Length of activity of self-employed physicians

A work-leisure trade-off model for French general practitioners

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Abstract. *The article presents an adaptation of the labour supply model applied to the independent medical sector, the characteristics of which, in comparison to the supply of contractual labour, are: no flat-rate payment (fee for service), greater freedom in determining schedules (length of consultation), a stricter and more direct set of medical and professional constraints (the patients, with differentiated pathologies, are "customers" representing demand for the physician). A theoretical work attempts to define the sets of constraints (economic and medical) which independent doctors are subject to when choosing their activity. An empirical study follows, demonstrating – in accordance with the theory – a marked difference in behaviour according to the sector of practise (free or fixed fees). Together, these two elements allow a more accurate determination of: i) the factors related to the length of consultation, a variable linked to the quality of medical practice, and ii) the work/leisure trade-off rules for this profession, which, at given numerus clauses, determine the supply of medical services. One of the main objectives of the econometric study is to estimate the price-elasticity of the length of a consultation. According to our empirical results, doctors with free fees indeed "convert" a price increase into improved healthcare quality (estimated by the average length of a consultation). However, the value of this elasticity, estimated at 0.22, may be surprisingly weak.*

Key-words. *Work-leisure tradeoff. Working time. Consultation time. Fee-for-service. General practitioners. Exogeneity. Simultaneous equations. Selection bias.*

JEL codes. *C13. C31. I11. J22. J30*

Introduction

Planning the supply of ambulatory healthcare is a key component of the healthcare organisation in a country, both from the point of view of the well-being of the population and that of public finance or health insurance. The choice of independent ambulatory healthcare, adopted for its advantages in terms of freedom of choice and the quality of treatment, nevertheless comes at a cost: the control variables available to the public authorities are more limited or, in other words, the margin of freedom granted to decentralised personnel are *a priori* larger than in a bureaucratic model. Three crucial parameters currently escape the control of the "regulator": the location of the activity, the length of work and the length of the consultations which quality of healthcare is usually linked to. The location and the spatial dimensions do not fall into the scope of this paper

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(see for example Scott, 2001[1]). We should simply note that, in France, control is assured by means of more or less coercive actions introduced when young doctors "set up" practice. However, the two aspects of the duration of medical activity (total time and time per consultation) continue to escape direct public control. These two issues in particular are considered in the present paper which addresses the following three questions often asked in the context of urban medical regulation. What is the total work time chosen by the independent general practitioner (weekly time)? Within this timeframe, what are the number of consultations and the length of a consultation? What are the indirect control levers which the public authorities might use to influence these choices?

These questions are examined in a real framework, that of the French system.

Main characteristics of the French general practice system		
	Sector 1	**Sector 2**
Payment scheme	Fee-for-service	Fee-for-service
Prices of medical services	Regulated prices -"prix conventionnés": fixed by an agreement between the GPs and the health insurance administration ("Sécurité Sociale")	Free pricing (higher than in sector 1), Cost for the GPs: greater personal social insurance contribution
Coverage and dates	Represents about 80% of GPs	Created in 1980, access closed in 1990
Reimbursement for the patients	Generally: 100% of the reference price. 70% by the Social Security, 30% by the complementary insurance –"mutuelle", if the patient has one (90%)…	Generally the extra price has to be paid by the patient (but certain complementary insurances cover extra prices)

With regard to independent medical work, few studies have analysed total work time and the length of consultations simultaneously. The few available references concerning the determinants of the length of a consultation[2] highlight the medical factors: patients' characteristics, prevalence of serious illness, etc, and sometimes physicians' characteristics: gender, age, modalities of economic organisation[3]. Very few studies attempt to link the "length of consultation" to the "total work time", even to invalidate the relationship whereby total work time, which is an indicator of the availability of the doctor, might influence the time devoted to each individual patient. Labour economics have taken an occasional interest in the overall labour supply of doctors[4]. In this case, however, the length of consultation is often left aside, in our opinion for two reasons: *i)* the scarcity of data allowing researchers to cross the length of consultation, patients' characteristics and the physicians' socio-economic characteristics (income, prices, etc., all data necessary in defining work/leisure tradeoff); *ii)* a "habitual bias" of labour economics which rarely

[1] In other countries, such as Canada, financial incentives have already been introduced specifically aimed at encouraging doctors to set up practice in the regions of Quebec where there is a lack of doctors (Bolduc et al, 1996).

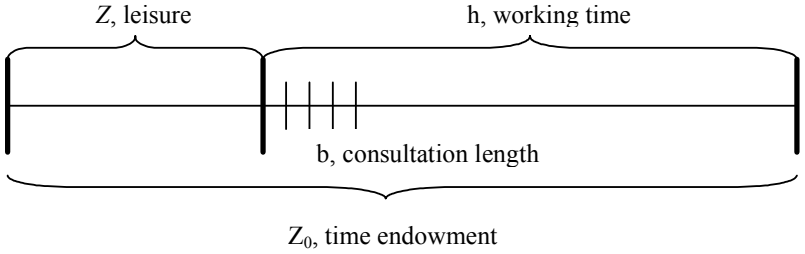
[2] When it is the subject of a statistical collection, which is relatively rare.

[3] Martin *et al.* (1997) and Carr-Hill *et al.* (1998), for example, obtain that female doctors dealing with patients of the same sex hold the longest consultations. Deveugele *et al.* (2002) claim that 1/3 of the variability in consultation durations results from the characteristics of the doctors and 2/3 from the characteristics of the patients with data where several series of consultations were timed in different western countries. Scott and Shiell (1997) obtain similar results for Australia.

[4] The references in the field are: Sloan (1975), Noether (1986) or Rizzo and Blumenthal (1994). The latter provide an estimation of the elasticity of the labour supply to wages of 0.23, with an adjusted price-elasticity of 0.44. In a study of the response of the medical labour supply to the tax system, Showalter and Thurston (1997) find that self-employed doctors are relatively more sensitive to the marginal rates of taxation (elasticity of 0.33) than wage-earning doctors. A study of Norwegian micro-data by Sæther (2003) confirms that the response of wage-earning hospital doctors is low.

considers labour supply outside a wage-based contract and which, as a result, rarely takes into account the specificities of independent activities (for lawyers, notaries, physicians,…) for which payment per hour can only be computed from fees-for-services with a certain scope for flexibility with regard to the time devoted to the services. The dual dimension of these choices is illustrated in Figure 1.

Figure 1. Work/leisure tradeoff and free distribution of consultations



In this paper, we use a standard work/leisure tradeoff model adapted to *independent medical activity*, the characteristics of which, in relation to the supply of contractual labour, are: no flat-rate payment (per consultation), greater freedom in determining schedules (length of consultation), a stricter and more direct set of medical and professional constraints concerning work activity and income (the patients are "customers"). Section 1 attempts to define the sets of constraints (economic and medical) to which independent doctors are subject when choosing their activity. This allows us to determine more accurately *the factors influencing the length of consultation* and *the rules of work/leisure tradeoff* for this profession. Section 2 presents the data obtained from a sample of 287 general practitioners (GPs) working independently in 2003 in the Provence-Alpes-Côte d'Azur region (South-Eastern France). Section 3 presents the results of an empirical study illustrating, in accordance with the theory, highly contrasting behaviours and balance between the length of consultation and work/leisure tradeoff between sector 1, limited by a designated price (i.e. fixed by an agreement between national health insurance and physicians' trade unions allowing patients to be reimbursed by their health insurance), and "pseudo-sector 2", where there is greater freedom concerning fees.

1. Supply of GPs' services

In this section we present a behavioural model for the supply of GPs' services according to the characteristics of their environment. The choice of the doctor is illustrated in the framework of the neo-classical theory of labour supply, taking into account the economic and medical constraints to which independent doctors are subject when choosing their activity. The doctor's aim is to obtain an income from his work which enables him to finance all or part of his consumption.

1.1. Objectives, constraints and choice of activity of an ambulatory general practitioner

In the context of the labour supply, the objective function traditionally adopted is a utility function $U(C,Z)$ integrating the consumption of a generic good, C, and leisure, Z. In this context, leisure is defined as the amount of time available once the medical activity is completed. The doctor has a fixed time endowment, Z_0, which he is free to distribute between leisure, Z, and the total time of his medical activity. Each consultation has a length, b, and the doctor undertakes a number of consultations, n. The price of the consumer good is fixed per unit, the price of each consultation is expressed by w.

Physicians are confronted with a number of constraints:

- a budgetary constraint with regard to the purchase of consumer goods: $C=wn$;
- a time constraint, distributing the time available between work and leisure: $Z=Z_0 - nb$;
- a constraint on the minimum quality of the healthcare provided with a minimum threshold for the length of consultation (noted $\overline{b}$): $b \geq \overline{b}$. This constraint may be justified by the respect of professional standards or institutional rules, by the demand of patients or even by social behavioural rules;
- a market constraint: the supply of independent healthcare services corresponds to patients' demand: $n \leq d(w,b)$.

The demand for GPs' services $d(w,b)$ is a function of the price of the services (price per consultation) and the quality of the consultation. In the model, patients perceive the length of consultation as a measure of quality. Each doctor acts in a context of monopolistic competition. He is therefore facing a demand with finite price-elasticity.

Formally, the physician's choice can be expressed as follows:

$$\max_{C,Z,w} U(C,Z) \quad sc \begin{cases} C = wn \\ Z = Z_0 - nb \\ b \geq \overline{b} \\ n \leq d(w,b) \end{cases} \tag{1}$$

The choice of medical activity also depends on the institutional characteristics of the independent medical sector. The characteristics of the healthcare system influence the possible choices of ambulatory medical activity. Our model enables us to describe two simple situations in which self-employed physicians may find themselves. In the first case, the price of a consultation is established centrally and is the result of negotiations between the unions and the sickness fund, for example. When the price of a consultation is set, only the length of the consultation and the number of consultations undertaken can be decided by the doctor. In the second case of "deregulated fees", the doctor can adjust his prices above the minimum regulation level. These two situations are studied successively in order to demonstrate the interaction between the institutional and economic constraints and self-employed GPs' preferences when choosing his activity.

1.2. Choice of activity and fixed price per consultation

For doctors practising or subject to a fixed price of consultation $\overline{w}$, the choice described by the programme is based on the length of consultation b and the number of consultations n. In this context, the first-order Kuhn and Tucker conditions of the programme (1) can be written as follows, maximising in relation to n and b:

$$\begin{cases} \overline{w}U_C - bU_Z + \lambda_2 = 0 \\ -nU_Z + \lambda_1 - \lambda_2 \partial d(\overline{w},b)/\partial b = 0 \\ \lambda_1 (b - \overline{b}) = 0 \\ \lambda_2 (n - d(\overline{w},b)) = 0 \end{cases} \tag{2}$$

with: $U_Z = \partial U(C,Z)/\partial Z$, $U_C = \partial U(C,Z)/\partial C$.

Several situations must be considered according to the saturation or non-saturation of the constraints[5] of minimum quality and market equilibrium.

The first situation occurs when physicians use consultation length to attract the demand necessary to maximise their satisfaction and thus balance their local market of medical consultations. In this case, the market constraint is saturated and the quality constraint is relaxed, the length of consultation offered is greater than the minimum fixed duration. This results in the system:

$$\begin{cases} U_Z / U_C = (\bar{w}/b)\left[\varepsilon_2 / (1+\varepsilon_2)\right] \\ n = d(\bar{w}, b) \end{cases} \tag{3}$$

which determines both the length and the number of consultations realised by the doctor. Here, ε_2 represents the length-elasticity of demand. The budgetary constraint and the time constraint provide the recursive definition of the level of consumption and the level of leisure achieved. This system of equations demonstrates that the choice of the consultation length is based both on physicians' preferences in terms of consumption and leisure and on the characteristics of the demand.

The marginal rate of substitution of consumption for leisure (U_Z / U_C) is equal to a "fee" $\bar{w}$ corrected by a factor $(1/b)\left[\varepsilon_2 / (1+\varepsilon_2)\right]$. This correction, introduced by the model in relation to the traditional choice of labour supply, can be explained by the specificities of the ambulatory medical activity. Indeed, in the context of the medical activity, the doctor controls in part the length of consultation and the pertinent remuneration is not therefore that of the actual consultation, rather it is the price per consultation time unit $\bar{w}/b$. Extending the length of consultation corresponds to a reduction in the rate of fees (defined by its temporal dimension). The rate of fees should also include the demand effect of the length of consultation via its length-elasticity $\left[\varepsilon_2 / (1+\varepsilon_2)\right]$. This medical activity can also be distinguished from the traditional labour supply by the fact that the possibilities for choice and adjustment are greater than for an "ordinary" employee as a result of the ability to fine-tune work time in accordance with the length and number of consultations accepted.

The second possible situation constitutes a corner-solution of the optimisation programme (1) in the presence of fixed pricing. In this case, the optimum choice for physicians consists in choosing the minimum length of consultation $\bar{b}$; the number of consultations is thus wholly determined by demand:

$$n = d(\bar{w}, \bar{b}) \tag{4}$$

Demand guides doctors' choices. This type of situation occurs when the doctor has a highly-developed taste for leisure and reducing the length of consultation to the bare minimum does not allow him to achieve his preferred situation in terms of tradeoff between consumption and leisure. Furthermore, if the doctor experiences a saturation of his consumption, the number of consultations offered to the patient may fall below the demand, thus creating a phenomenon of medical shortage. This phenomenon might also be observed if the doctor was to devote all his available time to his medical activity $(Z = 0)$.

[5] The list of inequality constraints is not exhaustive: a certain number were ignored as non-pertinent for the analysis undertaken in this paper. This is true for the constraint $Z \leq Z_0$, widely used in the context of studies concerning participation on the labour market. In this paper, all doctors questioned earned at least a part of their professional income from their independent activity and did not choose total inactivity as being an optimum solution. The existence of large fixed costs linked to the independent activity of the doctor (length of studies, fixed installation costs) is *a priori* sufficient to guarantee the existence of an internal solution to labour supply.

1.3. Choice of activity and "deregulated fees"

The possibility to adjust prices offers the doctor an additional opportunity to modify the demand presented to him (in addition to the variable *b*). This situation occurs when the doctor is not subject to a medical agreement or, more generally, if the agreement allows him to overrun fees or to invoice additional technical acts over and above the price of the consultation. In this case, the first-order Kuhn and Tucker conditions of programme (1) can be expressed as follows, maximising in relation to *n*, *b* and *w*:

$$\begin{cases} wU_C - bU_Z + \lambda_2 = 0 \\ -nU_Z + \lambda_1 - \lambda_2 \partial d(w,b)/\partial b = 0 \\ nU_C - \lambda_2 \partial d(w,b)/\partial w = 0 \\ \lambda_1 \left(b - \overline{b}\right) = 0 \\ \lambda_2 \left(n - d(w,b)\right) = 0 \end{cases} \quad (5)$$

When doctors can choose the consultation price, the market is automatically balanced (demand = supply for all $\lambda_2 \neq 0$)[6]. However, two cases can be identified according to whether or not the solution implies supply-side equilibrium with constraints saturation.

In the first case, the length of consultation adopted by the doctor is higher than the minimum level. The duration constraint is not saturated. The choice of the quantity, length and price of the consultations obeys:

$$\begin{cases} U_Z/U_C = (w/b)\left[\varepsilon_2/(1+\varepsilon_2)\right] \\ U_Z/U_C = (w/b)\left[(1+\varepsilon_1)/\varepsilon_1\right] \\ n = d(w,b) \end{cases} \quad (6)$$

where ε_1 represents the price-elasticity of demand.

This can also be expressed by:

$$\begin{cases} U_Z/U_C = (w/b)\left[\varepsilon_2/(1+\varepsilon_2)\right] \\ 1+\varepsilon_1+\varepsilon_2 = 0 \\ n = d(w,b) \end{cases} \quad (7)$$

The physician thus chooses the length and the price of consultation according to the characteristics of the patients such as to balance "price effects" and "quality" of the demand $(1+\varepsilon_1+\varepsilon_2=0)$. In this situation of "deregulated fees", the doctor has a new variable for "adjusting his market" (by managing his active patients list) and acts according to the best interests of his consumption/leisure tradeoff (first equation in programme (7)). In other words, this new system of constraints means that the length of consultation is not the only variable for adjusting total demand for the doctor: *w* is added to *b*; it is through this aspect of "the price of quality" that a gain is expected in social well-being by means of introducing a deregulated fees sector.

The second case occurs when the length of consultation adopted by the doctor is a minimum length of consultation determined exogenously. In this situation, the choice is described by the following system:

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[6] The particular case of zero leisure $(Z=0)$ is an exception; this very specific case is not envisaged here. In the empirical section, the case is excluded as the total work time necessarily requires provision for rest time.

$$\begin{cases} 1+\varepsilon_1+\varepsilon_2<0 \\ b=\overline{b} \\ U_Z/U_C=(w/b)\left[(1+\varepsilon_1)/\varepsilon_1\right] \\ n=d\left(w,\overline{b}\right) \end{cases} \quad (8)$$

The length of consultation is thus locally independent of preferences. The doctor increases the price of medical consultations in order to limit the total time devoted to his professional activity and thus to reduce the demand directed at him.

One final interesting case occurs when the physician decides to modulate only the length of consultation and to adopt the regulation price level $\overline{w}$ for his consultations. His decision is then described by system (3) in the previous sub-section. In this situation, while free to choose the pricing applied to the services he realises, the doctor deliberately chooses to position himself in sector 1, as a result of his preferences and economic constraints, without this being linked to any institutional constraint (without, for example, any agreement imposing this behaviour).

2. The data

The sample of doctors considered in this paper is taken from a regional survey conducted since March 2002 and dealing with the practices of 600 general practitioners in South-Eastern France ("Provence-Alpes-Côte d'Azur", or PACA, region) resulting from a joint initiative of the Regional Union of Self-employed Doctors (URML) and the Regional Centre for Disease Control (ORS). These 600 doctors are representative of the population of the 5,435 GPs, whose income results, at least in part, from independent medical practice in the PACA region (see Ventelou *et al.*, 2005 for a detailed description). Initially, 1,076 doctors were contacted with a view to creating a sample of 600 doctors (response rate: 55.8%). The sample was obtained by a random stratified sampling, strata being defined by gender, age (less than 43, 43 to 52, 53 and over in 2002) and size of the urban practice of the doctor (sampling rate 1/9.06). Physicians who were planning to stop practicing or to move out of the region, as well as those with *exclusive* pratice patterns such as homeopathy, acupuncture, etc., were excluded. Among the 600 physicians in the panel, 287 (47.8%) answered all the questions about activity and income. The sample of respondents is no longer perfectly representative of the regional population, as women and doctors practising in urban areas with more than 200,000 inhabitants are under-represented. However, a correction for this non-response was introduced during the analyses (see later, section 3). The three variables of interest used in the paper were calculated as follows.

The variable "leisure time" (in hours per week) is defined as the time remaining after deduction of the time each doctor reported to have worked. More precisely, leisure time is calculated as 7 times 24 hours minus the declared number of hours worked for a typical week (week without public holidays, other holidays, etc.). In this calculation, we nevertheless added the weekly leisure time corresponding to declared weeks of holidays.

The variable "length of consultation" (in minutes) was calculated by dividing the time devoted to patients (total time worked as an independent minus the time devoted to administrative tasks, medical training and medical representatives) by the number of consultations. The calculation takes into account a constant additional transport time (10 minutes) for all house calls.

The variable "price of consultation" corresponds to an average monetary value of a standard consultation in surgery (basic consultation). It was calculated by dividing the fees declared by the doctor (income from medical activity, including social contributions) by the number of consultations, plus 1.5 times the number of visits. The surcharge of 50% of the

basic consultation price corresponds to an average evaluation of the transport payment for house calls.

The calculation of the three variables above is based on the survey data. These data have one disadvantage in that they have been reported by physicians, but also an advantage in that they provide information not available elsewhere, for example concerning income or *total* work time, including "basically non medical tasks" such as administrative work, waiting and reception times of patients, reading and research time, self-training, etc.

Other information which could lead to an increase in the price and/or consultation length was not available in the database: for example the type of consultation (week-end, public holiday, night, emergency, on-call,), the content of the consultation (type of pathology, technical or surgical intervention undertaken during the consultation) and the reason for the consultation (first consultation, at the request of the patient, or follow-up consultation, when monitoring a previously identified pathology). Consultations undertaken outside the scope of reimbursed healthcare (telephone or free consultations) are not considered.

The variable "price of consultation" was used to distinguish two groups of physicians: the first includes all GPs in sector 1 with an average price of consultation not exceeding 18.5 euros[7] ("controlled price" or pseudo-sector 1), while the second includes GPs in sector 2 as well as the doctors in sector 1 with an average price of consultation higher than 18.5 euros ("deregulated price" or pseudo-sector 2). We chose this division rather than the administrative division sector 1 / sector 2 in order to take into account the fact that certain doctors who belong to the first sector *de facto* leave their official sector of activity, either in that they frequently practise fee overrunning (not covered by agreement), or that a large proportion of their income is derived from consultations with an increased price (for example night visits, occasional non-conventional medical services such as homeopathy or acupuncture or technical interventions).

The average age of respondent physicians is 50.6 for men and 48.8 for women. More than half of these doctors (51.9 %) realise, non-exclusively at least one non-conventional medical service; 41.5% are the owners of the location of the practice; 56.1% practice in a group surgery. More often than not, these doctors practise in the covenanted sector (83.3%). The distribution of the 287 doctors between the two pseudo-sectors is, on the other hand, balanced, half of them practising in pseudo-sector 1 (142 doctors (49.8%), of which 52.7% are women), with significant differences according to age (61.3% of the under 42s compared to 44.3% of the over 52s).

The weekly working time declared (including time on call) by the respondents is on average 57.5 hours. Male doctors work considerably more than female doctors throughout their professional life; 53.4% of men claim to work more than 58 hours per week compared to only 38.2% of women.

[7] The threshold of 18.5 euros corresponds to the price of a consultation in the covenanted sector for the first 5 months of the year data were collected (2002). We undertook a sensitivity analysis by setting several values for the division threshold in two pseudo-sectors; conclusions of the econometric study remain unchanged.

The weekly working time does not differ significantly in light of the division that we defined; it is an average of 56.8 hours for pseudo-sector 1 compared to 58.2 hours for pseudo-sector 2. The average consultation length for respondent doctors (according to our calculations, i.e. including the periods of inactivity between patients, etc.) is 32.4 minutes, with significant differences according to gender (39.4 minutes for women compared to 30.7 minutes for men) and pseudo-sector (27.6 minutes for pseudo-sector 1 compared to 37.2 minutes for pseudo-sector 2). The average price of consultation for all 287 doctors is 19.6 euros, with a considerably higher figure for pseudo-sector 2 (26.0 euros compared to 13.1 euros in the other pseudo-sector – figures in 2002).

3. Results

The econometric model was estimated in a structural form by a linear system of simultaneous equations[8]. The first-order conditions of the theoretical analysis indeed demonstrate a *concomitant* determination of hours worked (or leisure time) and GPs' consultation length, according to their environment, i.e. the characteristics of the patients and the set of economic constraints linked to the sector of activity, and according to GPs' personal characteristics (psychological parameters concerning their taste for leisure or family constraints influencing global availability in terms of work time). More precisely, the endogeneity of the two variables of interest (length of consultation and leisure time) was tested separately for each sector of activity. All the continuous variables were converted into logarithms, this conversion enabling us to interpret the estimated coefficients as elasticities while at the same time reducing the heteroskedasticity of the model.

The objectives of the econometric study are two-fold: first, to check that the doctors' choices are indeed affected by the "market characteristics" of the sector of activity in which they operate – in particular to ascertain that GPs benefiting from deregulated fees (pseudo-sector 2) adopt a different behaviour from the other GPs (pseudo-sector 1); second, to identify the direction of certain effects which remained ambiguous in the theoretical model, in particular the "price-sensitivity" of leisure time and length of consultations, which can be both positive and negative depending on the whether income effects or substitution effects are dominant – as is the case for any microeconomics of the labour supply. With regard to the independent medical supply proper, arbitration is nevertheless more complex since in light of price variations for medical consultations, and in addition to their global labour supply, doctors may also adjust the consultation itself (increasing the number of shorter consultations), to a certain degree affecting the reaction of the patients. In sector 2, an additional level of ambiguity is observed since GPs also set the price (as well as the consultation length).

The results are presented in Tables 1 and 2 for pseudo-sector 1 and in Tables 3 and 4 for pseudo-sector 2. In each table, the model adopted according to the endogeneity and heteroskedasticity tests (White, 1980, Lee *et al.*, 1980, Davidson et MacKinnon, 1993, Pesaran et Taylor, 1999) is underlined in bold. Given the significant differences between the sample of respondents and the total sample, we tested the influence of a possible non-response bias on the models using the Heckman two-stage estimator (Heckman, 1979, Greene, 1981), as well as the Heckman-Lee estimator (Greene, 2002)[9]. No selection bias was found. In other words, the coefficient linked to the inverse Mills ratio was never revealed as statistically significant in any of the equations estimated, as the p-values for all

[8] In general, to estimate the reduced form of the model, we would have had to resolve the theoretical model analytically (for example, whatever the form of the utility function).

[9] To test for the existence of a selection bias, we estimated the models for all 287 respondent GPs, including the interaction effects between the co-variables and the pseudo-sector, thus enabling us to compare these 287 "respondents" to the initial sample of 600 representative doctors.

tests were greater than 0.8[10]. All analyses were carried out using Stata 8.2 (StataCorp, 2003). We chose only to comment on the effects concerning the variables of the theoretical model: consultation length and leisure time, in relation to the prices practised in both sectors. The other econometric effects conform to economic intuition. Henceforth, for ease of expression, the term "sector" (1 or 2) will replace "pseudo-sector" (1 and 2), although it is understood that we retain the principle of this division (cf. section 2).

3.1. Price-elasticity of the length of consultation: the higher the fees for consultation, the longer the consultations.

In sector 1, price-elasticity is significantly different from 0 but has a lower coefficient than in sector 2. The coefficient of 0.22 obtained in sector 2 can be perfectly interpreted in terms of classic price-elasticity. For a 10% increase in the price applied, the average length of consultation increases by 2.2%, and doubling the price applied would seem to lead to an average increase in length of consultation of 22%, i.e. 4 to 5 minutes longer on average. It is clear that this result, obtained in sector 2, validates a behaviour whereby doctors are free to set their own price and the patients are free to accept the consultation, its length and the fees – always assuming that an alternative exists in the geographical zone of the patient which, given the medical density in South-Eastern France, is certainly realistic. In other words, in the present case, econometrics measures an "agreement" between the GP and the patient on the principle of *balancing* the length of the consultation and the apparent price. The consultation is longer and/but is also more expensive. Finally, let us note that a third (hidden) equation has been tested for sector 2; the possible endogeneity of tariff to the two other dependant variables, leisure time and consultation length. The exogeneity test could not be rejected for the tariff in sector 2 –P value>0.70. Then, there are no retroactions between the first two variables of interest (length and leisure) and the price. The latter is regulated "beforehand", irrespective of the choice of activity proper (see Table 5).

In sector 1, the sensitivity of the length of consultation to the price is more difficult to interpret insofar as the variability of the price is, by definition, restricted. The statistical variability obtained here may result from: *i)* measurement problems (the price is constructed indirectly according to the declared income data and the number of consultations); *ii)* the practice of overrunning fees (no covenant) or *iii)* associated medical interventions giving rise to specific payments outside a simple consultation. That the coefficient is lower tends to validate the theoretical framework used in the paper. Obviously for sector 1, it would obviously be better to have longitudinal data enabling to evaluate the effect of a variation *over time* of the official price on the consultation length.

3.2. Deregulated fees and doctor's behaviour: increased flexibility of behaviour in sector 2

The econometric study illustrates the endogeneity of leisure time in relation to the length of consultation for GPs in sector 1, which is not the case in sector 2. On the other hand, in both cases we could not reject the null of no-endogeneity of the consultation length in relation to the global labour supply (or its complementary, leisure). GPs seem to establish consultation length *first* according to external constraints, independent of their choice of leisure time (and more as a function of the patients' characteristics); this consultation length then determines the leisure time in sector 1, while this is not the case in sector 2, as GPs in the latter sector also retain a certain degree of personal freedom in their choice.

This result appears highly "intuitive" in light of the theoretical results obtained in section 1: GPs in sector 2 have the opportunity to "compensate" for the deleterious effects of a relatively high average consultation length on their leisure time by means of the prices applied. For an aged or seriously ill clientele causing them to reduce the rate of

[10] These results are not presented in the appendix as the estimations are similar and the conclusions unchanged.

consultations, they can, for example, maintain a satisfactory income by increasing the price per consultation. In sector 1, this strategy is not possible and the GP "suffers" more from the constraints resulting from the characteristics of his patients. If he wishes to maintain a high income, his "leisure time" is the only variable of adjustment: the higher the average consultation length, the less leisure can be chosen.

Conclusion

Conclusions of this paper can be drawn in several directions. If we concentrate solely on the "price – length of consultation" relationship, and considering the situation as in as favourable terms as possible, we should be pleased to have succeeded in confirming a *positive* sensitivity of the consultation length to the price: it would indeed appear that physicians translate a price increase by improved quality of treatment (estimated by the average consultation length…). This result confirms the theoretical analysis developed in section 1. In the context of a *political justification* of the deregulated fees sector, this result would tend, at least potentially, to legitimise sector 2 as it enables doctors to "separate" the need for treatment linked to their patients from their own considerations and economic constraints. If we equate each elementary consultation to an *ad hoc* price, the price/minute of the medical intervention can be held constant whatever the length of the consultation; and the economic neutrality of "patients in good health – seriously ill patients" is perfectly achieved.

Inversely, if we take a more severe standpoint, we are struck by the result considered *a contrario*: in the event of a *reduction* in the price of consultations, doctors tend to *increase* the number of *short* consultations in order to compensate for the fall in income "by quantity" – this effect is very often voiced in the public debate on the opportunity of increasing the real price of medical consultation. We may, furthermore, be *disappointed* by the elasticity value. The positive elasticity of 0.22 demonstrates, de facto, that the price/quality (length) conversion is far from being implemented in a 1-to-1 ratio. The result of the "price negotiation" which exists in sector 2 between the doctor and the patient is not, then, to the benefit of the patient. It is true that, in France, patients are only very slightly sensitive to the price of consultations, thus limiting the incentive to negotiate. Moreover, results strengthen the doubt that a single economic decision (increasing physicians' fee-for-service) may improve both professional earnings and services quality (as long as consultation time may be viewed as a proxy of it).

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Table 1. Consultation length (log) – Pseudo-sector 1

	OLS	OLS & robust	**2SLS**	2SLS & robust
Leisure time (log)	-1.123	-1.123	**0.487**	0.487
	(0.001)**	(0.003)**	**(0.597)**	(0.567)
Female	0.380	0.380	**0.311**	0.311
	(0.000)**	(0.000)**	**(0.001)****	(0.001)**
With children	-0.194	-0.194	**-0.179**	-0.179
	(0.001)**	(0.002)**	**(0.007)****	(0.009)**
Price of consultation (log)	0.145	0.145	**0.152**	0.152
	(0.002)**	(0.007)**	**(0.003)****	(0.006)**
Day release medical training (hours/year)	-0.001	-0.001	**-0.001**	-0.001
	(0.013)*	(0.003)**	**(0.055)+**	(0.028)*
% of patients between 0-16 years old (log)	-0.142	-0.142	**-0.004**	-0.004
	(0.271)	(0.201)	**(0.978)**	(0.973)
% of patients between 60-69 years old (log)	-0.283	-0.283	**-0.228**	-0.228
	(0.024)*	(0.123)	**(0.098)+**	(0.177)
% of patients 70 years old and above (log)	0.437	0.437	**0.548**	0.548
	(0.001)**	(0.001)**	**(0.000)****	(0.000)**
% of patients exempted from payment (log)	-0.630	-0.630	**-0.731**	-0.731
	(0.003)**	(0.003)**	**(0.002)****	(0.001)**
% of patients with free health care because of low income (log)	0.203	0.203	**0.202**	0.202
	(0.045)*	(0.074)+	**(0.064)+**	(0.071)+
Constant	9.865	9.865	**1.697**	1.697
	(0.000)**	(0.000)**	**(0.720)**	(0.700)
Number of observations	143	143	**143**	143
R^2 #	0.404	0.404	**0.358**	0.358
R^2 adjusted #	0.359	0.359	**0.309**	0.309
AIC	108.572	108.572	**119.281**	119.281
BIC	141.163	141.163	**151.872**	151.872
White's heteroskedasticity test (P-value)	0.162			
Hansen's over identification J-test (P-value)				0.908
Endogeneity C-test (P-value)				0.012
Sargan's over identification test (P-value)			**0.874**	
Durbin/Wu/Hausman endogeneity test (P-value)			**0.032**	
White/Koenker heteroskedasticity test (P-value)			**0.613**	
Pagan/Hall heteroskedasticity test (P-value)			**0.731**	

P-values in brackets + significant at 10%; * significant at 5%;
** significant at 1%
# Pesaran-Smith R^2 generalised for the 2SLS

Table 2. Leisure time (log) – Pseudo-sector 1

	OLS	**OLS & robust**	2SLS	2SLS & robust
Consultation length (log)	-0.070	**-0.070**	-0.064	-0.064
	(0.000)**	**(0.000)****	(0.077)+	(0.048)*
Female	0.043	**0.043**	0.040	0.040
	(0.015)*	**(0.012)***	(0.047)*	(0.032)*
Wishes to reduce working time	-0.046	**-0.046**	-0.046	-0.046
	(0.003)**	**(0.001)****	(0.003)**	(0.002)**
Owner of surgery	-0.026	**-0.026**	-0.026	-0.026
	(0.053)+	**(0.050)***	(0.057)+	(0.058)+
Works in institutions or retirement homes	-0.032	**-0.032**	-0.031	-0.031
	(0.035)*	**(0.031)***	(0.044)*	(0.033)*
Participates in humanitarian missions	-0.031	**-0.031**	-0.032	-0.032
	(0.220)	**(0.101)**	(0.214)	(0.095)+
Took over clientele	-0.023	**-0.023**	-0.024	-0.024
	(0.077)+	**(0.051)+**	(0.076)+	(0.052)+
% of patients between 0-16 years old (log)	-0.051	**-0.051**	-0.051	-0.051
	(0.072)+	**(0.094)+**	(0.074)+	(0.095)+
% of patients between 60-69 years old (log)	-0.048	**-0.048**	-0.047	-0.047
	(0.087)+	**(0.182)**	(0.103)	(0.191)
% of patients 70 years old and above (log)	0.000	**0.000**	-0.002	-0.002
	(0.998)	**(0.998)**	(0.930)	(0.931)
Time on call (log hours/week)	-0.013	**-0.013**	-0.013	-0.013
	(0.012)*	**(0.039)***	(0.012)*	(0.048)*
Constant	5.321	**5.321**	5.302	5.302
	(0.000)**	**(0.000)****	(0.000)**	(0.000)**
Number of observations	143	**143**	143	143
R^2 #	0.387	**0.387**	0.317	0.317
R^2 adjusted #	0.335	**0.335**	0.260	0.260
AIC	-322.607	**-322.607**	-307.199	-307.199
BIC	-287.052	**-287.052**	-271.645	-271.645
White's heteroskedasticity test (P-value)	0.003			
Hansen's over identification J-test (P-value)				0.630
Endogeneity C-test (P-value)				0.584
Sargan's over identification test (P-value)			0.779	
Durbin/Wu/Hausman endogeneity test (P-value)			0.827	
White/Koenker heteroskedasticity test (P-value)			0.117	
Pagan/Hall heteroskedasticity test (P-value)			0.137	

P-values in brackets + significant at 10%; * significant at 5%;
** significant at 1%
# Pesaran-Smith R^2 generalised for the 2SLS

Table 3. Consultation length (log) – Pseudo-sector 2

	OLS	**OLS & robust**
Leisure time (log)	-0.541	**-0.541**
	(0.136)	**(0.198)**
Female	0.232	**0.232**
	(0.009)**	**(0.032)***
Price of consultation (log)	0.227	**0.227**
	(0.001)**	**(0.012)***
With secretary or switchboard	-0.174	**-0.174**
	(0.011)*	**(0.007)****
Participates in therapeutic tests in town	-0.134	**-0.134**
	(0.052)+	**(0.033)***
% of non-conventional medical services in medical activity (log)	0.069	**0.069**
	(0.002)**	**(0.004)****
Time on call (log hours/week)	0.079	**0.079**
	(0.006)**	**(0.005)****
% of patients between 0-16 years old (log)	-0.311	**-0.311**
	(0.002)**	**(0.001)****
% of patients between 60-69 years old (log)	-0.164	**-0.164**
	(0.289)	**(0.288)**
% of patients 70 years old and above (log)	0.099	**0.099**
	(0.375)	**(0.400)**
% of patients exempt from payment (log)	-0.257	**-0.257**
	(0.008)**	**(0.032)***
Constant	7.067	**7.067**
	(0.000)**	**(0.001)****
Number of observations	144	**144**
R^2 #	0.459	**0.459**
R^2 adjusted #	0.414	**0.414**
AIC	137.313	**137.313**
BIC	172.951	**172.951**
White's heteroskedasticity test (P-value)	0.006	

P-values in brackets + significant at 10%; * significant at 5%; ** significant at 1%
Pesaran-Smith R^2 generalised for the 2SLS

Table 4. Leisure time (log) – Pseudo-sector 2

	OLS	**OLS & robust**	2SLS	2SLS & robust
Consultation length (log)	-0.033	**-0.033**	-0.031	-0.031
	(0.037)*	**(0.086)+**	(0.227)	(0.232)
Female	0.057	**0.057**	0.057	0.057
	(0.003)**	**(0.002)****	(0.004)**	(0.002)**
Age	0.038	**0.038**	0.038	0.038
	(0.044)*	**(0.039)***	(0.045)*	(0.042)*
Age squared	-0.000	**-0.000**	-0.000	-0.000
	(0.033)*	**(0.029)***	(0.033)*	(0.031)*
Time on call (log hours/week)	-0.031	**-0.031**	-0.031	-0.031
	(0.000)**	**(0.000)****	(0.000)**	(0.000)**
Wishes to reduce working time	-0.080	**-0.080**	-0.080	-0.080
	(0.000)**	**(0.000)****	(0.000)**	(0.000)**
Took over clientele	-0.033	**-0.033**	-0.032	-0.032
	(0.030)*	**(0.035)***	(0.032)*	(0.031)*
Constant	4.072	**4.072**	4.068	4.068
	(0.000)**	**(0.000)****	(0.000)**	(0.000)**
Number of observations	144	**144**	144	144
R^2 #	0.387	**0.387**	0.374	0.374
R^2 adjusted #	0.356	**0.356**	0.341	0.341
AIC	-293.291	**-293.291**	-290.162	-290.162
BIC	-269.532	**-269.532**	-266.403	-266.403
White's heteroskedasticity test (P-value)	0.049			
Hansen's over identification J-test (P-value)				0.098
Endogeneity C-test (P-value)				0.752
Sargan's over identification test (P-value)			0.112	
Durbin/Wu/Hausman endogeneity test (P-value)			0.935	
White/Koenker heteroskedasticity test (P-value)			0.102	
Pagan/Hall heteroskedasticity test (P-value)			0.120	

P-values in brackets + significant at 10%; * significant at 5%;
** significant at 1%
# Pesaran-Smith R^2 generalised for the 2SLS

Table 5. Price of consultation (log) – Pseudo-sector 2

	OLS	**OLS & robust**
With children	0.189	**0.189**
	(0.016)*	**(0.021)***
Living in a couple relationship	-0.686	**-0.686**
	(0.000)**	**(0.001)****
Secretary or answering service	-0.191	**-0.191**
	(0.032)*	**(0.025)***
Subscription to medical journals	-0.127	**-0.127**
	(0.116)	**(0.073)+**
Group practice	0.266	**0.266**
	(0.003)**	**(0.005)****
% of specific services (MEP) in medical activity (log)	0.060	**0.060**
	(0.024)*	**(0.010)***
Mortality rate (log)	-0.274	**-0.274**
	(0.070)+	**(0.048)***
% of patients 0-16 years (log)	-0.213	**-0.213**
	(0.073)+	**(0.131)**
% of patients 60-69 years (log)	0.058	**0.058**
	(0.784)	**(0.741)**
% patients 70 years and over (log)	-0.039	**-0.039**
	(0.781)	**(0.799)**
% of patients exempted from payment (log)	0.271	**0.271**
	(0.028)*	**(0.104)**
Drug prescription per contact (log)	-0.251	**-0.251**
	(0.009)**	**(0.021)***
Specialist density (log)	-0.040	**-0.040**
	(0.055)+	**(0.053)+**
Works in institutions or retirement homes	0.135	**0.135**
	(0.104)	**(0.048)***
Constant	5.056	**5.056**
	(0.000)**	**(0.000)****
Number of observations	144	**144**
R^2 #	0.314	**0.314**
R^2 adjusted #	0.240	**0.240**
AIC	188.487	**188.487**
BIC	233.034	**233.034**
White's heteroskedasticity test (P-value)	0.000	

P-values in brackets + significant at 10%; * significant at 5%; ** significant at 1%