Centre de Recherche en Économie et Statistique
CREST

Série des Documents de Travail

n° 2014-14

GPs' Response to Price Regulation : Evidence from a Nationwide French Reform

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June, 2014

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GPs' response to price regulation: evidence from a nationwide French reform *

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June 3, 2014

Abstract

This paper uses a French reform to evaluate the impacts of price regulation on general practitioners (GP) care provision, fees, and income. This reform has restricted, since 1990, the conditions self-employed GPs have to fulfill to be allowed to over-bill. We exploit 2005 and 2008 Public Health insurance administrative data on GPs activity and fees. We use regression discontinuity techniques in a fuzzy design to estimate causal impacts for GPs who set up practice in 1990 and were constrained to charge regulated prices. Our results suggest that GPs react to income effects. Under price regulation, facing prices lower of 42%, GPs provide 50% of more care than if they could overbill. Male GPs react more than female GPs, which leads to opposite effects on their labor income. GPs are more accessible to patients but may also induce demand. They reduce aside salaried activities, use more lump-sum payment schemes, and occupy more often gate-keeper positions. A complementary analysis at dates closer to the reform suggests that these figures may underestimate the short-term effects of price regulation.

Keywords: extra-billings, fee-for-service, GPs' activity, causal evaluation, regression discontinuity.

JEL codes: I11, C21, H51.

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*with the support of Health Chair - a joint initiative by PSL, Université Paris-Dauphine, ENSAE-CREST and MGEN under the aegis of the Fondation du Risque (FDR). We would like to thank Elodie Djemaï,Magali Dumontet, Carine Franc, Melyanni Johar, François Legendre, Julien Mousques, Manasa Patnam, the participants of the "Journées des Economistes de la Santé Français" conference (Créteil, December, 2013), the "Journée de la Chaire Santé" (Paris, March, 2014), the CREST-LMI Seminar (Paris, March, 2014) and the 5th Australasian Workshop of Econometrics and Health Economics (Fremantle, April, 2014) for useful comments and discussions. Any opinions expressed here are those of the authors and not of any institution.

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1 INTRODUCTION

In France, general practitioners (GPs) who provide primary care are usually self-employed and paid on a fee-for-service basis. Two types of contractual arrangements with Public Health insurance (PHI) co-exist. GPs who signed a sector 1 contract have to charge regulated prices, whereas sector 2 GPs can freely charge patients much above the regulated price for the same medical service. While these extra-billings do not directly affect National Health accounts, they may impact the provision of primary care, and question care access equity. Extra-billings may indeed lead to a decrease in physicians' activity, if the latter react to income effects. The "sector-2 freeze" reform that took place in December 1989, restricted the conditions to fulfill to access to sector 2 whereas before that date the sector choice was let free to GPs. The purpose of this paper is to exploit this change in regulation to evaluate empirically the impact of price regulation on GPs provision of care, fees and income, location, and patient group characteristics.

Economic theory predictions about how physicians should react to price regulation vary according to the models considered. In models in which physicians react to income effects (such as in McGuire and Pauly, 1991, Rizzo and Blumenthal, 1994, Thornton and Eakin, 1997), the ability to price discriminate may decrease the quantity of care provided, whereas it may not if physicians are just profit maximizers. However, less quantity of care provided may also be efficient if physicians induce demand under price regulation (see Evans, 1974, for one seminal work on this topic, and Delattre and Dormont, 2000, 2003 for empirical evidence on French data). Moreover, if the quality of care is a choice variable for the physician, Glazer and McGuire (1993) show in the Medicare context that discriminating both on price and quality entails efficiency benefits as it increases the care quality provided to both patients who are charged extra-billings and patients who are not. Kiffman and Scheuer (2011) revisit the Glazer and McGuire framework and precise situations, in which both patients' welfare and physicians' rents increase if overbilling is permitted. There is no consensus neither among empirical studies, maybe because these studies relate to countries with very different contexts of care regulation. For the U.S., McKnight (2007) provides little evidence that physicians changed their behavior in response to Medicare balance billing restrictions. The latter may only have led to a decline in follow-up phone calls, (no impact on the duration of visits nor on the likelihood of prescribing laboratory tests). In contrast, Yip (1998) shows that thoracic surgeons respond to Medicare fee cuts by increasing the volume of their services, and especially by concentrating on the most intensive procedures. For Canada, Rochaix (1993) and Nassiri and Rochaix (2006) show that a tariff-freeze led to more services provided by primary care physicians with more complex and lucrative procedures. Epp, Vining, Collins-Dodd, and Love (2000) find that patient visited less GPs who began to over-bill (whereas male patient visits did not change), but the increase in GP fees more than compensated this decrease in demand. In these papers, the income effect seems to dominate the substitution

effect. In line with those empirical studies, the French "sector 2-freeze" reform provides us with an adapted setup to evaluate the impact on provision of care of a physician price regulation.

We use PHI administrative data on GPs activity and fees in 2005 and 2008. The richness of our data enables us to study practice outcomes in detailed dimensions. We exploit the discontinuity induced by the new regulation in the probability that a GP began to practice with a sector 1 contract, and apply fuzzy regression discontinuity (RD) techniques (Hahn, Todd, and Van der Klaauw, 2001; Imbens and Lemieux, 2008; Lee and Lemieux, 2010). This enables us to estimate causal impacts of price regulation for GPs who set up practice in 1990 and were constrained by the reform to charge regulated fees.

Our results suggest a large effect of price regulation on the provision of care, which is consistent both with physician reactions to income effects and to supply-induced demand mechanisms. GPs constrained by the reform to charge regulated fees, who therefore face a 42% decrease in their prices, provide roughly 50% more care – essentially more visits, with respect to what they would have done if they were allowed to over-bill. More than two thirds of this increase in activity is directed to new patients, which indicates an increase in care accessibility. The rest is due to more frequent visits of regular patients, and may be related to demand inducement. GPs seem to focus on their self-employed activity: they reduce their aside salaried activities, use more lump-sum payment schemes, and are more often the gate-keeper of their patients. Male GPs react more to income effects than women. At the end, their labor income increases whereas it seems to decrease for women. Price regulation seems also to increase continuity of care as male GPs provide more guards and on-calls. We find some changes in patients characteristics: younger patients, less women and more low-income patients (for male GPs), and a little less patients with long-term diseases (for female GPs). Those changes are more consistent with an increased accessibility of care than to GPs selecting more their patients.

We evaluate the price regulation impacts in 2005 and 2008 using a reform that has changed regulation since 1990. During this period, sector 2 physicians are likely to have adapted their behaviors to the additional arrival of new regulated fees GPs entailed by the reform. To measure potential equilibrium effects, we conduct a complementary analysis and exploit a panel dataset on a sub-sample of French self-employed GPs, which provides us with information on GPs activity and fees at dates closer to the reform. We find that our previous results, especially on activity, may slightly underestimate the short-term effects of price regulation. Free-billing GPs may indeed charge less and provide more services, due to the increase in the share of sector 1 GPs consequent to the reform. Moreover, effects on activity may change along the career.

The paper proceeds as follows. Section 2 describes the regulation of physicians' fees in France. Section 3 describes the data and the different outcomes we analyze. The empirical strategy is

presented in section 4. Section 5 then reports the main results. Section 6 focuses on diffusion effects. Sensitivity checks are presented in section 7 and section 8 concludes.

2 GPS' PAYMENTS IN FRANCE

2.1 Regulation of GPs' payments in France

In France, two thirds of GPs are self-employed and paid on a fee-for-service basis (Ecosante, 2013). PHI proposes two types of contractual arrangements to them: sector 1 contract and sector 2 contract.

Sector 1 physicians charge the regulated or *reference* price for each type of medical procedure. Overbilling is forbidden. In exchange, PHI subsidizes part of sector 1 physicians social insurance contributions and pension savings.[1] The *reference* prices are fixed by bargaining between PHI and medical associations. For example, in 2008, the reference price for a GP office visit was 22€.

In sector 2, also called "free-billing" sector, physicians have the ability to charge extra-billings over the regulated prices for any service in so far as they show "tact and moderation" ("tact et mesure"), except for low-income patients. On average, the price of a sector 2-GP office visit was 34€ in 2008, but with great variability between GPs (with a standard deviation of 12.6€). In contrast with sector 1, sector 2 physicians' social insurance contributions and pension savings are not subsidized by PHI.

Patients freely choose the physician they consult and can change of physician at any time. The sector of the GP, as well as the prices she charges, are public information.[2] The *reference* prices define the amounts reimbursed to patients. PHI reimburses 70% of them to patients, whether they visit a sector 1 or a sector 2 GP. The remaining 30% (the co-payments) as well as potential supplements (extra-billings) are covered by a private healthcare contract the patient or his firm has taken out. For low-income patients, the complementary healthcare contract is public and given for free, - "Couverture Maladie Universelle Complémentaire" (CMUC). In 2012, only 4% of the population are not covered by any complementary healthcare scheme (see Garnero and Le Palud, 2013). All private healthcare contracts cover co-payments (complements). However, only some of them supplement PHI, and coverage levels for supplements vary greatly upon contracts.

[1] Namely 9.70% of net fees as regards their Health insurance contributions, 5% of their net fees as regards their family contributions and 2760€ per year as for their pension savings.

[2] They are available on the internet and GPs have the obligation to post prices in waiting rooms

2.2 Overbilling and the "sector-2 freeze" reform

The "sector 2" contract was created in 1980, just before the Presidential elections, as a way to increase physicians' income without impacting National Health accounts (Lancry and Sandier, 1999). This contract was a success from its creation on, and despite a constant concern for the increasing number of sector 2 physicians (specialists and GPs), only one reform really tempted to reduce the amount of extra-billings in France. This reform, effective since December 1, 1989, is called "sector-2 freeze". It restricts the conditions to fulfill to join sector 2 and therefore to over-bill.

More specifically, all physicians who set up practice before November 1989 had the right to choose the sector in which they wanted to practice, and to change of sector if they wanted.[3] Since December 1, 1989, the sector 2 contract has been only offered to physicians who had a qualifying University teaching and hospital practice (such as ex-clinic supervisors).[4] Further, physicians choose a sector once, when they set up practice, and cannot change of sector after even if they have titles to pretend to sector 2.[5] This regulation has applied for both GPs and specialists.

There always has been a financial advantage to practice in sector 2. Even when accounting for social contributions subsidies to sector 1 GPs, the prices set by sector 2 GPs are about 17% to 25% higher than those of sector 1 GPs, whatever the year between 1980 and 1989, and the level of experience. Despite this economic advantage, only 10 to 16% of GPs decided to join the sector 2 between 1980 and 1989 (Ecosante, 2013). The sector choice is then strongly endogenous, linked to individual trade-offs between labor and leisure, and ethical considerations. A large part of GPs has always been opposed to the sector 2, charged of creating a two-tier medicine (Hassenteufel, 1997).[6]

– INSERT HERE FIGURE 1–

The reform created a discontinuity in the probability that a GP joins sector 2, between 1989 and 1990, first full year of implementation. This discontinuity is not related to the GPs abilities nor to ethical concerns but only to the year she set up practice. As shown in Figure 1, while 11.2% of GPs who set up practice in 1989 chose a sector 2 contract, only 0.9% of those who

[3]Between 1980 and 1989, physicians had the possibility to change of sector (from sector 1 to sector 2, and from sector 2 to sector 1) during some regular periods of negotiations called "fenêtres conventionnelles". The last one occurred in December 1988.

[4]More precisely, the sector 2 contract has been offered to physicians who used to be clinic supervisors ("chefs de clinique des universités-assistants des hôpitaux") or senior hospital doctors ("assistants des hôpitaux généraux ou régionaux") for at least 2 years, see the "convention médicale de mars 1990", DGR 2474/90.

[5]More precisely, sector 2 physicians can choose to change to sector 1 whenever they want but the reverse is not possible.

[6]GPs opposed to sector 2 gathered in 1981 in a board that became in 1985 the first union specific to GPs.

began in 1990 made this choice. This very low percentage then remains stable after 1990. As a consequence, in 2011, less than 7% of self-employed GPs had a sector 2 contract vs 16% in 1990 (Ecosante, 2013).[7]

We will exploit this discontinuity to evaluate the effect of overbilling restriction. Before describing the evaluation method, we present our data and the outcomes considered in the next section. The empirical strategy is detailed in the following one.

3 DATA AND OUTCOMES

3.1 Data

In our main analysis, we exploit the exhaustive administrative *INSEE-CNAMTS-DGFiP File* on physicians. This dataset merges individual information on physician's activity provided by PHI (Caisse Nationale d'Assurance Maladie des Travailleurs Salariés, CNAMTS), and individual information on physician's earnings coming from household tax income declarations. As it covers the whole population of GPs, this file is our first source of information. It includes very precise information on GPs practice (year of practice beginning, year of graduation, location), the sector chosen, their fees, income, and related compositions, the annual quantity of care they provide and composition, together with their main sociodemographic characteristics, and those of their patients. However, these variables are observed only in 2005 and 2008.

To study the dynamics of price regulation effects and potential equilibrium effects, we use a second dataset, the *French self-employed GPs Panel*, on the post-reform period: 1990-2008. This panel is drawn from the administrative files of the CNAMTS and concerns only 1/12 of GPs. For each GP, each year, we have information on GPs characteristics, practice, care provided and fees, but with less details than previously.

We restrict the samples of both datasets to GPs who began their practice between 1983 (7 years before the reform) and 1996 (6 years after). This sufficiently large period of time will enable us to test the sensitivity of our results depending on the chosen bandwidth. We exclude GPs practicing overseas, GPs who did not contract with PHI,[8] those who declared having a particular mode of practice (such as acupuncture, homeopathy, allergy), as their services may differ from those of other GPs and are not always reimbursed on the same basis. Further, we exclude GPs aged 60 or older who receive pension or annuity. The latter have a very low or heterogeneous self-employed activity and are not comparable to others.

[7] GPs with a particular mode of practice (such as acupuncture, homeopathy, ...) are excluded.
[8] this case occurs very rarely, less than 1%.

Finally, our samples consist of 45,537 observations in 2005 and 2008 for the first one, and around 2,540 GPs observed per year between 1990 and 2008 for the panel.

3.2 Outcomes

We mainly aim to evaluate the effect of overbilling restriction on the quantity of care provided by a GP. Further, we will also consider effects on fees and income, and on some secondary outcomes.

Provision of care. Our favorite measure of the quantity of care provided is a synthetic indicator that accounts for both the number of medical procedures and how intensive in care the latter are. This *care provision indicator* is simply the sum of the numbers of medical procedures of a given type weighted by the reference price for this type of procedure. Further, we also consider the *number of medical procedures provided in a year*. Then, we decompose the quantity of care provided in two dimensions: the *number of different patients seen in a year*, and the *number of medical procedures per patient per year*. These two outcomes will enable us to see if an increase in the quantity of care provided hides more intensive follow-ups of the same patients, which could be related to inducement, or represents an increase in the accessibility of GPs who follow more patients. Finally, we decompose the care provided per type of procedures: office visits, home visits, and technical procedures. This enables us to study if the sector changes the composition of the activity of GPs for example towards more complex procedures.

Fees and income. Then, we focus on remuneration schemes of GPs and we study the effect of the sector on GPs fees and income. We consider the *total fees earned in a year*, which include extra-billings,[9] and the *average price of a procedure*, defined as the annual fees divided by the number of medical procedures performed in a year. We also consider sources of remuneration that may complement FFS activity, as the sector may lead GPs to change the composition of their activity in that dimension also. We focus on lump-sum payments, and aside salaried activity. Lump-sum payments include payments for each patient with a long-term disease followed as gate-keeper,[10] payments for child patients,[11] for night or week-end medical guards (on-calls), payments to reward computerization, and some additional ones related to "pay-for-performance" schemes. The latter types of lump-sum payments are quite small with respect to the three former.

[9] even if quite rare in practice, sector 1 GPs can punctually overbill in some specific cases, for example when patients ask for a visit outside opening hours. In 2008, the average amount of extra-billings per sector 1 GPs visit for was 0.2€. Total fees earned in a year include also lump-sum payments.

[10] France introduced in July 2005, a gate-keeping system, in order to avoid excessive use of ambulatory care. Patients have to refer to their "médecin traitant" before consulting a specialist if they want to get reimbursed by PHI. Each gate-keeper GP receives 40€per year per patient with long term disease.

[11] with different rates according to age, less than 2 years old, between 2 and 6, or between 6 and 16 years old

We study also the share of full-time self-employed GPs, $i.e.$ who do not have a salaried activity on top of self-employed practice.[12] Finally, as a synthesis of GP remuneration, we consider labor income, defined as net fees (i.e total fees earned in a year net of all professional expenses, such as social contributions, rent for office, secretarial services, ...) plus wages if any.

Secondary outcomes. Third, we study the effect of the sector on some secondary outcomes. We study changes in GPs prescribing behavior, which may entail supplementary costs for the community or may hide changes in the duration of visits that we unfortunately do not observe. We consider the annual amount of drug prescriptions per patient, as well as the annual total amount of prescriptions per patient. The latter includes drug prescriptions (50%) and prescriptions for laboratory tests or diem for disease. Then to evaluate if the sector changes the choice of location of practice of GPs, we study the share of GPs practicing in a rural area. Finally, we document if there are changes in characteristics of GPs groups of patients: in the shares of female patients, of patients aged 15 or less, of patients aged 65 and older, of low income patients (CMUC), of patients with a long-term disease, or in the share of patients for whom GP is gate-keeper.

Figure 2 in the appendix plots the main outcomes (the Care Provision indicator, the number of medical procedures, total fees and average price) by year of practice beginning around the year of the reform. It suggests that under price regulation, there is an increase in the provision of care, a decrease in the average price but no variation in the level of fees.

3.3 Sector 1 versus sector 2 GPs

Before turning to precise causal evaluation, we document basic descriptive statistics and comparisons between sector 1 and sector 2 GPs, on our sample of interest, $i.e.$ GPs who set up practice around 1990, between 1983 and 1996, see Table I.

– INSERT HERE Table I –

Sector 1 and sector 2 GPs notably differ in some observable characteristics. To control for those differences, we report in the third column of Table I, the estimates of OLS regressions of characteristics and outcomes on a dummy variable indicating whether a GP is in sector 1 and further controls, in particular the level of experience. Ceteris paribus, female GPs choose less frequently sector 1 than sector 2 (-7%). Sector 1 GPs set up practice at a younger age than sector 2s. They differ also of course in terms of pricing and volume of activity provided. Sector

[12] Around 7% of self-employed GPs also have a salaried activity, at hospital for example

1 GPs average prices of medical services is 30% lower than those of sector 2s, whereas the volume of activity a sector 1 GP provides is 20% larger than the one provided by a sector 2. At the end, the annual fees of a sector 1 GP are 9% less than those of a sector 2, again ceteris paribus. However due to subsidies in social contributions of sector 1s, labor income of sector 1s is 6% higher than the one of sector 2s. In terms of composition of their activity now, sector 1s provide more office visits than sector 2s and much more home visits. They also meet more often their patients and prescribe more. In contrast, sector 2s provide more technical procedures. Sector 1 GPs practice more often in rural areas. Finally, sector 1 GPs patient groups contain less women, less seniors, more young patients, more low-income patients, and slightly more patients with a long-term disease. Hence, as sector 1 and sector 2 GPs differ in observable characteristics, pricing behaviors, and patient group characteristics, we expect that they also differ in unobserved characteristics. The sector is a choice variable. Therefore, it is impossible, from these descriptive statistics, to infer any conclusions on the causal effects of price regulation, here of the sector, on the provision of care of treated GPs.

4 EMPIRICAL STRATEGY

Our empirical approach relies on a regression discontinuity design that exploits the discontinuity, before and after 1990, in the probability that a GP chooses to practice with a sector 1 contract. This design allows us to identify and estimate the effects of price regulation on the group of compliers.

4.1 Fuzzy RDD framework

Let W_i denote the treatment variable, here the sector status. $W_i = 1$ if physician i chooses to practice with a sector 1 contract (regulated fees), $W_i = 0$ if physician i chooses a sector 2 one (free billing). Let Y_i be an outcome of interest. In the Rubin causal model, the potential outcome of physician i, if she belongs to sector 1 is denoted $Y_i(1)$, the potential outcome if she belongs to sector 2, $Y_i(0)$. The treatment effect on physician i is $Y_i(1) - Y_i(0)$, the difference between both potential outcomes. It depends on physician i, and may vary between physicians. However, it is unobserved as only one of the two potential outcomes is observed, $Y_i = W_i Y_i(1) + (1 - W_i)Y_i(0)$. To measure causal effects, and in particular average treatment effects, we need further design specifications. The fuzzy regression discontinuity design (RDD) framework enables one to identify the local average treatment effect τ on the group of compliers, see Hahn, Todd, and

Van der Klaauw (2001), Imbens and Lemieux (2008), Lee and Lemieux (2010):

$$\tau = E[Y_i(1) - Y_i(0)|X = 1990 \text{ and } i \text{ is a complier }] \tag{1}$$

where X, the running variable, denotes the year when a physician sets up practice. Hence, τ is the effect of the sector for GPs who set up practice in 1990 (at the date of the reform), who were constrained by the reform, that is, who chose to practice with a sector 1 contract but would have chosen sector 2 if it was possible. We can rewrite τ as

$$\tau = \frac{\lim\limits_{x \to 1990^+} E[Y|X = x] - \lim\limits_{x \to 1990^-} E[Y|X = x]}{\lim\limits_{x \to 1990^+} P[W = 1|X = x] - \lim\limits_{x \to 1990^-} P[W = 1|X = x]} \tag{2}$$

Due to the restrictions imposed by the 1990 reform to access sector 2, there is a discontinuity in the probability of being treated according to the practice beginning year. The denominator of equation (2) is then strictly positive, which allows to identify τ. Hahn, Todd, and Van der Klaauw (2001) show that in practice an estimate of τ can be obtained by estimating

$$Y_i = \tau W_i + h(X_i) + \epsilon_i, \quad i = 1, \ldots, n, \tag{3}$$

where W_i is instrumented by $\mathbf{1}_{X_i \geq 1990}$, n is the number of physicians who set up practice in a local bandwidth of years around 1990, and $h(x)$ is a very flexible function of x, which is continuous at the date of the reform.[13] We consider linear, polynomial, linear spline specifications for h, with different slopes before and after the date of the reform, and various bandwidths. We do not include additional covariates as our main baseline covariates (sex, age) are continuous around the threshold and our regressions are performed on restricted bandwidth around the date of the reform, see Imbens and Lemieux (2008). For example, with a linear specification of h and a bandwidth of 5 years, our estimation relies on

$$Y_i = \tau W_i + \alpha_0 + \alpha_1(X_i - 1990)\mathbf{1}_{X_i < 1990} + \alpha_2(X_i - 1990)\mathbf{1}_{X_i >= 1990} + \epsilon_i, \quad i|1985 \leq X_i \leq 1994. \tag{4}$$

4.2 Validity conditions

The RDD identification strategy holds under some conditions, see Hahn, Todd, and Van der Klaauw (2001). First, the expectations of the potential outcomes conditional on X are to be

[13] This holds if estimates of the expectations and probabilities of equation (2) are done with same bandwidth and uniform kernels.

continuous at the discontinuity:

$$E(Y_i(0)|X_i = x) \text{ and } E(Y_i(1)|X_i = x) \text{ are continuous in } x = 1990. \tag{5}$$

Second, the treatment effect on physician i, $\Delta_i = Y_i(1) - Y_i(0)$, and the treatment status $W_i(x)$, are assumed to be locally jointly independent of the year of practice beginning X_i:

$$\Delta_i, W_i(x) \perp\!\!\!\perp X_i \text{ close to } X_i = 1990. \tag{6}$$

This is a local random assignment assumption. Condition (6) implies that GPs cannot precisely manipulate the threshold. They cannot precisely choose the date at which they begin to practice and especially, choose to set up practice before 1990 in order to benefit from sector 2. The term "precisely" is important here. τ is still identified even if some physicians who knew that the reform would occur in 1990, increased their effort in order to be able to begin their practice sooner, but their efforts were not sufficient to determine precisely the date at which they eventually set up practice, see Lee and Lemieux (2010). For instance, students may have increased their efforts to prepare and to defend their medical thesis more rapidly; or they may have increased their efforts to find a local of practice sooner, etc.. as soon as, those steps needed to begin to practice, are also likely to depend on aleas, not fully predictable.

Third, we assume that there are no physicians who chose a sector 2 contract in presence of the reform, and would have chosen a sector 1 one if the reform had not taken place. This is the "no defiers" assumption, which is classical in heterogenous treatment analysis.

Conditions (5) and (6) are not directly testable but some related features are. If physicians were able to perfectly manipulate the threshold, we should expect a discontinuity in the density of the running variable X before and after the date of the reform, in our case, a strong increase in the number of physicians who set up practice just before 1990, and a strong decrease just after. So it would be usual for the RDD literature to test for the continuity of the number of GPs by year of practice beginning, before and after the reform, see McCrary, 2008 and Lemieux and Milligan, 2008. However, here, we cannot directly follow this strategy. The number of new practicing GPs is indeed quasi-directly deduced from the *numerus clausus*, 9 years (average studies duration) before, $i.e.$ the number of students allowed to pass the first year of medical studies. As the *numerus clausus* shows discontinuous variations 9 years before 1990,[14], discontinuity in the number of new practicing GPs may just reflect those changes, which is not related to manipulation. The discontinuities in the number of GPs induced by changes in numerus clausus do not bias estimates of τ in so far as they do not affect the outcome continuity condition given by

[14]the *numerus clausus* was 7121 in 1980, then decreased, but not continuously: 6389 in 1981 and in 1982, 5900 in 1983, 5000 in 1984, ...

condition (5). If some physicians manipulate the threshold and hurry to set up practice in order not to be constrained by the reform, we should also expect discontinuous decreases in 1990 in the average age at practice beginning and in the average duration between graduation and practice beginning (and maybe also changes in some other characteristics). We check whether there are discontinuities in the two former variables before and after the reform by regressing them on local trends before and after, and testing for continuity at the date of the reform. For both variables, t-tests cannot reject continuity at 5% whatever the trend specification we use: linear, quadratic or linear spline, see also Figure3, in the appendix. Gender and family status also appear to be continuously distributed before and after the reform, see Figure 4, in the appendix. So we do not find hints of manipulation.

4.3 Discreteness of X and Regressions Goodness of Fit

Our running variable, X_i, the year of practice beginning, is discrete. In order to achieve the identification of the treatment effect, we need to assume that the regression function $h(.)$ is correctly specified, see Lee and Card (2008). So we should pay a particular attention to the model fit quality. To do so, we perform goodness of fit tests in the spirit of Lee and Card (2008) and Lemieux and Milligan (2008), which compare the squared residuals of equation (3), seen as the restricted model, with those of a totally flexible/unrestricted model, see the appendix for details. We always report test p-values in the tables of results.

Moreover, for inference issues, regressions are clustered by the year of practice beginning to account for some potential remaining specification errors (Lee and Card, 2008).[15]

4.4 Which effect do we estimate ?

Under the validity conditions detailed before, the RDD approach enables one to identify and estimate the causal effect of being in sector 1 rather than being in sector 2, so the causal impact of a type of price regulation, namely the overbilling restriction, for a specific group: sector 1 GPs who set up practice in 1990 and would have chosen a sector 2 contract if possible. This group of compliers concerns 11% of GPs who set up practice in 1990. This proportion is given by the slope coefficient of the instrument $\mathbf{1}_{X_i \geq 1990}$ in the first-stage regressions, and can also be straightforwardly read from Figure 1.[16] This complier group is specific. There is no external validity *a priori* of the results as the effect of the treatment is allowed to differ among physicians.

[15] There remains a risk of bias of $\hat{\tau}$ if the specification errors on the regression functions before and after the reform are not identical.

[16] With linear, quadratic, and linear spline specifications, this slope estimate is always .106. We do not report in details first-stage regressions results for conciseness but we will always report Fisher statistics of excluded instruments in tables of results.

One advantage of the RDD method however is that, being local, τ is identified whatever the structural change trends in the GPs population, such as feminization, as long as they occurred in a continuous way around the date of the reform. Moreover, the effect of overbilling restriction we estimate is a long-term effect as the data we use are observed 15 to 18 years after the date of the reform.

5 RESULTS

Table II reports the results of the regression discontinuity analysis for all GPs. We also performed the analysis by gender separately, see Table III. We only comment effects whose goodness-of-fit tests do not reject trend specifications at 5%, and whose estimates are stable across non-rejected specifications. Results reported in the text are those obtained with a linear spline specification, using a bandwidth of 5 years before and after the reform.

– INSERT HERE Table II –

– INSERT HERE Table III –

5.1 Provision of care

First, GPs who were forced by the reform to practice regulated fees, increase their volume of activity by 51% (+43 800€)[17] with respect to what they would have done under unregulated fees. This increase in the *Care provision indicator* is mainly driven by an increase in the *number of medical procedures* provided: +61% (+2100). The increase in activity is much higher for men (69%, +67 500€) than for women (32%, +21 500€).

More care provision may express supply induced-demand mechanisms, a well-known drawback of the fee-for-service payment system in a context of regulated fees: because income is closely related to the number of services provided by GPs, GPs have strong incentives to increase their activity in order to increase their income, and to induce demand. However, more than two thirds of the increase in activity is directed to new patients. *The number of different patients per GP seen in a year* increases by 42% (+506), and similarly for men and women.[18] The rest of the increase in activity is directed to a higher *number of medical procedures per patient*. Hence, price regulation may have increased the accessibility of GPs for patients (or at least

[17] To give an order of idea of magnitudes involved, we also compute effects on levels. We multiply effect estimates by the average outcome level for sector 2 GPs who set up practice in 1989. Note also that we interpret log effects as percentages, which leads to a slight overestimation.

[18] Nearly 70% of the increase in the number of medical procedures 2100, concern procedures addressed to new patients ($506 \times 2.9 = 1467$), and the remaining concern an increased number of procedures provided to old patients.

redistributed patients from hospital to ambulatory care). This increased accessibility is not only directed to occasional patients but also to new regular patients. We observe indeed that the *share of patients for whom the GP is a gatekeeper* increases significantly (+6.9%).

Finally, if we decompose the care provided by type of procedure, we observe that the increase in care provision mostly concerns visits: on average, GPs make 150% (+350) more *home visits* than under unregulated fees and 73% (+2200) more *office visits*, whereas the effect on the *number of technical procedures*, which are often more lucrative, is negative and not always significant. However, the pattern differs for men and women. Male GPs provide more *home visits* (+255%, i.e +770), whereas estimates are not significant for women. In contrast, even if male GPs provide slightly more *office visits* than women, the increase represents a much more important share for female GPs (+91%, i.e +2150) than for male GPs (+67%, i.e +2400).

5.2 Fees and income

Without price regulation, GPs would have charged their patients 42% more for their services. This huge impact also explains why such large effects are obtained for our different outcomes, especially for the provision of care.[19]

Price regulation is likely to change also GPs composition of remuneration. Potentially, GPs can increase their participation to salaried activities; or the part of their labor income obtained though lump-sum payments. Our results show that GPs do not increase their participation to salaried activities: the *share of GPs exclusively self-employed* does not evolve significantly. Simultaneously, they strongly increase their amounts of *lump-sum payments* (+162%). Part of this increase may be due to the positive impact of price regulation on the share of GPs who become gate-keeper: this position offers them lump-sum payments for each patient with a long-term disease. For 2008 only, our database provides some information on lump-sum payments per type. Additional analysis shows that male GPs lump-sum payments increase both due to more guards and on-calls (continuity of care) and to more specific patients (child patients and gate-keeping positions for long-term disease patients). In contrast, lump-sum payments of female GPs increase only due to specific patients. Further, GPs do not choose to turn to salaried activities but rather to concentrate on earning more through their self-employed practice using also complementary remuneration schemes based on capitation. We observe the same for men and women.

Overall, *the total fees* under price regulation are higher for men (+36%), due to the combined effects on the volume of care and on lump-sum payments, but not significantly different for

[19]The literature usually evaluated effects of smaller reduction in fees, leading logically to much lower effect magnitudes: Gruber, Kim, and Mayzlin (1999) show that each 10% rise in the relative price between cesarean and normal childbirth leads to a 8.4% increase in cesarean delivery rates. Nguyen (1996) shows that a 10% reduction in fees leads to a 4% increase in the volume of services provided.

female GPs as the latter do not increase their workload as much as male GPs do. At the end, *GP labor income* is higher for male GPs (+32%) but smaller for female GPs (even if estimates are not stable across specifications). This result confirms previous results in the literature (see Rizzo and Zeckhauser, 2007), that show that male GPs react more strongly than female GPs to income effects. Overall, forbidding GPs to overbill leads to a decrease in income, unless they significantly increase their workload.

5.3 Secondary outcomes

First, the *Annual drug prescription per Patient* increases by 40%, (+64€), resp. +25% (+76€) for the *Annual prescription per Patient*. This suggests an unexpected drawback of price regulation, at least for National Health accounts. Moreover, it is unlikely that GPs are able to face the increase in care provision consecutive to price regulation, just by increasing their hours of work. They may probably also reduce the duration of their visits. Sector 1 GPs spend indeed on average less time per visit than sector 2s (15.6' vs 18.3', see Breuil-Genier and Goffette, 2006). Therefore, a pessimistic explanation of this result may be that GPs decrease the duration of their visits, and compensate it by prescribing more, leading to a decrease in the quality of care provided. Unfortunately, we do not observe any measure of quality of care, nor GPs' total number of hours of work, nor GPs' average duration of visits in our database to test this hypothesis. A second explanation may be that GPs use this higher amount of prescriptions (including diems) to retain their patients more (patients may consider that GPs who prescribe more provide a better quality of care). A third explanation may be that sector 1 GPs follow more patients suffering from chronic conditions who need more prescription renewals, hence leading to an increased number of prescriptions per patient. We can refute this last explanation because we find a negative or null impact of price regulation on the share of patients with long-term disease, see below. Note that one should be cautious when interpreting the impacts of price regulation on prescribing behaviors because they do not pass our robustness analysis (see section 7) and these behaviors are only observed for men: women do not prescribe more per patient.

Secondly, we do not find any impact of price regulation on the choice of location of practice. Medical density being lower in rural areas, it may be easier for GPs, in these areas, to compensate the decrease in the price of their services by increasing their activity. However, GPs do not make this decision.

Thirdly, we find small changes in the characteristics of the patients followed. Price regulation leads male GPs to follow more *patients aged 15 or less*, which is consistent with the increase in lump-sum payments, female GPs to follow less *patients aged 65 and older* and both male and female GPs to follow less *women*. Male GPs follow also more *low-income (CMUC) patients*

and female GPs follow a little less *patients with long term disease*. Constraining GPs to charge patients at reference fees does not lead *a priori* them to select more their patients.

6 DIFFUSION AND BEHAVIOR ADAPTATION TO NEW REGULATIONS

The sector-2 freeze took place in 1990. However, we evaluate causal effects in 2005 and 2008, 15 to 18 years later. During this period, only few and marginal changes in regulation may have affected sector 1 and sector 2 GPs differently.[20] In general, both groups of GPs faced the same changes in regulation (namely increases in reference prices, extension of new remuneration schemes for on-calls and following specific patients).[21] However, during this period, it is very likely that sector 2 physicians adjusted their fees and practices to the additional arrival of new sector 1 GPs induced by the new regulation more than they would have done, did the reform not take place. The share of sector 2 GPs decreased continuously over the years, from 16% in 1990 to 8.5% in 2008 (Ecosante, 2013. Due to this adaptation, we probably mis-estimate the true effect of price regulation. Especially, we may underestimate the effect on activity as sector 2s may have increased their level of activity and decreased their prices facing additional competition of more numerous sector 1 GPs. As the share of sector 2 GPs has always been rather small, this bias is probably limited.

To investigate the existence of such equilibrium effects, we first confirm the intuition that sector 2 GPs practicing after 1990 adjust their behaviors in response to nearby sector 1 GPs competition. We use the French self-employed GPs Panel File, which contains a sub-sample of GPs followed yearly. We run three regressions that explain the log number of medical procedures, the log level of prices, and the log total annual fees of sector 2 GPs over the 1990-2008 period, by the local share of sector-1 GPs and local medical density (measured at the *département* level). We also control for individual and time fixed effects, experience and its square, see Table IV. Sector-2 GPs activity is indeed positively influenced by the share of sector-1 GPs (significant at 10% level) and sector-2 GPs' prices are negatively influenced by it. Hence, sector 2 GPs had

[20] In 1990, PHI subsidies for family social contributions were introduced for sector 1 GPs, but they represent only 13% of all PHI subsidies for sector 1 social contributions. Since 2005, sector 2 GPs can sign an option of "coordination", which offers them some subsidies in exchange for reducing their extra-billings. This option was a complete failure, and covers only 1300 GPs in 2011. Last, since 2004, the basis of fees used by PHI to compute subsidies for sector 1 social contributions exclude extra-billings, which does not make a great difference as sector 1 extra-billings are marginal, see Cour des Comptes (2012).

[21] Reference prices of home or office visits increased in 1993, 1995, 2002, 2006, 2007. The co-payment of medical procedures increased from 25% to 30% of their reference prices in 1993. Since 2000, lump-sum payments have grown: notably, lump sum payments for following less than 2 year-old patients (2003), and with the creation of gate-keeping position (2005 July), GPs receive 40€per year per patient with long-term disease followed as gate-keeper, see Cour des Comptes (2012).

probably been constrained to increase their activity, and to decrease their prices more than they would have done had the share of sector 2 GPs remained the same. So the effects of the sector we evaluate in 2008 are likely to underestimate the true impacts on the provision of care, and the magnitudes of the impacts on price. In a sense, our control group has also been (slightly) affected.

– INSERT HERE Table IV –

Second, we perform a similar discontinuity regression analysis on the panel data, separating the effects per experience groups: between 2 and 5 years of experience, between 5 and 15 years of experience, more than 15 years of experience. For comparison with the results obtained in the main analysis, we also present the results of these regressions for years 2005 to 2008.[22] We focus on the care provision indicator, annual number of medical procedures, total annual fees, and average price, see Table V.[23] The sector impacts are not constant across experience groups. The additional quantity of care provided by sector 1 GPs wrt to what they would have done in sector 2, is stronger at the beginning of the career and the first years after the reform, than after. The magnitude of this effect decreases indeed with time and experience, and so the significance of the corresponding estimate. In this panel dataset, we have far less observations than in our main dataset.[24] So those results suffer from a lack of statistical power, as shown by the very large standard deviations. The decreasing magnitude of the effect price regulation on activity is likely to reflect a mix of equilibrium effects (sector 2 GPs adapting their behavior to an increasing competition of sector 1 GPs) and changing effect with experience (long-term versus short-term effects). For both reasons, the effect of price regulation that we measure in 2005-2008 should underestimate the short-term effect we would have probably estimated in earlier years.

Surprisingly, the gap in prices between sector 1 and sector 2 GPs tends to increase with the level of experience whereas it should decrease over the years if sector 2 GPs adjust their prices to those of the competition. In contrast, this illustrates that sector 2 GPs can adapt their prices to their level of experience (and related skills) by increasing extra-billings, whereas sector 1 GPs cannot. However, we cannot give too much importance to these results as they often do not pass our specification tests.

– INSERT HERE Table V –

[22] We distinguish GPs according to their level of experience rather than to the year of observation because activity changes a lot at the early beginning of the career, and RD estimates would be distorted by the presence of new entrants. This is not the case in 2005, when all GPs have at least 10 years of experience, they have all built up their practice and constitute a much more homogeneous sample.

[23] These are the only four outcomes that are common between the two data sets.

[24] We observe around 98 to 290 GPs per year who set up practice around the date of change in legislation.

7 SENSITIVITY CHECKS

As sensitivity checks, we change the bandwidth of the local regressions; we provide additional results to assess the risk of manipulation and the timing of the reform; and we perform some falsification tests.

7.1 Changing the bandwidth

We first check the sensitivity of our results to the choice of the bandwidth. We extend and narrow the bandwidth of one year and redo the RDD analysis. With a bandwidth of 4, RD regressions rely on GPs who began their practice between 1986 and 1993; with 6, on GPs who began their practice between 1984 and 1995. Full RD results with bandwidths of 4 and 6 are reported in Table VI in the appendix. The main results presented previously are not sensitive to the choice of the bandwidth.[25]

7.2 Reform timing and threshold manipulation: additional checks

In July 1989, PHI and medical associations renewed the previous medical convention in which the choice between sectors was let free to physicians. This renewal had to be approved by the Government by the end of November, which the Government did not. December 6th, PHI informed that as the Government approval was missing, the medical convention did not hold anymore and that physicians who set up practice after December, 1st, 1989 could only sign a sector 1 contract until further notice (circulaire CNAMts DGR 2434/89). This further notice arrived in March 1990 with the signature and approval of a new medical convention (circulaire CNAMts DGR 2434/90). The latter presented the new rules for accessing sector 2, which applied to all physicians who set up practice after December, 1st 1989. Physicians who set up practice between December, 1st 1989 and March, 31st 1990, and who fulfilled the new conditions had one month to change of sector if they wanted. We learn two things from this. First, the reform was really unanticipated as the medical convention had been renewed in July 1989. So, the only physicians who potentially manipulated the threshold have to be found among those who could have suspected that the Government would not give its approval at the end of November, $i.e.$, among those who finally began in November 1989. Further, even if we find a higher number of physicians who began in November, it may rather be related to the risk of legal uncertainty than to manipulation issues. Second, physicians who began their practice between December 1989 and March 1990, accepted to do so even if there was a legal uncertainty. Moreover, they did not

[25] One should not put too much attention to the results of the local quadratic regressions when the bandwidth is 4 because only 8 year cells are used to estimate 6 parameters.

receive exactly the same treatment as those who began later. They first started to practice with a sector 1 contract and then had the possibility to change of contract. For both reasons, treatment effects may be different for them from for the others. In the following, we provide additional elements showing that most of our results are stable including or not those concerned GPs.

In the 2008 data, we do observe the *month* of the beginning of practice, additional to the year. We cannot use it as a running variable because we do not have enough observations per month to conduct the analysis and because, within a year, the beginning of practice shows a strong seasonality. Due to pay-roll tax issues, January is indeed more interesting than in other months.[26] Moreover, we have less confidence in the month variable than in the year one, as months distribution in our data differ from those of the adeli registry, ("Automatisation DEs LIstes") another exhaustive registry of all the Health professionals practicing in the Public or the Private sector, while the years distributions are very similar. If we put enough confidence however in the month variable, we can provide additional hints on the presence or not of manipulation and its potential impact of the regression results.

Threshold manipulation. In November 1989, the share of GPs who chose sector 2 is higher, 27%, vs 11% in October and 7% in December. However the number of GPs who began their practice in November is small and similar to what happened the year before (232, vs 215). This may indicate some threshold manipulation but for a modest number of GPs.

So, we check if we find the same regression results when deleting those GPs from the sample. Detailed results are reported in Table VII in the appendix. As we observe the month of practice beginning in the 2008 data only, we first report this information for the GPs observed in 2005, and delete those with missing months. We re-run the analysis on this new sample, as due to the selection induced by deletion, results, presented in column 2 of Table VII, may differ from those on the complete sample, which are reported in column 1. Then, we delete observations concerning GPs who began in November and include those who began in December 1989 in the after reform period, and we re-run the analysis (column 3). Comparing column 2 and 3, we confirm that results are quite stable for all outcomes considered with few exceptions. The effect on care provision is somewhat smaller in magnitude (26% compared to 37%) but the difference is not statistically meaningful, and the effect is still significant at 10% for the care provision indicator, at 15% for the number of procedures. The effect on the number of patients is not significant anymore but the magnitude of the estimates remain close (22% vs 34%) with respect to the size of standard deviations. The effect on home visits is also somewhat smaller but still strong and significant (+100% vs 144%). The only results that really differ are those for prescriptions, which are not significant anymore.

Legal uncertainty. Last, we delete observations concerning GPs who began between Decem-

[26] Self-employed GPs get strongly reduced social contributions for the first two civil years of practice.

ber, 1st 1989 and March, 30st 1990, and who were exposed to legal uncertainty and a slightly different treatment as others. We re-run the analysis. Results are reported in the last column of Table VII. They are very similar to those of the main specification, excepted the effects for prescriptions, which are not significant anymore.

7.3 Falsification tests

As falsification tests, we run the same RD analysis choosing 1996 instead of 1990 as date of the reform, see Table VIII in the appendix. No outcomes appear to have significantly changed. Note especially how the first-stage F statistics for nullity of excluded instruments are low in comparison to those of Table II as the share of GPs who joined sector 1 presents no discontinuity around 1996.

8 CONCLUDING COMMENTS

We use the sector 2-freeze reform to analyze the effect of price regulation, here the restriction to overbill. The richness of our data enables us to consider detailed dimensions of GP practice. The restriction to overbill leads GPs to provide largely more care (+51%) in response to facing lower prices (-42%). So GPs strongly react to income effects.[27] Under price regulation, GPs are more accessible for patients. They may also induce demand and provide more care than what would probably be necessary for patients. The quality of care provided is likely to change also but we are limited in our analysis as we do not observe quality indicators. Price regulation also seems to insure continuity of care in ambulatory: more gate-keepers, male GPs provide more guards and on-calls. Male GPs react more to income effects than female GPs, which leads at the end to a higher male labor income, and a somewhat smaller female one than what it would have been without price regulation. Moreover, GPs increase their use of complementary remuneration schemes based on capitation (lump-sum payments) but not their salaried activities. Further, price regulation induces some changes on patient groups, which are consistent with the increased accessibility of ambulatory care and a potential redistribution of patients from hospital.[28]

For efficiency concerns, one may find natural to perform a cost-benefit analysis. This is beyond the scope of the paper especially due to the fact that benefit side is not observed, and RD

[27] We assume there are no changes in demand: the aggregate demand addressed to a GP under price regulation will indeed be the same as the one addressed if the GP is able to perfectly price discriminate patients above the reference price and if there are no changes in quality provided.

[28] Patients may also have redistributed themselves from sector 2 to sector 1. In that case, we cannot speak of causal effects of sector on this type of outcomes as both the treatment and the control group were affected.

methods enable one to identify only local treatment effects. However, we can give some intuitions for the cost side. First, if GPs no longer over-bill, patients (or their complementary and supplementary healthcare insurances) pay less for each service provided. There are transfers of money from physicians to patients. However, physicians provide more services, which impacts National Health accounts and so, patients. Overall, the total fees earned by a GP can give us an intuition about aggregate cost. These fees remained stable, the reform would have been neutral for the collectivity. The decrease in extra-billings would have been compensated by the increase in the provision of care. Our results show an increase in the total amount of fees, which is only significant for male GPs. Hence putting aside equilibrium effects, if we assume that the local effect estimated on male compliers holds for all male GPs, the total amount paid by the collectivity is likely to be higher under overbilling restrictions.[29]

The sector 2 freeze affected GPs massively, as GPs did usually not have the qualifying hospital practice that would have allowed them to begin to practice as sector 2 GPs. However, a recent reform of medical education (2004), which aimed at improving the attractiveness of the GP profession, changed GPs' status. GPs are now considered as specialists and can obtain qualifying hospital practice. Future cohorts could be able to practice again as sector 2 physicians. The regulation of GPs' extra-billings, combined with recent changes in the characteristics of GPs in ambulatory care (feminization and young cohorts with stronger preferences for leisure and group practice), is very likely to become again a challenge for care regulation. Our results suggest that if these new GPs react to income effects at least as much as our complier group, the 2004 reform should lead to a decrease in GPs' activity in the future years (or a redistribution of patients towards hospitals). This decrease would first be limited as the predominance of sector 1 GPs would guarantee a control over prices. However, in the long run, the plausible increase in the share of sector 2 GPs is likely to release this control.

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[29]Note that changes in prescription behaviors should be accounted for in a cost-benefit analysis. However, as our results concerning prescriptions are not stable, we do not comment them more.

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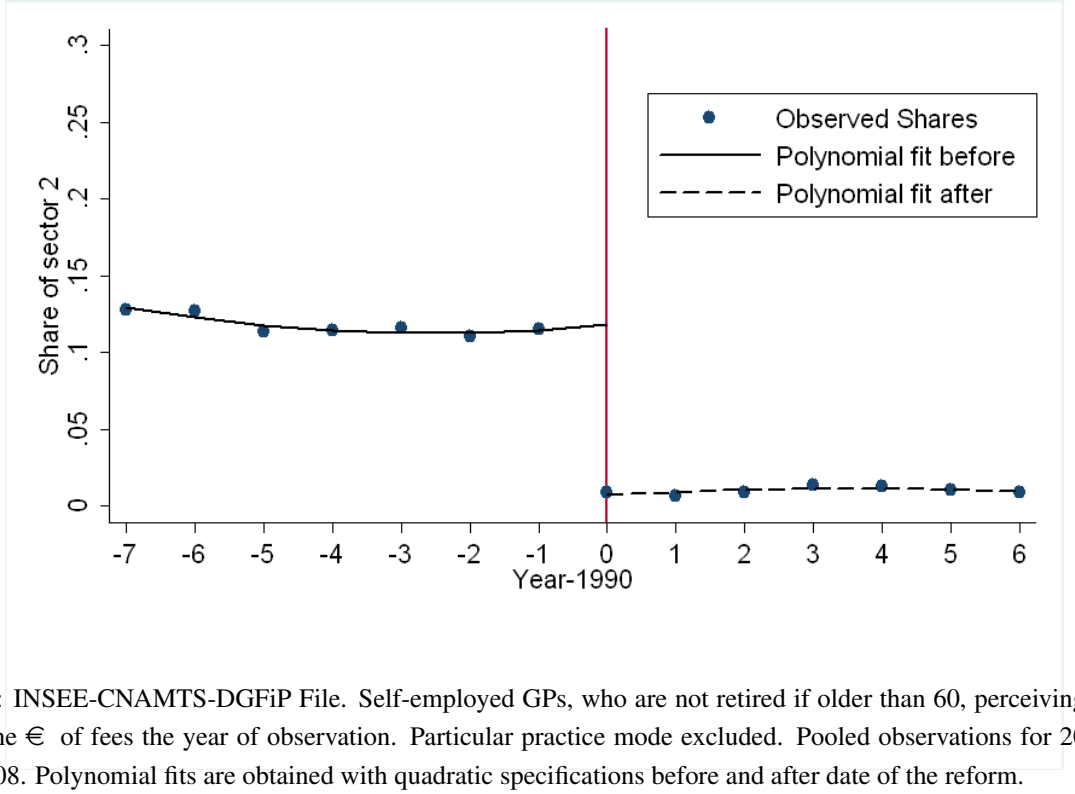
9 GRAPHICS AND TABLES



Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees the year of observation. Particular practice mode excluded. Pooled observations for 2005 and 2008. Polynomial fits are obtained with quadratic specifications before and after date of the reform.

Figure 1: Share of GPs joining sector 2 by year of practice beginning

Table I: Descriptive statistics and OLS results

	Average	St. Dev	OLS estimate: S1 wrt S2 (1)
Nb of obs.	45537		
Sh. of Sector 1	0.929	0.256	
Sh. of Women	0.272	0.445	-0.074***
Age	49.051	4.597	-0.904***
Annual Provision of Care (in Log)			
Care Provision Indicator	11.623	0.629	0.209***
Nb. of Medical Procedures	8.441	0.651	0.217***
Nb. of Technical Proc.	2.332	1.958	-0.314***
Nb. of Office Visits	8.229	0.906	0.134***
Nb. of Home Visits	5.798	1.683	1.093***
Nb. of Patients	7.230	0.596	0.116***
Nb. of Med. Proc per Patient	1.482	0.239	0.076***
Annual Fees and Income			
Avg. Price (in Log. €2008)	3.262	0.211	-0.305***
Total fees (in Log. €2008)	11.673	0.601	-0.087***
Lump-sum Payments (in Log. €2008)	8.173	1.504	0.812***
for On-Calls/Guards (2008 only)	4.199	3.932	0.822***
for Specific Patients (2008 only)	7.015	2.026	1.642***
Labor Income (in Log. €2008)	11.126	0.604	0.063***
Sh. of Full-time Self-Employed GPs	0.926	0.261	0.005
Secondary Outcomes			
Sh. of Patients for whom GP is Gate Keeper	0.349	0.178	0.077***
Annual Prescription per Patient (in Log. €2008)	5.882	0.764	0.244***
Annual Drug Prescription per Patient (in Log. €2008)	5.215	0.843	0.279***
Sh. of Female Patients	0.560	0.067	-0.052***
Sh. of Patients aged 15 or Younger	0.213	0.075	0.045***
Sh. of Patients aged 65 or Older	0.157	0.086	-0.008***
Sh. of CMUC Patients	0.091	0.088	0.053***
Sh. of Patients with Long-term Disease	0.144	0.060	0.013***
Sh. of GPs practicing in rural areas	0.169	0.374	0.124***

*** stands for statistical significance at 1% level.

(1)The third column reports OLS estimates of regressing the outcome variable of a given line on a dummy variable indicating whether GP is in sector 1 (wrt sector 2), and controls X that depend on the outcome considered. $X =$ sex, experience, squared experience and year when the dependent variable is the age. $X =$ experience, squared experience and year when the dependent variable is the women dummy. $X =$ sex, experience, squared experience, shares of women, of less than 15 and of more than 65 years-old in patients group, of CMU patients and of patients with long-term disease, year and size of locality for the outcomes on the provision of care and on fees and income. $X =$ sex, experience, squared experience, year and size of locality for the secondary outcomes except Practice in rural areas for which $X =$ sex, experience, experience squared and year.

Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008. The care provision indicator is the sum of the number of medical procedures per type weighted by the corresponding reference price. The number of medical procedures sums of office visits, home visits and technical procedures. The average price is the total annual fees divided by the number of medical procedures performed in a year. Total annual fees include fees earned at reference price, extra-billings and lump-sum payments. Lump-sum payments for Specific Patients include Lump-sum payments for child patients and for gate keeping positions of patients with long-term disease. It also includes some other regulated surcharges impossible to isolate from lump-sum payments. Labor Income is net of all professional expenses and social contributions. CMUC patients are low income patients for whom it is forbidden to charge extra-billings.

Table II: RD estimates: GPs Beginning Practice 5 Years Before and After 1990

		Local linear	Local Quadratic	Local Linear Spline
Annual Provision of Care (in Log)				
Care Provision Indicator	Est	0.459***	0.471***	0.510***
	(Sd)	(0.076)	(0.101)	(0.087)
	$GOF: p$	*0.287*	*0.167*	*0.458*
Nb. of Medical Procedures	Est	0.537***	0.552***	0.611***
	(Sd)	(0.114)	(0.163)	(0.145)
	$GOF: p$	*0.126*	*0.054*	*0.209*
Nb. of Technical Proc.	Est	-0.272	-0.587*	-0.336
	(Sd)	(0.251)	(0.342)	(0.243)
	$GOF: p$	*0.226*	*0.115*	*0.123*
Nb. of Office Visits	Est	0.498***	0.720***	0.731***
	(Sd)	(0.14)	(0.243)	(0.204)
	$GOF: p$	*0.145*	*0.098*	*0.333*
Nb. of Home Visits	Est	1.552***	1.428***	1.509***
	(Sd)	(0.228)	(0.257)	(0.125)
	$GOF: p$	*0.019*	*0.049*	*0.654*
Nb. of Patients	Est	0.397***	0.388***	0.420***
	(Sd)	(0.122)	(0.142)	(0.136)
	$GOF: p$	*0.636*	*0.605*	*0.533*
Nb. of Med. Proc. per Patient	Est	0.093^p	0.119**	0.136^p
	(Sd)	(0.063)	(0.057)	(0.083)
	$GOF: p$	*<0.001*	*<0.001*	*<0.001*
Annual Fees and Income				
Average Price (in Log. €2008)	Est	-0.416***	-0.386***	-0.415***
	(Sd)	(0.049)	(0.056)	(0.055)
	$GOF: p$	*0.115*	*0.054*	*0.045*
Total Fees (in Log. €2008)	Est	0.121^p	0.166^p	0.196**
	(Sd)	(0.078)	(0.112)	(0.098)
	$GOF: p$	*0.290*	*0.180*	*0.460*
Lump-Sum Payments (in Log. €2008)	Est	1.323***	1.65***	1.621***
	(Sd)	(0.233)	(0.246)	(0.219)
	$GOF: p$	*0.350*	*0.590*	*0.859*
Labor Income (in Log. €2008)	Est	0.085	0.000	0.089
	(Sd)	(0.089)	(0.094)	(0.107)
	$GOF: p$	*0.391*	*0.224*	*0.252*
Sh. of Full-Time Self-Employed GPs	Est	0.024	0.035	0.031
	(Sd)	(0.043)	(0.027)	(0.022)
	$GOF: p$	*0.094*	*0.460*	*0.910*
Secondary Outcomes				
Sh. of Patients for whom GP is Gate Keeper	Est	0.104***	0.069***	0.097***
	(Sd)	(0.022)	(0.02)	(0.02)
	$GOF: p$	*0.434*	*0.418*	*0.843*
Annual Prescription per Patient (in Log. €2008)	Est	0.357***	0.154**	0.249***
	(Sd)	(0.074)	(0.071)	(0.04)
	$GOF: p$	*0.776*	*0.788*	*0.968*
Annual Drug Prescription per Patient (in Log. €2008)	Est	0.404***	0.386***	0.403***
	(Sd)	(0.068)	(0.068)	(0.033)
	$GOF: p$	*0.582*	*0.648*	*0.975*
Sh. of Female Patients	Est	-0.035***	-0.024***	-0.028***
	(Sd)	(0.006)	(0.008)	(0.008)
	$GOF: p$	*0.840*	*0.711*	*0.735*
Sh. of Patients aged 15 or Younger	Est	0.036**	0.066***	0.053***
	(Sd)	(0.016)	(0.018)	(0.018)
	$GOF: p$	*0.018*	*0.059*	*0.011*
Sh. of Patients aged 65 or Older	Est	0.004	-0.056^p	-0.037^p
	(Sd)	(0.019)	(0.035)	(0.025)
	$GOF: p$	*<0.001*	*0.001*	*0.016*
Sh. of CMUC Patients	Est	-0.001	0.106***	0.063***
	(Sd)	(0.031)	(0.029)	(0.023)
	$GOF: p$	*<0.001*	*0.003*	*0.001*
Sh. of Patients with Long-term Disease	Est	0.006	-0.029	-0.022*
	(Sd)	(0.009)	(0.022)	(0.013)
	$GOF: p$	*0.008*	*0.020*	*0.101*
Sh. of GPs practicing in rural areas	Est	0.071	0.131	0.119
	(Sd)	(0.123)	(0.136)	(0.128)
	$GOF: p$	*0.001*	*0.001*	*<0.001*
F- First Stage of excluded instrument		1427	957	929
Nb Obs.		33701	33701	33701

Note: this table reports regression discontinuity estimates for various outcomes with local linear, local quadratic and local linear spline specifications. The bandwidth used is 5: the data used restrict to GPs who began their practice between 1985 to 1994. Regressions are clustered by the year of practice beginning. (Sd) stands for the standard deviation estimate, and $GOF: p$ is the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level.

Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008.

Table III: RD estimates by Gender, GPs Beginning Practice 5 Years Before and After 1990

		Male GPs			Female GPs		
		Local linear	Local Quadratic	Loc. Lin. Spline	Local linear	Local Quadratic	Loc. Lin. Spline
Annual Provision of Care (in Log)							
Care Provision Indicator	Est	0.515***	0.663***	0.686***	0.470***	0.223***	0.322***
	(Sd)	(0.119)	(0.180)	(0.152)	(0.119)	(0.032)	(0.047)
	$GOF: p$	*0.072*	*0.036*	*0.176*	*0.929*	*0.999*	*0.995*
Nb. of Medical Procedures	Est	0.562***	0.688**	0.753***	0.600***	0.377***	0.472***
	(Sd)	(0.171)	(0.268)	(0.233)	(0.129)	(0.055)	(0.048)
	$GOF: p$	*0.022*	*0.007*	*0.038*	*0.894*	*0.994*	*0.996*
Nb. of Technical Proc.	Est	-0.201	-0.374	-0.107	-0.192	-0.901^{p}	-0.592
	(Sd)	(0.157)	(0.469)	(0.269)	(0.596)	(0.548)	(0.531)
	$GOF: p$	*0.888*	*0.713*	*0.715*	*0.008*	*0.011*	*0.019*
Nb. of Office Visits	Est	0.316	0.637^{p}	0.668**	0.891***	0.866***	0.918***
	(Sd)	(0.239)	(0.395)	(0.332)	(0.109)	(0.172)	(0.118)
	$GOF: p$	*0.014*	*0.009*	*0.080*	*0.707*	*0.488*	*0.470*
Nb. of Home Visits	Est	1.883***	2.908***	2.547***	1.172*	-0.905	-0.04
	(Sd)	(0.283)	(0.240)	(0.151)	(0.708)	(0.679)	(0.319)
	$GOF: p$	*0.050*	*0.085*	*0.425*	*0.003*	*0.400*	*0.732*
Nb. of Patients	Est	0.453**	0.420*	0.498**	0.371***	0.389***	0.362***
	(Sd)	(0.197)	(0.247)	(0.224)	(0.082)	(0.042)	(0.081)
	$GOF: p$	*0.203*	*0.143*	*0.161*	*0.861*	*0.803*	*0.665*
Nb. of Med. Proc. per Patient	Est	0.072	0.188***	0.177*	0.158**	0.006	0.089*
	(Sd)	(0.083)	(0.064)	(0.096)	(0.068)	(0.057)	(0.053)
	$GOF: p$	*0.003*	*0.003*	*0.004*	*0.036*	*0.034*	*0.178*
Annual Fees and Income							
Average Price (in Log. €2008)	Est	-0.373***	-0.345***	-0.393***	-0.475***	-0.422***	-0.431***
	(Sd)	(0.072)	(0.089)	(0.087)	(0.034)	(0.076)	(0.045)
	$GOF: p$	*0.025*	*0.024*	*0.009*	*0.260*	*0.117*	*0.211*
Total Fees (in Log. €2008)	Est	0.19^{p}	0.342*	0.360**	0.125	-0.046	0.040
	(Sd)	(0.119)	(0.180)	(0.151)	(0.117)	(0.046)	(0.081)
	$GOF: p$	*0.081*	*0.050*	*0.243*	*0.948*	*0.995*	*0.944*
Lump-Sum Payments (in Log. €2008)	Est	1.224***	2.198***	1.939***	1.672***	0.748*	1.225***
	(Sd)	(0.332)	(0.481)	(0.386)	(0.458)	(0.421)	(0.290)
	$GOF: p$	*0.058*	*0.123*	*0.341*	*0.159*	*0.612*	*0.416*
Labor Income (in Log. €2008)	Est	0.218**	0.282*	0.325**	-0.041	-0.360***	-0.182*
	(Sd)	(0.099)	(0.156)	(0.136)	(0.137)	(0.076)	(0.095)
	$GOF: p$	*0.360*	*0.177*	*0.259*	*0.678*	*0.706*	*0.794*
Sh. of Full-Time Self-Employed GPs	Est	-0.002	-0.020	-0.008	0.053	0.110*	0.091
	(Sd)	(0.041)	(0.072)	(0.059)	(0.089)	(0.063)	(0.085)
	$GOF: p$	*0.068*	*0.047*	*0.338*	*0.147*	*0.768*	*0.195*
Secondary Outcomes							
Sh. of Patients for whom GP is Gate Keeper	Est	0.080***	0.079**	0.099***	0.150***	0.037	0.093***
	(Sd)	(0.026)	(0.032)	(0.036)	(0.053)	(0.027)	(0.017)
	$GOF: p$	*0.635*	*0.394*	*0.529*	*0.112*	*0.846*	*0.741*
Annual Prescription per Patient (in Log. €2008)	Est	0.223***	0.358***	0.327***	0.632*	-0.275*	0.132
	(Sd)	(0.084)	(0.136)	(0.115)	(0.328)	(0.166)	(0.123)
	$GOF: p$	*0.563*	*0.391*	*0.389*	*0.049*	*0.868*	*0.506*
Annual Drug Prescription per Patient (in Log. €2008)	Est	0.267***	0.600***	0.49***	0.683**	-0.050	0.275*
	(Sd)	(0.096)	(0.121)	(0.115)	(0.332)	(0.156)	(0.167)
	$GOF: p$	*0.483*	*0.376*	*0.585*	*0.076*	*0.929*	*0.499*
Sh. of Female Patients	Est	-0.032**	-0.02	-0.029^{p}	-0.054***	-0.043***	-0.044***
	(Sd)	(0.016)	(0.020)	(0.020)	(0.013)	(0.010)	(0.014)
	$GOF: p$	*0.076*	*0.056*	*0.023*	*0.556*	*0.524*	*0.355*
Sh. of Patients aged 15 or Younger	Est	0.046***	0.095***	0.079***	0.018	0.018^{p}	0.009
	(Sd)	(0.015)	(0.026)	(0.014)	(0.020)	(0.012)	(0.023)
	$GOF: p$	*0.138*	*0.239*	*0.280*	*0.078*	*0.082*	*0.026*
Sh. of Patients aged 65 or Older	Est	0.012	-0.025	-0.021	-0.002	-0.104***	-0.058***
	(Sd)	(0.024)	(0.040)	(0.031)	(0.025)	(0.031)	(0.017)
	$GOF: p$	*0.010*	*0.016*	*0.081*	*0.032*	*0.293*	*0.386*
Sh. of CMUC Patients	Est	-0.015	0.142***	0.080***	0.025	0.051	0.037
	(Sd)	(0.038)	(0.02)	(0.017)	(0.026)	(0.050)	(0.032)
	$GOF: p$	*<0.001*	*0.297*	*0.438*	*<0.001*	*<0.001*	*<0.001*
Sh. of Patients with Long-term Disease	Est	0.004	-0.008	-0.012	0.013	-0.064***	-0.036***
	(Sd)	(0.008)	(0.024)	(0.014)	(0.018)	(0.023)	(0.011)
	$GOF: p$	*0.222*	*0.113*	*0.203*	*0.027*	*0.600*	*0.935*
Sh. of GPs practicing in rural areas	Est	0.083	0.160	0.141	0.055	0.087	0.090
	(Sd)	(0.133)	(0.159)	(0.137)	(0.120)	(0.123)	(0.127)
	$GOF: p$	*0.026*	*0.019*	*0.010*	*0.054*	*0.123*	*0.024*
F- First Stage of excluded instrument		1309	1036	1077	125	72.3	94.2
Nb Obs.		24336	24336	24336	9365	9365	9365

Note: this table reports regression discontinuity estimates for various outcomes with local linear, local quadratic and local linear spline specifications. The bandwidth used is 5: the data used restrict to GPs who began their practice between 1985 to 1994. Regressions are clustered by the year of practice beginning. (Sd) stands for the standard deviation estimate, and $GOF: p$ is the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level. Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008.

Table IV: Fixed effect panel estimates on sector 2 GPs outcomes, 1990-2008

		Nb of Med. Proc. in Log	Average Price in Log	Total Fees in Log
Local share of sector 1 GPs	Est	0.015*	-0.0132***	0.0014
	(Sd)	(0.009)	(0.005)	(0.008)
Local medical density	Est	0.0005	-0.0065*	-0.0059
	(Sd)	(0.0057)	(0.0034)	(0.0047)
Experience and squared.		Yes	Yes	Yes
Individual Fixed effects		Yes	Yes	Yes
Time Fixed effects		Yes	Yes	Yes
Nb Obs.		5110	5110	5111

Note: this table reports panel fixed effects regression estimates for three outcomes of sector 2 GPs. Standard errors are clustered at the individual level. Regressions are clustered by GPs. (Sd) stands for the standard deviation estimate. *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level. Source: French self-employed GPs Panel file. Self-employed sector 2 GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Panel observations between 1990 and 2008.

Table V: RD estimates per experience: GPs beginning practice 5 Years Before and After 1990

			Exp ∈ (2-5]	Exp ∈ (5-15]	Exp> 15	2005-2008
Care Provision Indicator (in Log)	Loc. lin.	Est	0.972***	0.566**	0.127	0.396
		(Sd)	(0.401)	(0.342)	(0.402)	(0.494)
		$GOF : p$	0.929	0.014	0.002	0.006
	Loc. Quad.	Est	1.682**	0.316	0.142	1.331
		(Sd)	(1.023)	(0.752)	(0.541)	(0.939)
		$GOF : p$	0.996	0.255	0.028	0.461
	Loc. lin. spl.	Est	1.198**	0.414	0.712	0.857
		(Sd)	(0.500)	(0.517)	(0.701)	(0.681)
		$GOF : p$	0.992	0.941	0.257	0.125
Nb. of Medical Procedures (in Log)	Loc. lin.	Est	1.140***	0.594*	0.507	0.516
		(Sd)	(0.435)	(0.355)	(0.363)	(0.469)
		$GOF : p$	0.719	0.264	0.062	0.016
	Loc. Quad.	Est	2.111*	0.540	1.261	1.261
		(Sd)	(1.207)	(0.775)	(1.062)	(0.891)
		$GOF : p$	0.990	0.684	0.125	0.272
	Loc. lin. spl.	Est	1.487***	0.614	0.733	0.946^{p}
		(Sd)	(0.563)	(0.534)	(0.615)	(0.646)
		$GOF : p$	0.999	0.614	0.367	0.151
Total Fees (in Log)	Loc. lin.	Est	0.633^{p}	0.171	-0.340	-0.112
		(Sd)	(0.388)	(0.335)	(0.534)	(0.504)
		$GOF : p$	0.722	0.006	0.009	0.0007
	Loc. Quad.	Est	1.492	-0.022	0.286	0.815
		(Sd)	(1.055)	(0.734)	(0.468)	(0.966)
		$GOF : p$	0.991	0.079	0.063	0.403
	Loc. lin. spl.	Est	0.891*	0.055	0.235	0.334
		(Sd)	(0.497)	(0.505)	(0.701)	(0.696)
		$GOF : p$	0.980	0.777	0.206	0.096
Average Price (in Log)	Loc. lin.	Est	-0.508***	-0.423***	-0.803***	-0.666***
		(Sd)	(0.147)	(0.089)	(0.213)	(0.243)
		$GOF : p$	0.172	0.000	0.023	0.008
	Loc. Quad.	Est	-0.619*	-0.563***	-0.675***	-0.752*
		(Sd)	(0.356)	(0.208)	(0.205)	(0.426)
		$GOF : p$	0.169	0.000	0.448	0.027
	Loc. lin. spl.	Est	-0.596***	-0.559***	-0.708***	-0.801***
		(Sd)	(0.192)	(0.144)	(0.285)	(0.329)
		$GOF : p$	0.364	0.000	0.631	0.165
F-First stage of excluded instrument	Loc. lin.		183.13	342.44	59.55	100.01
	Loc. Quad.		110	206.65	35.72	60.08
	Loc. lin. spl.		110.21	206.89	44.66	60.11
Nb Obs.			4947	17032	7586	6226

Note: this table reports regression discontinuity estimates for 4 outcomes with local linear, local quadratic and local linear spline specifications, for GPs per groups of experience and so, observed at different periods of time. The bandwidth used is 5: the data used restrict to GPs who began their practice between 1985 and 1994. Estimates of the first column (2-5 years of experience) are obtained using pooled observations between 1990 and 1998; estimates of the second column (5-15 years of experience) are obtained using pooled observations between 1990 and 2008; estimates of the third column (>15 years of experience) are obtained using pooled observations between 2000 and 2008; estimates of the fourth column (2005-2008) are obtained using pooled observations between 2005 and 2008; (Sd) stands for the standard deviation estimate and $GOF : p$ is the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15%. Source: French self-employed GPs Panel file. Self-employed GPs, who are not retired if older than 60, particular mode of practice excluded and who perceived at least one € of fees in the observation year.

10 APPENDIX

10.1 Goodness of fit tests

We follow Lee and Card (2008) and Lemieux and Milligan (2008) and compare the squared residuals of equation (3), seen as the restricted model, with those of a totally flexible/unrestricted model in which W_i and $h(.)$ are replaced by a full set of dummy variables accounting for all the values of the years of practice beginning, contained in the bandwidth. The distance between both reflects misspecification of h. In our case, if X can take values $1, \ldots, j, \ldots, J$, a goodness-of-fit statistic is

$$GOF = \sum_{j=1}^{J} \sum_{i|X_i=j}^{n_j} \frac{1}{\hat{\sigma}^2_{\epsilon_j}} \left[\hat{u}_i^2 - (Y_i - \bar{Y}_j)^2\right], \tag{7}$$

where $\hat{\sigma}^2_{\epsilon_j}$ denote the residual variance of the unrestricted model, n_j, the number of GPs beginning their practice in year j, $\bar{Y}_j$ the average value of Y over them, and $\hat{u}_i$ are the residuals of the restricted model. Under the specification of the model, $GOF \rightarrow \chi^2(J-K)$, where K stands for the number of constraints in the restricted model. In practice, $\hat{u}_i$ are the residuals of the second-stage equation of the restricted model. They are obtained by regressing Y_i on $h(X_i)$ and the fitted $\hat{W}_i$ derived from the first-stage equation.

10.2 Additional graphics and tables

Table VI: RD estimates, changing the Bandwidth

		Bandwidth= 4			Bandwidth= 6		
		Local linear	Local Quadratic	Loc. Lin. Spline	Local linear	Local Quadratic	Loc. Lin. Spline
Annual Provision of Care (in Log)							
Care Provision Indicator	Est	0.539***	0.246***	0.491***	0.623***	0.294***	0.444***
	(Sd)	(0.095)	(0.090)	(0.085)	(0.126)	(0.075)	(0.081)
	$GOF: p$	*0.478*	*0.634*	*0.235*	*0.050*	*0.068*	*0.032*
Nb. of Medical Procedures	Est	0.642***	0.226	0.584***	0.664***	0.417***	0.555***
	(Sd)	(0.150)	(0.160)	(0.144)	(0.141)	(0.110)	(0.132)
	$GOF: p$	*0.246*	*0.629*	*0.095*	*0.067*	*0.049*	*0.029*
Nb. of Technical Proc.	Est	-0.437*	0.054	-0.207	-0.181	-0.669**	-0.406^p
	(Sd)	(0.239)	(0.230)	(0.201)	(0.322)	(0.294)	(0.273)
	$GOF: p$	*0.210*	*0.103*	*0.094*	*0.108*	*0.215*	*0.190*
Nb. of Office Visits	Est	0.634***	0.571^p	0.740***	0.617***	0.538***	0.664***
	(Sd)	(0.157)	(0.356)	(0.21)	(0.161)	(0.141)	(0.189)
	$GOF: p$	*0.232*	*0.119*	*0.132*	*0.066*	*0.042*	*0.043*
Nb. of Home Visits	Est	1.752***	1.025***	1.465***	1.605***	1.459***	1.477***
	(Sd)	(0.144)	(0.314)	(0.120)	(0.208)	(0.174)	(0.134)
	$GOF: p$	*0.486*	*0.521*	*0.398*	*0.052*	*0.044*	*0.128*
Nb. of Patients	Est	0.443***	0.186	0.404***	0.538***	0.261**	0.371***
	(Sd)	(0.136)	(0.181)	(0.138)	(0.142)	(0.111)	(0.131)
	$GOF: p$	*0.554*	*0.478*	*0.275*	*0.161*	*0.172*	*0.149*
Nb. of Med. Proc.	Est	0.137*	0.036^p	0.128p	0.087^p	0.103*	0.128*
per Patient	(Sd)	(0.083)	(0.022)	(0.083)	(0.058)	(0.062)	(0.077)
	$GOF: p$	*<0.001*	*0.930*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Annual Fees and Income							
Average Price	Est	-0.437***	-0.272***	-0.404***	-0.376***	-0.452***	-0.43***
(in Log. €2008)	(Sd)	(0.061)	(0.037)	(0.054)	(0.045)	(0.066)	(0.059)
	$GOF: p$	*0.050*	*0.439*	*0.020*	*0.007*	*0.015*	*0.008*
Total Fees	Est	0.205**	-0.046	0.18*	0.288**	-0.035	0.125
(in Log. €2008)	(Sd)	(0.095)	(0.127)	(0.098)	(0.128)	(0.080)	(0.093)
	$GOF: p$	*0.495*	*0.488*	*0.226*	*0.021*	*0.039*	*0.013*
Lump-Sum Payments	Est	1.52***	1.55***	1.645***	1.434***	1.407***	1.53***
(in Log. €2008)	(Sd)	(0.163)	(0.398)	(0.226)	(0.204)	(0.182)	(0.227)
	$GOF: p$	*0.823*	*0.542*	*0.626*	*0.506*	*0.359*	*0.398*
Labor Income	Est	0.119	-0.19**	0.076	0.191^p	-0.076	0.051
(in Log. €2008)	(Sd)	(0.113)	(0.084)	(0.108)	(0.121)	(0.067)	(0.098)
	$GOF: p$	*0.251*	*0.81*	*0.095*	*0.261*	*0.383*	*0.200*
Sh. of Full-Time	Est	0.048***	0.037	0.033	-0.007	0.059***	0.035^p
Self-Employed GPs	(Sd)	(0.018)	(0.038)	(0.023)	(0.051)	(0.019)	(0.024)
	$GOF: p$	*0.892*	*0.643*	*0.680*	*0.063*	*0.537*	*0.771*
Secondary Outcomes							
Sh. of Patients for whom G	Est	0.107***	0.054***	0.099***	0.107***	0.085***	0.096***
is Gate Keeper	(Sd)	(0.022)	(0.013)	(0.021)	(0.02)	(0.018)	(0.018)
	$GOF: p$	*0.837*	*0.97*	*0.579*	*0.641*	*0.5*	*0.644*
Annual Prescription	Est	0.352***	0.016	0.235***	0.382***	0.265***	0.263***
per Patient(in Log. €2008)	(Sd)	(0.074)	(0.074)	(0.038)	(0.070)	(0.080)	(0.049)
	$GOF: p$	*0.834*	*0.952*	*0.861*	*0.811*	*0.662*	*0.701*
Annual Drug Prescription	Est	0.462***	0.295***	0.394***	0.443***	0.419***	0.401***
per Patient (in Log. €2008)	(Sd)	(0.034)	(0.083)	(0.032)	(0.056)	(0.072)	(0.052)
	$GOF: p$	*0.946*	*0.883*	*0.856*	*0.389*	*0.235*	*0.217*
Sh. of Female Patients	Est	-0.027***	-0.041***	-0.03***	-0.038***	-0.029***	-0.029***
	(Sd)	(0.007)	(0.004)	(0.007)	(0.005)	(0.008)	(0.007)
	$GOF: p$	*0.84*	*0.998*	*0.587*	*0.848*	*0.737*	*0.862*
Sh. of Patients aged	Est	0.039**	0.092***	0.058***	0.037**	0.052***	0.050***
15 or Younger	(Sd)	(0.016)	(0.026)	(0.018)	(0.015)	(0.015)	(0.017)
	$GOF: p$	*0.006*	*0.235*	*0.005*	*0.049*	*0.039*	*0.029*
Sh. of Patients aged	Est	-0.011	-0.048	-0.038^p	0.018	-0.038*	-0.035^p
65 or Older	(Sd)	(0.016)	(0.056)	(0.026)	(0.022)	(0.021)	(0.024)
	$GOF: p$	*0.001*	*<0.001*	*0.003*	*<0.001*	*0.001*	*0.010*
Sh. of CMUC Patients	Est	0.047**	0.034***	0.051***	0.000	0.052**	0.054***
	(Sd)	(0.019)	(0.004)	(0.019)	(0.027)	(0.025)	(0.020)
	$GOF: p$	*0.063*	*0.998*	*0.015*	*<0.001*	*<0.001*	*<0.001*
Sh. of Patients with	Est	-0.002	-0.047	-0.027**	0.012	-0.017	-0.019^p
Long-term Disease	(Sd)	(0.010)	(0.035)	(0.013)	(0.012)	(0.014)	(0.013)
	$GOF: p$	*0.005*	*0.009*	*0.133*	*0.012*	*0.039*	*0.162*
Sh. of GPs practicing	Est	0.042	0.398***	0.165	0.100	0.065	0.097
in rural areas	(Sd)	(0.131)	(0.109)	(0.12)	(0.119)	(0.127)	(0.131)
	$GOF: p$	*<0.001*	*0.009*	*0.001*	*0.001*	*0.001*	*<0.001*
F- First Stage of excluded instrument		1120	450.0	881.6	629.4	1304	904.5
Nb Obs.		27459	27459	27459	39571	39571	39571

Note: this table reports regression discontinuity estimates for various outcomes with local linear, local quadratic and local linear spline specifications. The bandwidth used is 4 (resp. 6): the data used restrict to GPs who began their practice between 1986 to 1993 (resp. 1984 to 1995). Regressions are clustered by the year of practice beginning. (Sd) stands for the standard deviation estimate, and $GOF: p$ is the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level. Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008.

Table VII: RD estimates: More Results on Manipulation and Legal Uncertainty

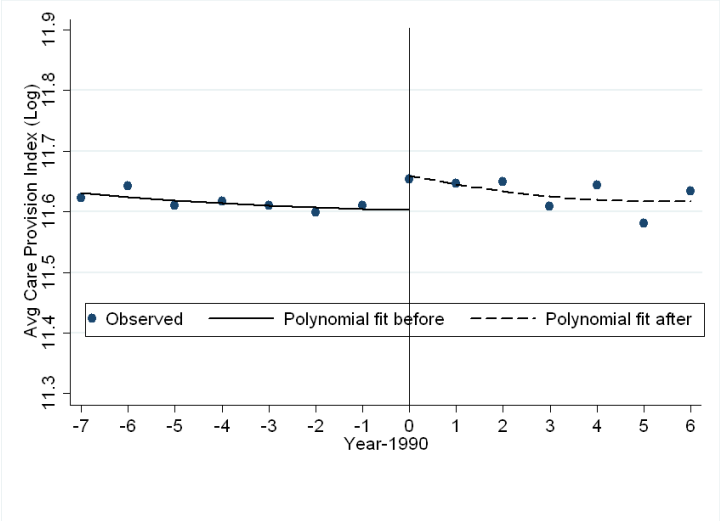
		All	W/o missing months	W/o Nov 89 nor missing	W/o Dec 89 to March 90 nor miss.
Annual Provision of Care (in Log)					
Care Provision Indicator	Est	0.51***	0.376***	0.257*	0.379***
	(Sd)	(0.087)	(0.096)	(0.146)	(0.101)
	$GOF: p$	*0.458*	*0.307*	*0.203*	*0.321*
Nb. of Medical Procedures	Est	0.611***	0.454***	0.334^p	0.494***
	(Sd)	(0.145)	(0.151)	(0.207)	(0.151)
	$GOF: p$	*0.209*	*0.121*	*0.060*	*0.165*
Nb. of Technical Proc.	Est	-0.336	-0.426*	-0.394^p	-0.663***
	(Sd)	(0.243)	(0.228)	(0.266)	(0.214)
	$GOF: p$	*0.123*	*0.296*	*0.296*	*0.309*
Nb. of Office Visits	Est	0.731***	0.544***	0.406*	0.63***
	(Sd)	(0.204)	(0.187)	(0.240)	(0.182)
	$GOF: p$	*0.333*	*0.494*	*0.316*	*0.658*
Nb. of Home Visits	Est	1.509***	1.441***	1.002**	1.153***
	(Sd)	(0.125)	(0.169)	(0.439)	(0.178)
	$GOF: p$	*0.654*	*0.258*	*0.314*	*0.281*
Nb. of Patients	Est	0.42***	0.339**	0.218	0.368***
	(Sd)	(0.136)	(0.143)	(0.160)	(0.139)
	$GOF: p$	*0.533*	*0.508*	*0.265*	*0.540*
Nb. of Med. Proc.	Est	0.136	0.083	0.087	0.09
per Patient	(Sd)	(0.083)	(0.085)	(0.077)	(0.092)
	$GOF: p$	*<0.001*	*<0.001*	*<0.001*	*<0.001*
Annual Fees and Income					
Average Price	Est	-0.415***	-0.397***	-0.351***	-0.437***
(in Log. €2008)	(Sd)	(0.055)	(0.056)	(0.073)	(0.051)
	$GOF: p$	*0.045*	*0.037*	*0.015*	*0.258*
Total Fees	Est	0.196**	0.056	-0.017	0.057
(in Log. €2008)	(Sd)	(0.098)	(0.104)	(0.145)	(0.107)
	$GOF: p$	*0.460*	*0.306*	*0.235*	*0.296*
Lump-Sum Payments	Est	1.621***	1.405***	1.139**	1.314***
(in Log. €2008)	(Sd)	(0.219)	(0.183)	(0.52)	(0.245)
	$GOF: p$	*0.859*	*0.865*	*0.748*	*0.739*
Labor Income	Est	0.089	0.079	0.043	0.053
(in Log. €2008)	(Sd)	(0.107)	(0.098)	(0.121)	(0.128)
	$GOF: p$	*0.252*	*0.351*	*0.322*	*0.220*
Sh. of Full-Time	Est	0.031	0.018	0.001	0.022
Self-Employed GPs	(Sd)	(0.022)	(0.019)	(0.024)	(0.027)
	$GOF: p$	*0.910*	*0.929*	*0.940*	*0.903*
Secondary Outcomes					
Sh. of Patients for whom GP	Est	0.069***	0.092***	0.080*	0.089***
is Gate Keeper	(Sd)	(0.020)	(0.022)	(0.042)	(0.022)
	$GOF: p$	*0.843*	*0.741*	*0.706*	*0.859*
Annual Prescription	Est	0.249***	0.234***	0.077	0.116^p
per Patient (in Log. €2008)	(Sd)	(0.040)	(0.069)	(0.192)	(0.075)
	$GOF: p$	*0.968*	*0.557*	*0.584*	*0.564*
Annual Drug Prescription	Est	0.403***	0.405***	0.304	0.209***
per Patient (in Log. €2008)	(Sd)	(0.03)	(0.077)	(0.32)	(0.075)
	$GOF: p$	*0.975*	*0.445*	*0.49*	*0.494*
Sh. of Female Patients	Est	-0.028***	-0.029***	-0.025*	-0.025**
	(Sd)	(0.008)	(0.009)	(0.015)	(0.011)
	$GOF: p$	*0.735*	*0.514*	*0.547*	*0.449*
Sh. of Patients aged	Est	0.053***	0.054***	0.043*	0.056**
15 or Younger	(Sd)	(0.018)	(0.020)	(0.024)	(0.025)
	$GOF: p$	*0.011*	*0.008*	*0.006*	*0.002*
Sh. of Patients aged	Est	-0.037	-0.033	-0.048**	-0.057**
65 or Older	(Sd)	(0.025)	(0.023)	(0.022)	(0.023)
	$GOF: p$	*0.016*	*0.028*	*0.038*	*0.029*
Sh. of CMUC Patients	Est	0.063***	0.063***	0.067**	0.068***
	(Sd)	(0.023)	(0.023)	(0.030)	(0.026)
	$GOF: p$	*0.001*	*0.002*	*0.002*	*0.002*
Sh. of Patients with	Est	-0.022*	-0.019^p	-0.029**	-0.035**
Long-term Disease	(Sd)	(0.013)	(0.013)	(0.013)	(0.014)
	$GOF: p$	*0.101*	*0.051*	*0.061*	*0.037*
Sh. of GPs practicing	Est	0.119	0.127	0.115	0.057
in rural areas	(Sd)	(0.128)	(0.135)	(0.164)	(0.138)
	$GOF: p$	*<0.001*	*<0.001*	*<0.001*	*0.001*
F- First Stage of excluded instrument		929	415	233	395.4
Nb Obs.		33701	32203	31971	30757

Note: this table reports regression discontinuity estimates with local linear spline specification, for (1) GPs of Table II, (2) GPs for whom we observed the month of practice beginning, (3) GPs for whom we observed the month of practice beginning excepted those who began in November 1989, (4) excepted those who began between December 1989 to March 1990. The bandwidth used is 5: restriction to GPs who began between 1985 and 1994. Regressions are clustered by the year of practice beginning. (Sd) stands for the standard deviation estimate, $GOF: p$ the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level. Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008.

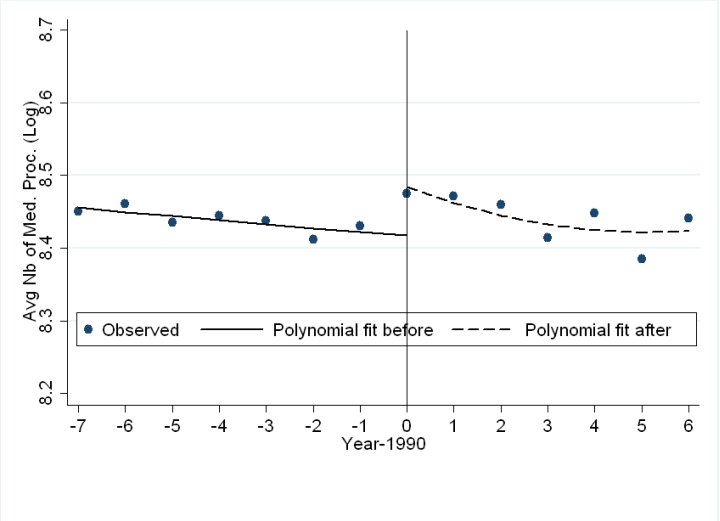
Table VIII: Falsification: RD estimates for a Pseudo-Reform in 1996.

		Local linear	Local Quadratic	Local Linear Spline
Annual Provision of Care (in Log)				
Care Provision Indicator	Est	6.814	-114.613	21.799
	(Sd)	(5.744)	(424.822)	(25.165)
	$GOF : p$	*0.080*	*0.047*	*0.036*
Nb. of Medical Procedures	Est	8.237	-104.185	21.619
	(Sd)	(5.988)	(383.898)	(25.89)
	$GOF : p$	*0.118*	*0.061*	*0.067*
Nb. of Technical Proc.	Est	3.285	53.449	-21.427
	(Sd)	(5.394)	(193.428)	(19.223)
	$GOF : p$	*0.062*	*0.028*	*0.119*
Nb. of Office Visits	Est	12.424	-173.079	39.267
	(Sd)	(9.421)	(614.859)	(42.871)
	$GOF : p$	*0.131*	*0.078*	*0.076*
Nb. of Home Visits	Est	28.333*	-151.511	50.498
	(Sd)	(15.441)	(598.674)	(56.798)
	$GOF : p$	*0.001*	*0.001*	*0.001*
Nb. of Patients	Est	4.459	-131.028	24.554
	(Sd)	(5.093)	(468.222)	(25.942)
	$GOF : p$	*0.128*	*0.568*	*0.36*
Nb. of Med. Proc. per Patient	Est	2.767**	21.714	-2.414
	(Sd)	(1.279)	(73.071)	(3.705)
	$GOF : p$	*<0.001*	*0.004*	*0.05*
Annual Fees and Income				
Average Price (in Log. €2008)	Est	-2.253**	-3.666	-1.571
	(Sd)	(0.948)	(14.386)	(2.357)
	$GOF : p$	*0.251*	*0.976*	*0.933*
Total Fees (in Log. €2008)	Est	5.984	-107.851	20.048
	(Sd)	(5.449)	(397.095)	(23.726)
	$GOF : p$	*0.108*	*0.069*	*0.047*
Lump-Sum Payments (in Log. €2008)	Est	18.651^{p}	-208.996	55.131
	(Sd)	(12.26)	(787.389)	(51.782)
	$GOF : p$	*0.044*	*0.015*	*0.017*
Labor Income (in Log. €2008)	Est	6.156^{p}	-83.439	16.659
	(Sd)	(4.258)	(309.1)	(19.547)
	$GOF : p$	*0.404*	*0.431*	*0.369*
Sh. of Full-Time Self-Employed	Est	0.508	24.134	-4.146
	(Sd)	(0.846)	(79.189)	(5.47)
	$GOF : p$	*0.112*	*0.139*	*0.393*
Secondary Outcomes				
Sh. of Patients for whom GP is Gate Keeper	Est	1.402^{p}	-0.105	2.456
	(Sd)	(0.86)	(2.56)	(9.376)
	$GOF : p$	*0.557*	*0.487*	*0.654*
Annual Prescription per Patient (in Log. €2008)	Est	10.986*	-94.465	27.124
	(Sd)	(6.416)	(345.086)	(24.825)
	$GOF : p$	*0.231*	*0.379*	*0.15*
Annual Drug Prescription per Patient (in Log. €2008)	Est	10.344	-118.674	29.379
	(Sd)	(8.053)	(437.806)	(30.146)
	$GOF : p$	*0.028*	*0.036*	*0.009*
Sh. of Female Patients	Est	-0.627^{p}	11.843	-2.74
	(Sd)	(0.428)	(42.103)	(2.273)
	$GOF : p$	*0.674*	*0.869*	*0.961*
Sh. of Patients aged 15 or Younger	Est	0.002	-7.061	1.79
	(Sd)	(0.257)	(24.194)	(1.53)
	$GOF : p$	*0.010*	*0.015*	*0.189*
Sh. of Patients aged 65 or Older	Est	1.036	-9.93	2.281
	(Sd)	(0.821)	(37.595)	(2.402)
	$GOF : p$	*<0.001*	*0.027*	*0.001*
Sh. of CMUC Patients	Est	0.166	-1.311	-0.077
	(Sd)	(0.34)	(8.671)	(1.304)
	$GOF : p$	*0.081*	*0.093*	*0.252*
Sh. of Patients with Long-term Disease	Est	0.565	-7.393	1.803
	(Sd)	(0.446)	(26.695)	(1.618)
	$GOF : p$	*0.002*	*0.189*	*0.059*
Sh. of GPs practicing in rural areas	Est	-1.617**	-18.601	2.42
	(Sd)	(0.72)	(42.401)	(2.998)
	$GOF : p$	*0.038*	*0.127*	*0.307*
F- First Stage of excluded instrument		4.705	.077	1.293
Nb Obs.		26207	26207	26207

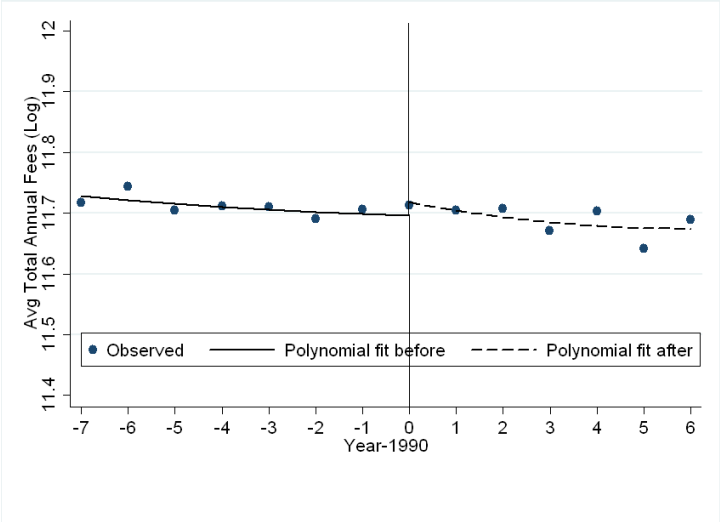
Note: this table reports falsification regression discontinuity estimates with local linear, local quadratic and local linear spline specifications. We imagine a pseudo-reform took place in 1996. The bandwidth used is 5: restriction to GPs who began to practice between 1991 to 2000. Regressions are clustered by the year of practice beginning. (Sd) stands for the standard deviation estimate, $GOF : p$ is the p-value of the goodness of fit test of Lee and Card (2008). *** indicate statistical significance at 1%, ** at 5%, * at 10%, and ^{p} at 15% level. Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008.



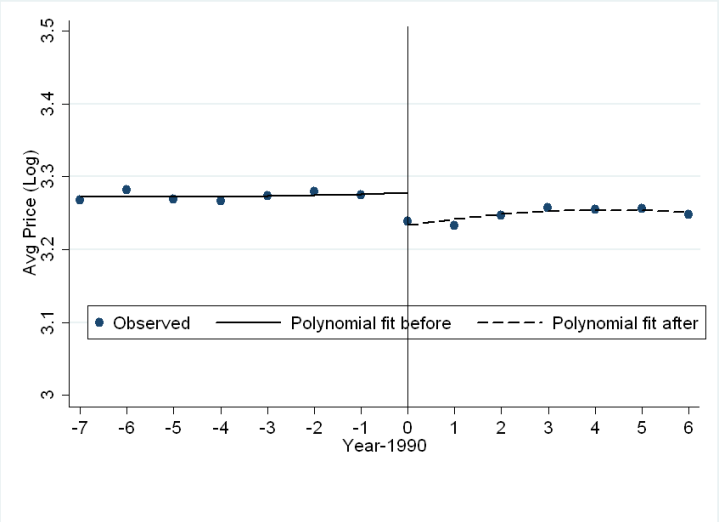
(a) Care Provision Indicator (Log)



(b) Nb of Medical Procedures (Log)



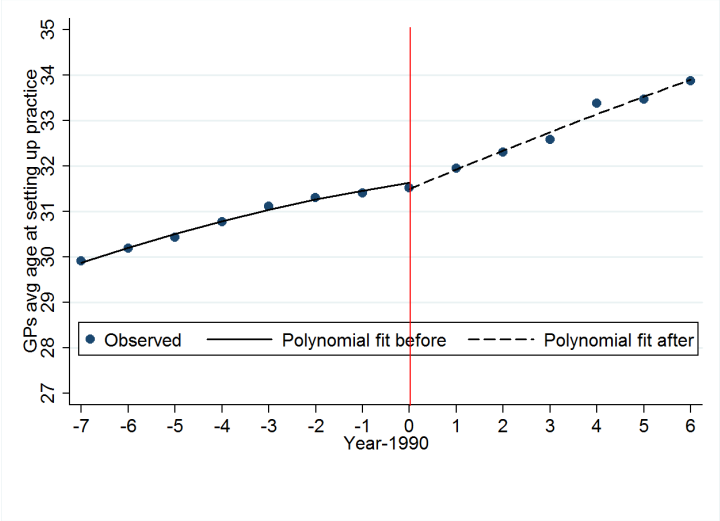
(c) Total fees (Log)



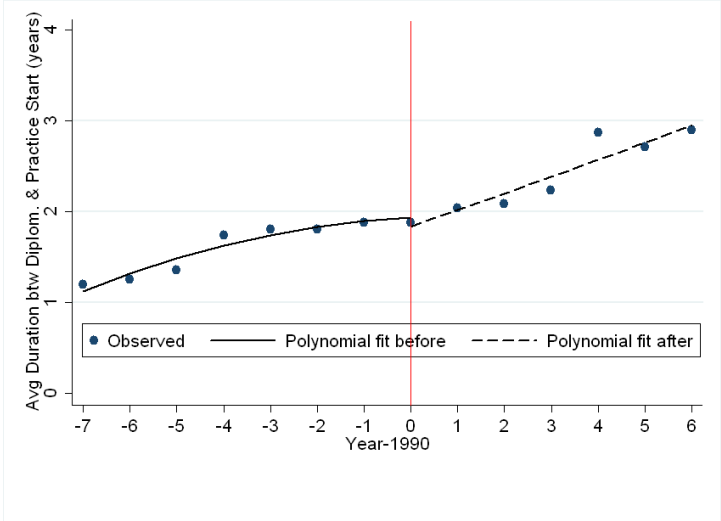
(d) Average price (Log)

Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008. Polynomial fits are obtained with quadratic specifications before and after date of the reform.

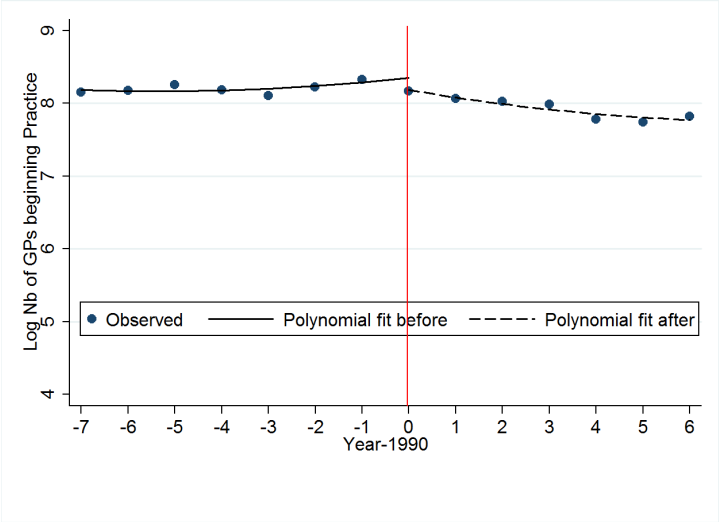
Figure 2: Main outcomes per year of practice beginning



(a) Age when beginning to practice



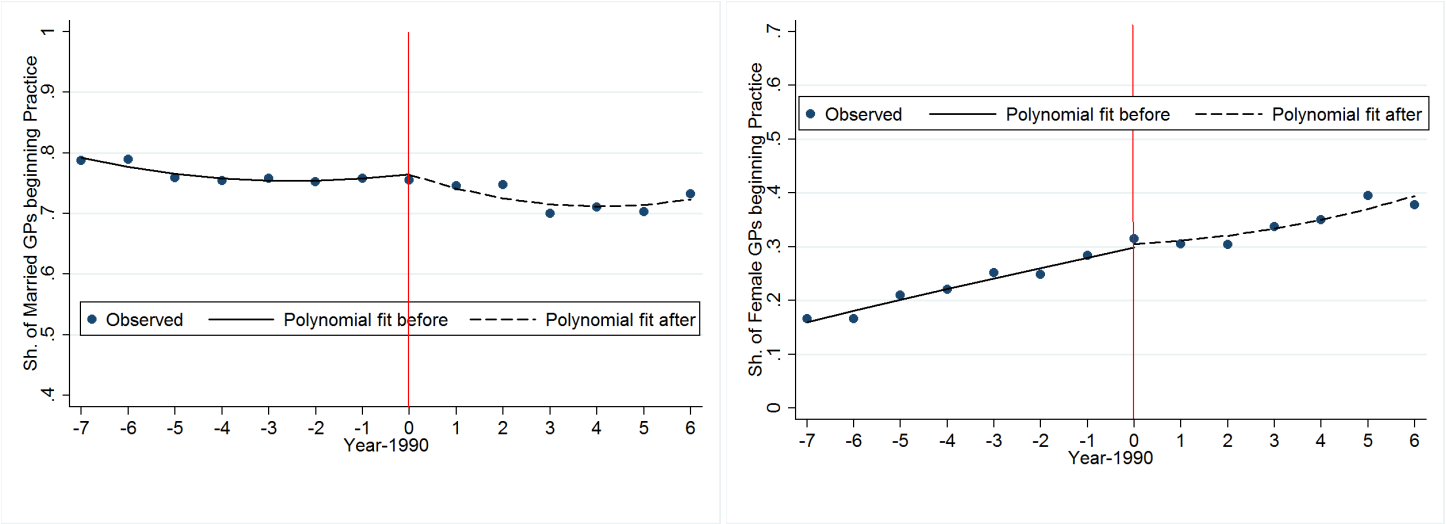
(b) Duration between graduation and practice start



(c) Number of GPs by year of practice beginning

Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008. Polynomial fits are obtained with quadratic specifications before and after date of the reform.

Figure 3: Continuity of GPs behaviors of practice beginning



(a) Married GPs (b) Female GPs

Source: INSEE-CNAMTS-DGFiP File. Self-employed GPs, who are not retired if older than 60, perceiving at least one € of fees in the observation year. Particular practice mode excluded. Pooled observations for 2005 and 2008. Polynomial fits are obtained with quadratic specifications before and after date of the reform.

Figure 4: Continuity of GPs characteristics