

Eliciting Consumption-Leisure trade-off via “contingent valuation”: the case of self-employed GPs

“Doing Contingent Valuation as you never did it”

Chanel O⁽¹⁾, Paraponaris A^(2,3,4), Protière C^(3,4), Rolland S⁽³⁾, Ventelou B^(1,3,4)

(1) CNRS GREQAM

(2) Department of Economics, University of the Mediterranean

(3) PACA Regional Center for Disease Control

(4) INSERM Unit 912

Abstract

This paper is devoted to the analysis of labour supply, and specifically focuses on physicians’ labour supply responses to higher compensations. One of the objectives is to challenge the reality of a “backward bending” form for the labour supply of General Practitioners (GP). In order to overcome the lack of data (no real variability in prices), we decided to study declarative data collected in a process similar to a Contingent Valuation survey, in which hypothetical offers (variations in prices) are submitted to surveyed GPs. Results are that the negative slope of the labor supply seems highly likely.

Résumé

L’enjeu de cette étude est de mieux comprendre les déterminants de l’offre de travail des médecins libéraux, et notamment d’analyser les déterminants du signe de la relation entre l’offre de travail du médecin et le tarif de la consultation pratiqué en secteur conventionné. Nous proposons de « révéler » les choix individuels des médecins à l’occasion d’une enquête d’évaluation contingente, ceci dans le cadre d’un modèle d’arbitrage travail-loisir tenant compte de la possibilité d’un phénomène de « backward bending ». D’après les résultats obtenus sur la base des déclarations des médecins confrontés à des scénarios hypothétiques d’augmentation de tarif, on montre que l’élasticité de l’offre de travail médical au tarif est très vraisemblablement négative.

1 Introduction

In the literature devoted to the valuation of time spent in leisure (and the consumption-leisure trade-off), the value of time has generally been computed as a percentage of the wage rate. Indeed, the neoclassical model of labour-leisure choice assumes that every individual derives utility from the consumption of both a bundle of goods, measured through income, and leisure. When choosing the quantities of work and leisure, individuals are supposed to choose the combination that maximizes their utility, so that the marginal rate of substitution between labour and leisure indicates both the hourly wage rate and the value of an additional hour of leisure.

This model possesses at least two drawbacks. First, it requires a set of assumptions necessary for the labour market to be in “pure and perfect competition” and to accurately reflect actual individual trade-offs between work and leisure. Second, it implies that there was a sufficient heterogeneity in data to estimate real changes in behaviour due to price variations which is obviously not the case in the French “sector 1” of general practice, since prices are invariant and fixed by the Social Security).

Two methods exist to assess the economic value of goods that have no market price or that are not yet available on a market. The first one uses behaviour observed on markets related to some aspect of the good (where preferences are “revealed” through hedonic or travel cost methods) and the second elicits declared preferences concerning the good (“stated” preferences). The most known and used approach for stated preferences is the contingent valuation (CV), in which respondents are presented a “constructed market” for the good at stake and reveal their (hypothetical) behaviour regarding whether or not they are willing to buy this good and at which price.

Based on the second approach, this paper aims to provide results in two connected directions: to explore how a change in fees would affect the supply of medical consultation and to value marginal units of leisure (i.e. non professional) activities for General Practitioners (GP). The present paper is organized as follows: in section 2, we sketched a theoretical microeconomic model of medical labour-supply showing the possibility of a “backward bending” curve -at least for some value of exogenous parameters. In section 3, we discuss whether CV survey could help to overcome the lack of data, when hypothetical offers (variations in prices) are submitted to surveyed people. In section 4, we present the sources of data. Results are given in section 5.

2 Problem: “The backward bending curve”, also in the case of independent GP

The model for independent practices contrasts with the standard model of labour supply in the following characteristics: a “fee” is paid per consultation and there is a simultaneous decision on the length of consultation. The physician’s choice can be expressed as follows:

$$\begin{aligned} & \text{Max} U(C, Z) \\ & \text{st. } C = w.N.x - T \\ & \quad Z = Z_0 - b.N.x \quad (1) \\ & \quad N = N(x, b) \end{aligned}$$

where the physician faces:

- **a budgetary constraint** (for the purchase of goods): $C = w.N.x - T$; with C the level of consumption, w the price of consultation, x the number of consultation per patient, N the number of client and T the overall cost of the medical activity.

- **a time constraint** Z , with b the length of consultation (Now, the opportunity cost of the supply of health services is loss of leisure: for $L = b.N.x$, we will assume $U'_L < 0$)

- **a market constraint** N (number of client): $N = N(x, b)$;

We consider that each physician acts in a context of a local monopoly. The level of demand addressed to each physician - the size of the clientele - is a function $N(x, b)$ of the quantity of service offered (number of consultation) and the quality of the consultation (b). McGuire (2000) suggests a “net benefit function” for the patient that depends on the level of medical activity, the level of quality provided by the physician and the degree of competition among suppliers. This net benefit function plays a similar role to our demand function. We identify “quality” and “length of consultation”, an assumption already suggested by McGuire. In our labour supply framework, the cost of quality is endogenous: it is defined as the value of the loss in leisure; due to the time spent in each consultation (b). Formally, the physician’s choice can be expressed as follows:

Assuming an optimisation in b and x by the physician, the first order conditions (FOC) are:

$$\begin{cases} e_{N/x} = -1 \\ \frac{U'_Z}{U'_C} = \frac{e_{N/b}}{1 + e_{N/b}} \frac{w}{b} \end{cases} \quad (2)$$

with $e_{N/b} = \frac{\partial N / N}{\partial b / b}$, the elasticity of N to b ; $e_{N/x}$ idem for x .

The first equation is a direct result of the fee-for-service system: the substitutability between number of consultations / number of patient is perfect. The second equation gives a modified Leisure / Consumption rule in which the elasticity of the clientele to b appears as a parameter.

By choosing working time and consultation duration, the physician must internalise the effects of her allocation on patient's benefit (patient willingness to remain in her clientele)¹.

These two equations allow to compute x^* and b^* , the equilibrium choice for the two unknown variables of the program, and, consequently, $L^* = b^*x^*N(b^*,x^*)$ the labour supply at equilibrium. As showed by the equation 2 in the first order conditions, a decisive factor resides in the ratio U'_Z/U'_C , the marginal rate of substitution between leisure and consumption. For simplicity, we can give some particular form of function U and N. Suppose:

- $U(C,L) = (C^{\phi-1/\phi} - \delta L^{\phi-1/\phi})^{\phi/\phi-1}$; the parameter δ symbolizes the opportunity-cost of time at physician level; ϕ is the usual CES parameter.

$$-N(b,x) = b^\beta (\chi(x))^\alpha;$$

For τ , such as $T = \tau \cdot w \cdot x \cdot N$ (that is τ is the cost of GP consultation, per unit of consultation). We obtain:

$$\begin{cases} e_{\chi/x} = -1/\alpha \\ b = \left(\frac{1}{\delta} \frac{\beta}{1+\beta} \frac{w}{(w-\tau)^{1/\phi}} \right)^{\frac{\phi}{1-\phi}} \end{cases}$$

Then the supply of medical labour $L^* = b^*x^*N(b^*,x^*)$ equals to :

$$L^* = (b)^{\beta+1} (\chi(x^*))^{\alpha+1} = (\chi(x^*))^{\alpha+1} \left(\frac{1}{\delta} \frac{\beta}{1+\beta} \frac{w}{(w-\tau)^{1/\phi}} \right)^{\frac{\phi}{1-\phi}(\beta+1)}$$
 We have:

$$\text{sign} \left[\frac{\partial L^*}{\partial w} \right] = \text{sign} \left[-\frac{\phi\tau}{1-\phi} - w \right]$$

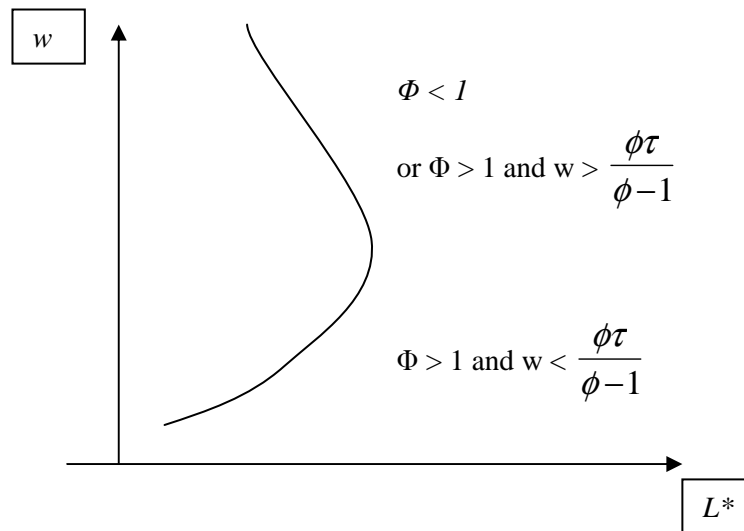
A derivation of L^* in w showed that the sign of the relationship between L and w depends on the sign of a term that we can easily discuss.

For $\phi < 1$ (poor possibility of substitution between leisure and consumption), the expression is always negative. Referring to the Figure 1 if real wages were to increase from w_1 to w_2 then the GP is willing to decrease hours worked from L_1 to L_2 . Note that this may be hours worked per day, month, year or even lifetime.

However, if $\phi > 1$ (the substitution effect is *a priori* greater than the income effect), the expression becomes positive for low level of wage, but remains negative for high level of wage.

¹ We can draw a parallel with the model framework presented in (Rochaix 1993) where physicians are assumed to realize a two-stage trade-off: first, they make an income-leisure trade-off depending on the real wage rates and secondly they allocate their effort between different procedures/activities on the basis of their relative prices. The main difference consists in assuming that, on the second stage, physicians allocate their effort between "duration" and "quantity" of consultation on the basis of the relative demand elasticity of both terms

Figure 1: The backward bending curve



We obtain the classical “backward bending curve” in this model nowadays adapted to *independent medical activity*. The lessons of the model are the following:

- for weak substitution between time and money, the elasticity of the labour supply to remuneration of procedures can be negative: the more you pay the health service, the less physicians work. This is intuitive: when money and time are highly complementary, the income effect - due to higher fees - pushes physicians to allocate earnings in more leisure time also, reducing the labour supply.
- for higher incomes, $w > \Omega$, the negative slope is even more likely (even for higher levels of substitutability between time and money in the utility function).

These results are already well documented in the case of salaried worker (when w is a wage), and the present model re-states them in the case of the fee-for-service payments.

3 Need for data and method to collect them

Labour economists have taken an occasional interest in the overall labour supply of doctors. The relevant references in the field are: Sloan (1975), Noether (1986), Rizzo and Blumenthal (1994). The last provide an estimation of the elasticity of 0.23 for the labour supply to wages, 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 more sensitive to the marginal rates of taxation, with an elasticity of 0.33, than are wage-earning doctors. A study of Norwegian micro-data by Sæther (2006) confirms that the response of wage-earning hospital doctors is low. The most recent studies used panel data from Norway and found a long run wage elasticity of 0.3, a figure which could be viewed as higher than studies conducted in the US taking into account that doctors in Norway are wage-earning (Badi et al., 2005). Ikenwilo and Scott (2008) offer a renewed approach by integrating degrees in job quality as an alternative explanation for wage

differences². The results are sensitive to the exclusion of job quality and show a slight underestimation of the uncompensated earnings elasticity (of 0.09), without controlling for the effect of job quality, and 0.12 when job quality is controlled for.

In order to overcome the lack of data for France (no real variability in the prices pay to physicians in sector 1), we decided to study declarative data collected in a process similar to a CV survey, in which hypothetical offers (variations in prices) are submitted to surveyed practitioners. If properly implemented, CV surveys have been proved to provide reasonable values for non market goods and non use values in environment and health fields.

This paper implements a CV survey on a representative sample of French GP to assess the value of leisure. The French health system is regulated by the Health authority that set up fees paid per visit for the 93% of the GP that chooses to belong to the National Health Service (*Secteur I*), the remaining 7% can set this price freely (*Secteur II*). A way to increase the supply of medical visit without changing the number of GP consists in increasing the fee paid per consultation. However, this policy could be double-edged if on average, GP prefer to keep their income constant by decreasing the number of worked hours, i.e. if the value of the marginal income is lower than the value of leisure.

4 Description of data

The sample of doctors comes from a panel survey conducted since March 2007 and that examines the medical practices of 1,901 general practitioners in five French regions: Basse-Normandie, Bourgogne, Bretagne, Pays de Loire, and Provence Alpes Côte d'Azur. The panel was compiled from a joint initiative of the Ministry of Health, the National Federation of the Regional Centres for Disease Control (ORS), and the five Regional Unions of Self-employed Doctors (URML) in the regions concerned. In each region, the doctors selected for this study are representative of the overall population of GPs (see Aulagnier et al. 2007). The sample was obtained by random stratified sampling with the strata defined by gender, age (under 45, 45-54, 54 and older in 2006) and location (urban, suburban, rural). Doctors planning to stop practising or to move out of the region, as well as those who practiced exclusively complementary or alternative medicines such as homeopathy and acupuncture were excluded. The first survey wave took place in March and April 2007. It collected data from GPs concerning levels of activity, such as workload, list size, and number and type of consultations. This wave also includes data from the Individual Receipt for Activity and Prescribing (IRAP), an administrative document given to GPs by the Social Security, which records all reimbursed spending of patients. It enables the precise computation of activity for each practitioner of the panel.

To explore GP behaviour regarding the trade off between income and leisure, we asked GP in what extent they will change their quantity of labour (number of hours worked and average duration of a visit) in reaction to changes in the current fee paid per visit. One increase among three has been randomly proposed: 5%, 10% or 20%. Note that letting unchanged the quantity

² A key issue is the lack of attention paid to the role of non-pecuniary factors in influencing labour supply. This stems from a concern about unobserved heterogeneity in models where hourly wages have been shown to have a small effect on labour supply, and where workers may choose to increase or reduce their hours worked in response to changes in non-pecuniary factors that are usually unobserved by researchers and that may be correlated with the included independent variables, leading to omitted variables bias.

of labour and the average duration of consultation automatically results in a similar increase (of 5%, 10% or 20%) of their incomes.

This approach differs from the common way non market goods are elicited in CV. Indeed, the usual wording is typically about how much are individuals willing to pay for a change in quantity / quality of a good at stake (see for instance Dalenberg et al., 2004 for a direct measurement of the value of different leisure activities). By proposing a price (the fee increases), the wording used in our survey purposely imposes no *a priori* regarding the direction of the changes –which can differ across individuals due to different motivations and tastes. Indeed, by supposing that the level of utility before the change in fee reflects the optimum level of each individual, we are able to determine the trade off between a change in income and a change in the quantity of leisure consumed, i.e. to estimate the marginal “shadow” or “implicit” price of leisure.

5 Results

5.1 Sample

Of the initial sample of 1901, we remove 130 GP (6.9%) that do not belong to “Secteur I” (GP that chooses to belong to the National Health Service and applies fixed fees), as well as 346 respondents that either did not answer key questions (regarding the number of hours worked, duration of consultation, number of consultations) or whose answers were surprisingly high or low for the variables relevant in the analysis (change of more than 50% in the number of hours worked, average duration of the consultation shorter than 5 minutes,...). The remainder sample then consists of 1,425 out of 1,901 respondents (74.96% of the initial sample).

In the following, we do not distinguish the number of consultation by client (x) and the number of client (N), and we are only interested in the number of acts N^* ($=x.N$ in the theoretical model), defined as $N^*=L/b$

The change in the number of acts is the difference between the declared number of acts after the scenario and the actual number of acts:

$$\Delta N^* = [(L+\Delta L)/(b+\Delta b)] - L/b$$

with L the number of hours worked, b the average declared duration of a consultation, ΔL the change in the number of hours worked and Δb the change in the duration of consultation.

Two variables are now interesting for the public decision-maker in a centralized health system (like France) or for private decision-makers in a large health insurance coverage (US health system for instance) looking for an increase in medical supply: the elasticity of the number of hours worked to the level of fee E_{LT} as well as the elasticity of the medical supply (number of procedures) to the level of fee E_{N^*T} .

The former is computed as $E_{LT}=(\Delta L/L)/(\Delta w/w)$ and the latter $E_{N^*T}=(\Delta N^*/N^*)/(\Delta w/w)$, where w is the level of fee reimbursed at the time of the survey and Δw the increase in level of fee proposed in the scenario (i.e. 5% ,10% or 20%).

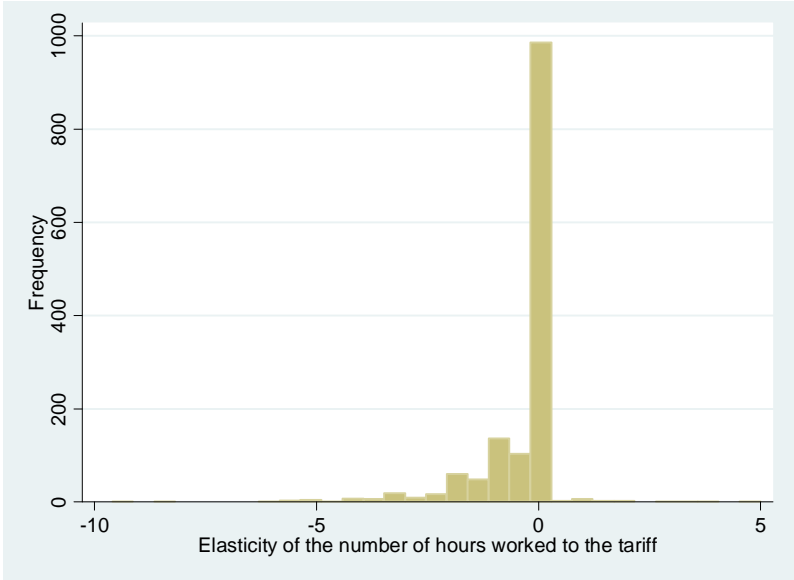
E_{LT} gives the position of GP on the backward bending curve and E_{N*T} informs whether an increase in fees is going to increase the supply, i.e. whether fees constitute a relevant instrument to induce a higher medical supply.

5.2 Descriptive statistics

Let us first consider the elasticity of the number of hours worked to the level of fee E_{LT} .

GP expressed a change in the number of hours worked in 441 out of 1,425 cases (30.95%) and null changes in the remaining 984 cases (79.05%). Among the non-null changes, 422 expressed a diminution and 19 an increase of the number of hours. Hence, most of the GP are either in the vertical part (null elasticity) or in the backward part (negative elasticity) of the Supply of Labour Curve. It is not surprising since it is known that leisure is not an “inferior good” and that GP have on average a higher income than other workers. The Figure 2 below outlines the distribution.

Figure 2 Distribution of E_{LT}



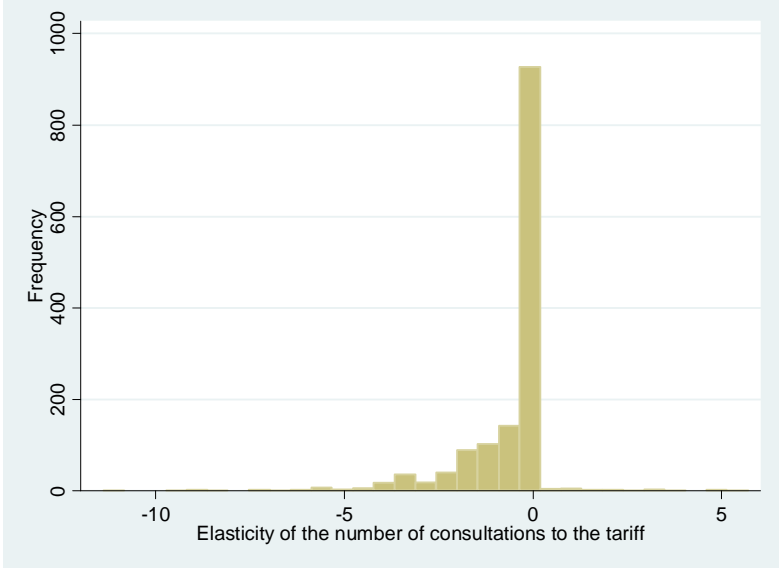
When computing the elasticity of the number of hours worked to the level of fee E_{LT} , we obtain an average of $-.397$. Computing elasticities by scenario, we find respectively $-.504$, $-.394$ and $-.288$ for corresponding changes of 5%, 10% and 20% in the level of fees. The mean elasticity obtained in the 20% change scenario is significantly and substantially higher than in the 5% change (two sample two tailed comparison mean, p-value $p=.001$) and the 10% change scenario with ($p=.017$) scenarios. There are no significant differences between elasticity WTP for the 5% change and 10% change scenarios ($p=0.126$).

This result indicates that the change in the number of hours worked decreases with the change in the fees, i.e. a marginal decreasing in elasticity.

Let us now consider the elasticity of the number of offered procedures to the level of fee E_{N*T} .

In addition to change in labour duration, GP were also allowed to state changes in the duration of consultation: $L=x.b.N$. Hence, the declared number of acts results both from changes in the number of hours worked and changes in the consultation duration. In 514 out of 1,425 cases (36.07%) it results in a change in the number of consultation, and no changes in the remaining 911 cases (63.93%). Among the non-null changes, 491 expressed a diminution and 23 an increase of the number of consultations. It then appears that most of the GP declares willing to do fewer acts if the level of fee increases than the number they currently do. The Figure 3 below outlines the distribution.

Figure 2 Distribution of E_{N^*T}



When computing the elasticity of the number of offered procedure to the level of fee E_{N^*t} , we obtain an average of $-.589$. Computing elasticities by scenario, we find $-.696$, $-.605$ and $-.461$ respectively for a change of 5%, 10% and 20% in the level of fees. The mean elasticity obtained in the 20% change scenario is significantly and substantially higher than in the 5% change scenario ($p=.0074$) and the 10% change scenario (with $p=.024$). There are no significant differences between elasticity WTP for the 5% change and 10% change scenarios ($p=0.339$). Here again, these results indicate that the change in the number of consultations is marginally decreasing with the change in the level of fee.

5.3 Estimation results

We have so far considered only changes in mean elasticities or only taken into account differences due to the scenario proposed to GP. In order to take into account subjects' heterogeneity and to find whether some characteristics of the GP may explain their choices in terms of work duration or number of acts, we now turn to regressions analyses.

Much of health data - as well as our dataset - are characterized by a large amount of null data and we face the issue of correctly accounting for this specific shape of the distribution. Madden (2008) considers two alternatives: sample selection and two-part models. He notes

that the observation of no consumption of medical services can be caused from two different decisions: a participation decision and a consumption decision³.

Depending on whether independence between the error terms of the participation decision and the consumption decision is assumed, the Heckman Selection model (correlation) or the Two-part Model (no correlation) is relevant. The former requires a two step (or a maximum likelihood) estimation of the correlation, whereas the latter can be estimated with a probit for participation and an OLS for consumption.

As we cannot reject the null assumption of nullity of the correlation coefficient in the Heckman model (Wald test null correlation leads to a p-value of 0.596), we choose to estimate a two part model. The first equation is a Probit which reflects the decision to change the number of hours worked (as well as the duration of consultation for the E_{N*T}) and the second equation is an OLS equation explaining the value taken by the elasticities for non null answers.

The set of explanatory variables is relatively large and contains the following variables:

- socioeconomic variables exogeneous to the GP decision: age, gender, scenario proposed (5%; 10%; 20%), living in couple, proportion of patients older than 60, proportion of patients with special health insurance (i.e. free healthcare because of low income),
- variables specific to professional long term decisions: having a medical secretary, belonging to a group practice, location (rural, urban, suburbs), reasons declared for choosing the place of practice (supply of GP insufficient in the zone of exercise or monetary incentive),
- variables specific to professional short term decisions: participate to formation, offer free consultation, participation in peer groups for quality benchmarks, participation in CME (continuous medical education)
- self assessed criteria that may affect professional short term decisions: Self-assessed level of wealth, self-assessed level of satisfaction regarding own professional activity.

The econometric estimates are given in Table 1 for the elasticity of the number of hours worked to the level of fee E_{L_t} , and Huber White standard errors are computed to account for possible heteroscedasticity. We present the most parsimonious model with variables whose significativity is lower than 10%. Note that because the equation of decision to change is a Probit, i.e. a nonlinear model, marginal effects differ with practitioners' characteristics. We compute them, in the third column at the mean values of the explanatory variables, accounting for the continuous or discrete nature of the explanatory variables at stake. For the equation explaining the elasticity, Ordinary Least Squares are used and the marginal effects are obviously equal to the estimated parameters.

³ His paper treats the case of smoking and drinking, in which individuals may decide not to smoke (drink) no matter how cheap cigarette (alcohol) is (this is the participation decision). On the other hand, some smokers (drinkers) may decide not to smoke because cigarette (alcohol) is too expensive or due to low income (this is the consumption decision).

Table 1 Estimation results (E_{LT})

Variables	Decision to change (Probit)		Elasticities (OLS)
	Parameters (p-value)	Marginal effects	Parameters (p-value)
Constant	-.73958*** ($<.0001$)	-	-.10821 (.639)
5% Scenario	-.59813*** ($<.0001$)	-.19482*** ($<.0001$)	-1.7471*** ($<.0001$)
10% Scenario	-.24842*** (.003)	-.08446*** (.0003)	-.54198*** ($<.0001$)
Gender (female)	-.20583** (.018)	-.06957** (.014)	
Participation in CME	.21376* (.072)	.07088* (.057)	
Free consultation	.1830** (.050)	.06170** (.042)	
Prof Satisfaction	-.07229** (.037)	-.02512** (.036)	
% of patient > 60	.00855** (.031)	.00298** (.031)	
Secretary	.24751*** ($<.001$)	.08487*** (.0001)	
BasseNorm	-.23734* (.054)	-.07815*** (.004)	-.61303 (.033)
(Age)^2			-.00017** (.037)
Particip in peer groups			.10200* (.063)
Bretagne			-.11185 (.450)
Bourgogne			-.40417** (.020)
Pays de Loire			-.23655 (.103)
Number of obs.	1,423		441
LRI / R ² ajusté	0.0487		0.2851
Test de nullité jointe (p-value)	78.40*** ($<.0001$)		16.52*** ($<.0001$)
lnL ₀	-880.87		
Log vraisemblance	-837.98		

Significancy of estimated parameters and marginal effects: *** if p-value <0.01 , ** if p-value <0.05 , * if p-value <0.1 .

The Likelihood Ratio Index is computed as: $1-(\log L/\log L_0)$, where $\log L_0$ is the value of the log-likelihood in a model with a constant only.

The first column in Table 1 presents the results of the decision to change the number of hours worked. It could be connected to a study of the location of GPs within Figure 1 showing the

“backward bending curve”. Roughly speaking, GPs can be at the middle of the curve (no reaction in L) or above this intermediate area (negative reaction in L).

First, it is worth noting that the type of scenario proposed is highly significant and negatively related to a change in the worked hours: the marginal probability to change is almost 20% (resp. 8.5%) lower for a 5% (rep. 10%) increase in the level of fee than for a 20% increase. Thus, the fact that the likelihood to change increases with the change proposed in the fee can be considered as a reassuring result and provides evidence of validity of the method (in line with the results generally found with income in CV surveys, see Bishop and Woodward 1995 for instance). Turning to the effect of the other significant variables, we note the following coherent results. The coefficient associated with *Gender* is significant and negative: women are less likely to decide to change the number of hours worked. Indeed, being female decreases by 7% the probability to change (generally in favour of a negative change). *Declaring being happy with his/her job* also reduces the probability to change by 2.5%, which conforms to intuition. It seems to be a geographical phenomenon as GP living in *Basse-Normandie* are less likely to change (7.8%) than their colleagues living in one of the four other regions.

Regarding the variables specific to the professional activity, *participation to CME*, *offering free consultation*, and *having medical secretariat* respectively increases the probability to change by 7.09%, 6.17% and 8.49%. Finally, an increase by 1% of the *proportion of patients older than 60* increases the likelihood to change by 0.3%.

Turning now to the determinants of the elasticity in the fourth column of Table 1, we also find that the type of scenario proposed is highly significant and negatively related to the level of elasticity. This confirms that the elasticity is negative with a marginal decreasing pattern: a change of 1 € in the level of fee proposed in the *5% Scenario* implies a higher negative effect on the number of hours worked than the same change in the *10% Scenario*. The effect of the variable *Age* is decreasing with a quadratic pattern: the older the respondent, the lower the negative elasticity. An increase of one unit in *participation in peer groups* induces a significant increase of elasticity. Finally, when compared to the PACA region, GP living in all other regions exhibit a negative decrease in elasticity (significant for *Basse-Normandie* and *Bourgogne*).

Let us turn now to the elasticity of the number of offered procedures to the level of fee E_{N^*T} .

The first column in Table 2 presents the results of the decision to change the number of acts. First, it is worth noting that, as previously found, the type of *scenario* proposed is highly significant and negatively related to a change: the marginal probability to change is 24% (resp. 12%) lower for a 5% (rep. 10%) increase in the fee than for a 20% increase. The effect of *Age* is quadratic with a maximum at 51: the closer to 51, the higher the likelihood to change; although, after 51, the effect of one additional unit of age (a year...) becomes negative: i.e. decreases the propensity to change when facing greater fees. Being a *female* living in couple decrease the likelihood to change by 7.26% compared to females single and all males. Regarding the variables specific to the professional activity, and similarly to previous results, *participation to formation*, *doing free acts*, and *having medical secretariat* respectively increases the probability of a change by 8.35%, 5.51% and 10.25%. Finally, an increase by 1% of the *proportion of patients older than 60* increases the likelihood to change

by 0.3%. The geographical phenomenon remains as GP living in *Basse-Normandie* are less likely to change (9%) than their colleagues living in one of the four other regions.

Table 2 Estimation results (E_{N*T})

Variables	Decision to change (Probit)		Elasticities (OLS)
	Parameters (<i>p</i> -value)	Marginal effects	Parameters (<i>p</i> -value)
Constant	-0.73958*** ($<.0001$)	-	-0.74029*** (.001)
Scenario 5%	-0.69597*** ($<.0001$)	-0.24283*** ($<.0001$)	-2.0151*** ($<.0001$)
Scenario 10%	-0.3285*** ($<.0001$)	-0.11938*** ($<.0001$)	-0.78457*** ($<.0001$)
(Age) ²	.00112* (.056)	.000419** (.056)	
(Age) ³	-.0000147* (.057)	-.00000547* (.057)	
Participation in CME	.23345** (.046)	.08352** (.037)	
Free consultation	.15071* (.095)	.05506* (.088)	
% of patient >60	.00855** (.031)	.00297** (.046)	
Secretary	.27913*** ($<.0001$)	.10255*** ($<.0001$)	
Couple & Female	-.20018** (.036)	-.072612** (.031)	
BasseNorm	-.25385** (.033)	-.09040** (.024)	
Rural			-.32247* (.051)
Particip to peer groups			.15836*** (.001)
Couple			-.41146* (.059)
Bretagne			.36480** (.028)
PACA			.34612 (.028)
Number of obs.	1,414		513
LRI / R ² ajusté	0.0547		0.2381
Test de nullité jointe (<i>p</i> -value)	92.38*** ($<.0001$)		16.09*** ($<.0001$)
lnL ₀	-926.19		
Log vraisemblance	-875.54		

Significancy of estimated parameters and marginal effects: *** if *p*-value <0.01 , ** if *p*-value <0.05 , * if *p*-value <0.1 .

The Likelihood Ratio Index is computed as: $1-(\log L/\log L_0)$, where $\log L_0$ is the value of the log-likelihood in a model with a constant only.

Turning now finally to the determinants of the elasticity in the fourth column of Table 2, we also find that the type of *Scenario* proposed is highly significant and negatively related to the level of elasticity. Living in *Couple* decreases the elasticity (compared to single GP) as well as living in *Rural* areas (compared to urban and suburbs). Participation to peer groups induces a significant increase of the elasticity of the number of acts to fee by 15.84%. Finally, when compared to GP living in other regions, GP living in *PACA* as well as *Bretagne* have a significant (a comparable) higher elasticity.

5.4 Towards a monetary assessment of leisure

If we assume that general practitioners freely chose the quantities of work and leisure that maximizes their utility, the marginal rate of substitution between labour and leisure indicates the value of an additional hour of leisure.

For the 441 respondents who declare changing the amount of hours worked in reaction to a change in fee of Δw (5%, 10% or 20% depending on the scenario), the overall associated change in the weekly income (also accounting for a change in the mean duration of the consultation if declared by the practitioner) is:

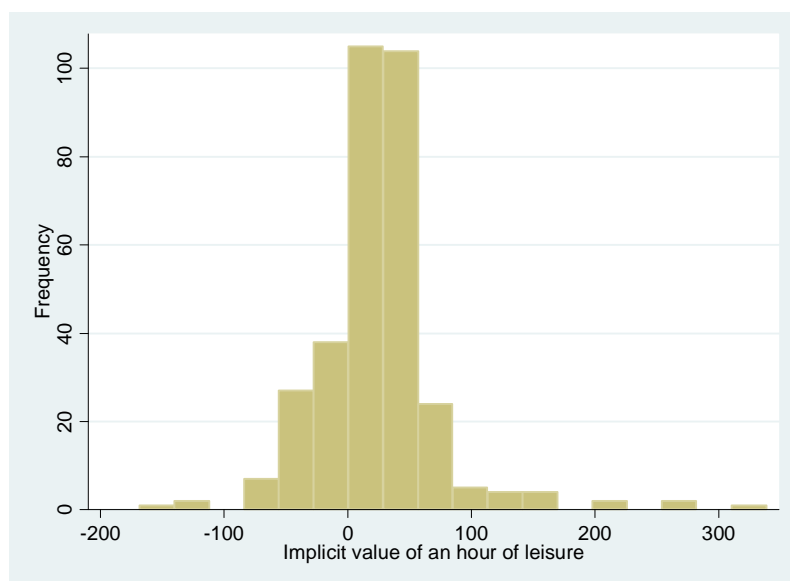
$$\begin{aligned}\Delta C &= \Delta w N^* + \Delta N^* w + \Delta w \Delta N^* \\ &= \Delta w N^* + \left\{ \left[\frac{L + \Delta L}{b + \Delta b} \right] - \frac{L}{b} \right\} (w + \Delta w)\end{aligned}$$

The value of an hour of leisure is the trade off the practitioner makes between a change in income and a change in the worked hours:

$$V_1 = \Delta C / \Delta L.$$

The computation of the value of an hour of leisure for the 441 practitioners who declare a non null ΔL , leads to €51.02 per hour. By scenario, we find €54.55, €56.06 and €44.96 respectively for a change of 5%, 10% and 20% in the level of fees, with no significant differences across them. Although these results on average lie in a plausible range, a careful analysis of the distribution (see Figure 4 below) indicates that 18.6% of the hourly values of leisure take a negative value, which seems counter-intuitive. Further explorations are then required to determine whether these negative values are due to non optimal behaviours in reaction to a change in fee or to another reason.

Figure 4 Distribution of the hourly value of leisure



6 Conclusion

The public decision-maker should be able to compare several possible public policies before implementing the one that generates the highest expected welfare in the population. This requires the computation of optimal reaction of agents to alternative decisions. For that, Contingent Valuation methods could help to better predict behaviour of agents facing changes in their economic environment. In this perspective, the results of this paper are informative for those interested in the aggregate response of GP healthcare service to compensations. In particular, the result of an average negative value for the elasticity to the level of fee is useful. We found that most of the French GPs are in the vertical part (null elasticity) of the labour supply curve, where the income effect clearly dominates substitution effect. Even more, some of them are in the backward part (negative elasticity). It is not surprising since leisure is not “inferior good” and GP have on average a high income.

These results might be important for the design of policies which intend to get an increase in the labour supply of French physicians: the leverage of the consultation-fee does not seem to offer great perspectives for the policymaker.

However, we interviewed a set of already setup physicians, implicitly assuming that the number of physician in each area of practice is given. Of course, it is possible that in the long run the level of consultation fee plays a positive role: in the number of physician setup in family practice; in the localisation of physician in sub-regions of France. However this positive role may be compensated by the opposite effect of a reduced supply of health services, as shown by our results. One of the implications of the present study is then that the decision-maker should look for a second instrument in order to control the size of the health service supply in the territory, like incentives to some specific location (rural), or tax

exemption for a given duration after installation. The level of fees (paid per consultation), as unique monetary incentives, seems to demonstrate ambiguous effects.

Finally, an interesting future research would be to compare the declared behaviours of the practitioners in reaction to a hypothetical change in fee with their behaviours in reaction to an actual change. This is possible since the same panel has been surveyed in 2008, and an increase in fee corresponding to the 5% scenario (a rise of 1 euro) has been decided by the Social Security late 2007.

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