domain

Region	Communication	Dignity	Prompt attention	
			Subjective	Objective
Andalusia	0	0	0	0
Aragon	0.280	0.302	0	0
Asturias	0	0	0	0
Balearic Islands	0	0.094	0	0.082
Canary Islands	0.176	0	0	0
Cantabria	0	0	0.137	0
Castilla-La Mancha	0	0	0	0
Castile and Leon	0	0	0	0
Catalonia	0	0	0	0
Valencia Community	0.471	0.494	0.345	0
Extremadura	0	0	0.518	0
Galicia	0.032	0	0	0
Region of Murcia	0	0.048	0	0
Navarre	0	0.061	0	0
Basque Country	0.041	0	0	0.918
La Rioja	0	0	0	0

Table 2

Specialised care: Region weights for the synthetic Community of Madrid by domain

Region	Communication	Dignity	Prompt attention	
			Subjective	Objective
Andalusia	0	0	0	0
Aragon	0	0	0	0.259
Asturias	0	0	0	0
Balearic Islands	0.228	0.134	0	0
Canary Islands	0.034	0	0.476	0.006
Cantabria	0	0	0	0.017
Castilla-La Mancha	0	0	0	0
Castile and Leon	0	0	0	0
Catalonia	0	0.299	0	0.388
Valencia Community	0.112	0	0	0
Extremadura	0.033	0	0.524	0.253
Galicia	0.463	0.286	0	0
Region of Murcia	0	0	0	0
Navarre	0	0	0	0.033
Basque Country	0.131	0.280	0	0
La Rioja	0	0	0	0.043

Supplementary Material 2

Table 1

Primary care: Predictors of the Communication domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.26	16.93	17.80
Ln (GDP per capita)	10.43	10.11	10.09
Ln (Public expenditure per capita in primary care)	4.76	4.96	5.05
Number of doctors per 100,000 inhab.	54.54	59.40	62.40
Number of nurses per 100,000 inhab.	52.44	59.71	63.40
Number of non-health staff per 100,000 inhab.	43.58	43.77	40.76
Communication (2008)	7.01	6.98	7.28
Communication (2006)	6.92	7.02	7.37
Communication (2004)	7.04	7.00	7.27
Communication (2002)	6.93	6.91	6.99

Note: All variables are averaged for the pre-intervention period (2002-2008). GDP per capita and public expenditure are measured in 2016 euros.

Table 2

Primary care: Predictors of the Dignity domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.26	17.23	17.80
Ln (GDP per capita)	10.43	10.13	10.09
Ln (Public expenditure per capita in primary care)	4.76	4.96	5.05
Number of doctors per 100,000 inhab.	54.54	59.52	62.40
Number of nurses per 100,000 inhab.	52.44	59.79	63.40
Number of non-health staff per 100,000 inhab.	43.58	43.80	40.76
Dignity (2008)	7.47	7.46	7.50
Dignity (2006)	7.54	7.54	7.61
Dignity (2004)	7.57	7.55	7.55
Dignity (2002)	7.51	7.50	7.41

Note: All variables are averaged for the pre-intervention period (2002-2008). GDP per capita and public expenditure are measured in 2016 euros.

Table 3

Primary care: Predictors of the Prompt attention (subjective) domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.20	17.90	17.68
Ln (GDP per capita)	10.45	9.91	10.11
Ln (Public expenditure per capita in primary care)	4.85	5.19	5.12
Number of doctors per 100,000 inhab.	54.54	65.07	62.40
Number of nurses per 100,000 inhab.	52.44	69.72	63.41
Number of non-health staff per 100,000 inhab.	43.58	44.44	40.76
Prompt attention (subjective) (2008)	5.58	5.66	5.98
Prompt attention (subjective) (2006)	6.56	6.60	6.76
Prompt attention (subjective) (2005)	7.05	6.91	6.77
Prompt attention (subjective) (2004)	6.54	6.52	6.79

Note: All variables are averaged for the pre-intervention period (2004-2008). GDP per capita and public expenditure are measured in 2016 euros.

Table 4

Primary care: Predictors of the Prompt attention (objective) domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.19	18.09	17.48
Ln(GDP per capita)	10.46	10.43	10.13
Ln(Public expenditure per capita in primary care)	5.00	5.42	5.30
Number of doctors per 100,000 inhab.	56.36	58.99	63.74
Number of nurses per 100,000 inhab.	52.02	60.93	64.23
Number of non-health staff per 100,000 inhab.	43.40	40.27	41.10

Note: All variables are averaged for the pre-intervention period (2008). GDP per capita and public expenditure are measured in 2016 euros.

Supplementary Material 3

Table 1

Specialised care: Predictors of the Communication domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.26	18.30	17.80
Ln (GDP per capita)	10.43	10.09	10.09
Ln (Public expenditure per capita in specialised)	6.39	6.40	6.40
Number of health staff per 100,000 inhab.	672.89	658.15	671.40
Communication (2008)	6.77	6.78	7.24
Communication (2006)	6.75	6.82	7.25
Communication (2004)	6.74	6.74	7.12
Communication (2002)	6.47	6.41	6.67

Note: All variables are averaged for the pre-intervention period (2002-2008). GDP per capita and public expenditure are measured in 2016 euros.

Table 2

Specialised care: Predictors of the Dignity domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.26	18.06	17.80
Ln (GDP per capita)	10.43	10.22	10.09
Ln (Public expenditure per capita in specialised)	6.39	6.41	6.40
Number of health staff per 100,000 inhab.	672.89	564.94	671.40
Dignity (2008)	7.28	7.15	7.45
Dignity (2006)	7.20	7.19	7.51
Dignity (2004)	7.09	7.10	7.45
Dignity (2002)	6.77	6.76	6.85

Note: All variables are averaged for the pre-intervention period (2002-2008). GDP per capita and public expenditure are measured in 2016 euros.

Table 3

Specialised care: Predictors of the Prompt attention (subjective) domain (mean values)

	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.20	15.76	17.68
Ln (GDP per capita)	10.45	9.88	10.11
Ln (Public expenditure per capita in specialised)	6.48	6.48	6.48
Number of health staff per 100,000 inhab.	689.91	689.99	684.84
Prompt attention (subjective) (2008)	4.28	4.36	5.06
Prompt attention (subjective) (2006)	4.75	4.59	5.17
Prompt attention (subjective) (2004)	4.43	4.44	5.13

Note: All variables are averaged for the pre-intervention period (2004-2008). GDP per capita and public expenditure are measured in 2016 euros.

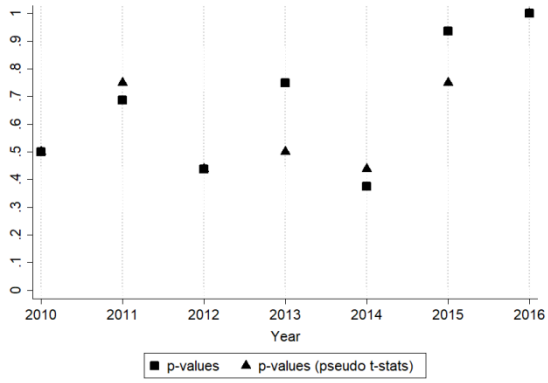
Table 4

Specialised care: Predictors of the Prompt attention (objective) domain (mean values)

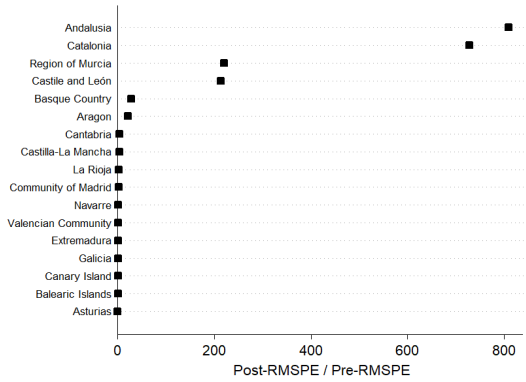
	Community of Madrid		Average of 16 control regions
	Real	Synthetic	
Proportion of population aged ≥65 years	14.20	18.17	17.68
Ln (GDP per capita)	10.45	10.16	10.11
Ln (Public expenditure per capita in specialised)	6.48	6.47	6.48
Number of health staff per 100,000 inhab.	689.91	636.39	684.84
Prompt attention (objective) (2008)	86.46	86.30	82.17
Prompt attention (objective) (2006)	79.84	79.75	83.24
Prompt attention (objective) (2004)	77.14	77.02	74.83

Note: All variables are averaged for the pre-intervention period (2004-2008). GDP per capita and public expenditure are measured in 2016 euros.

Supplementary Material 4

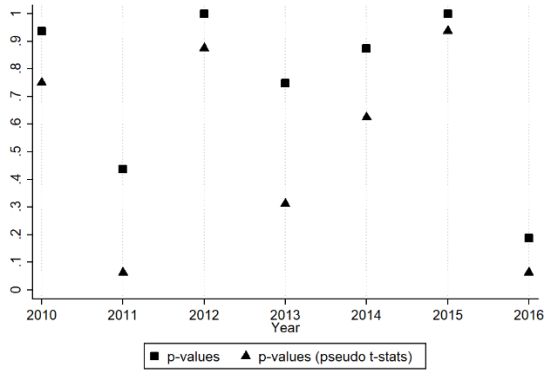


Prompt attention (subjective)

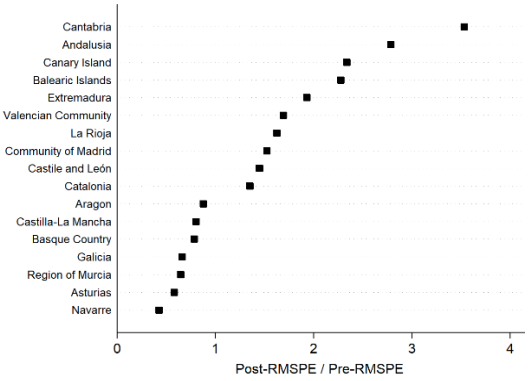


Prompt attention (subjective)

Figure 1. Placebo tests for primary care: p-value and pseudo t-stats (left-side graphs); and RMSPE ratio (right-side graphs)



Dignity



Dignity

Figure 2. Placebo tests for specialised care: p-value and pseudo t-stats (left-side graph); and RMSPE ratio (right-side graph)

Supplementary Material 5

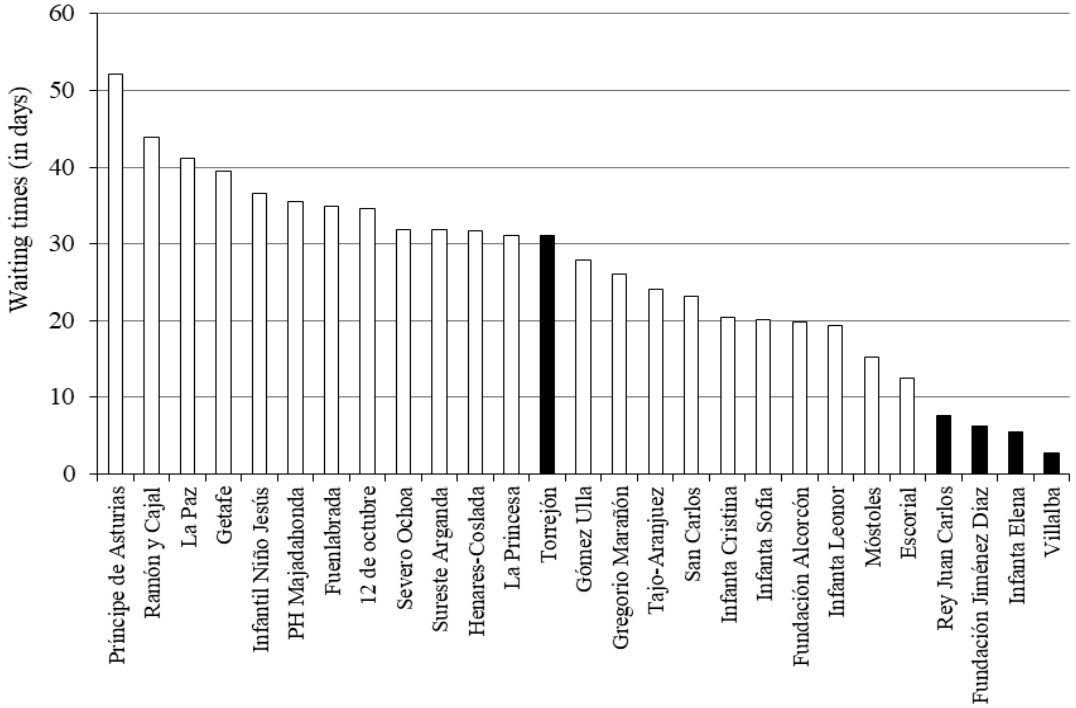


Figure 1. Average waiting times (in days) by hospital for specialised care in November of 2018 in the Community of Madrid. Servicio Madrileño de Salud (SERMAS). Department of Health.