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A Microeconometric Study of Theatre Demand

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Abstract. We develop a model of theatre demand with learning by consuming, and test some of its implications on a large random sample of theatregoers and non-theatregoers. This seems to be the most comprehensive econometric study of demand for the theatre from individual data. We hypothesize that each time the consumer watches a play, he experiences a degree of pleasant or unpleasant surprise on the basis of which he will revise his future expectations of his own taste. The learning phase is likely to be unusually long for highly differentiated cultural goods. Our set of data contains unique information about the full price and the fixed cost of theatre, the objective quality of the outing, past experience of and taste for the theatre, and consumption of substitute leisure activities such as reading, television and cinema. Our methodology and data enable us to infer price elasticity on survey data from knowledge of theatregoing experience and taste. After controlling for many variables, we conclude that demand for the theatre is price-elastic, which contradicts previous estimates on aggregate time-series data. Moreover, we estimate demand conditional on past attendance after controlling for selectivity bias. Satisfaction reported by consumers after the last play is also estimated and interpreted as an ordinal conditional choice.

Key words: theatre demand, learning by consuming, individual data, conditional choice and satisfaction (JEL: Z1, L82)

1. Introduction

The purpose of this paper is to apply demand theory to the theatre by adapting it to take account of the randomness inherent in this choice and the accumulation of theatregoing experience. Account will also be taken of various aspects of income and the full price – in time and money – of a theatre outing, the quality of service and tastes in relation to the theatre and its substitutes.

So far most demand functions estimated for the performing arts have been based on aggregated (time series or cross-sectional) data and at best could therefore incorporate these factors only indirectly and in a very incomplete manner [despite this, the time dimension was included by Withers (1980) and the risk dimension by Abbé-Decarrous and Grin (1992)]. As a result of these studies (see in particular Moore, 1966, and Gapinski, 1984, for theatre, Lange and Luksetich, 1984, for classical music concerts, Cameron, 1990, for the cinema, and Withers, 1980, Bonato *et al.*, 1990, Frey and Pommerehne, 1989, for all performing arts), it is nevertheless

known that the performing arts are not exempt from the law of demand: the price elasticity of the ticket is negative, most frequently between –0.3 and –0.6; income elasticity is positive and may exceed unity; finally, the cross price elasticities of all performing arts are positive and indicate substitution relationships that are sometimes significant.

Some studies used individual data on surveys audiences or theatregoers only. While the seminal work of Baumol and Bowen (1966) produced only descriptive analyses, Globerman and Book (1977) estimated Engel curves for many cultural events. They found income elasticities of around 0.75 for theatre, Morrison and West (1986) with a sample of 340 individuals that included non-theatregoers suggested that "early exposure" is the key to future demand. Their demand for theatre was based on four explanatory variables only. As far as we know, our study of theatre demand is the most comprehensive to be based on individual data. It is the first econometric study to be conducted in France on demand for performing arts. Since only 7 percent of the adult French population attend the theatre at least once a year (Guy and Mironer, 1988), it is extremely difficult and expensive to extract a sufficient number of theatregoers from a survey representative of the adult population. Observation of individual data from a recent survey conducted on behalf of the Ministry of Culture gives us access to a large number of variables for income, full price, quality, taste and theatregoing experience. It also allows us to study a number of aspects of demand: the discrete choice to attend or not attend the theatre over a period of one year or four years, the frequency of such outings during the same period and the respondent's stated satisfaction with the last play seen.

The data are described briefly in section 2 and the theoretical analysis is presented in section 3. The econometric consequences of sample selectivity are considered in section 4. Thereafter, the empirical results are assessed in section 5. Section 6 contains a summary of the principal results and the conclusion.

2. Data Description

In 1987 the Ministry of Culture commissioned a survey of a sample of 8,000 individuals 15 years of age and above, including 1,000 theatregoers. The initial detailed results were published by Jean-Michel Guy and Lucien Mironer (1988). This exceptional "Theatre" survey allows us to distinguish three samples, with the smaller samples successively nested in the larger (after elimination of missing or anomalous data): (i) a sample of the population 15 years of age and above ($n = 7,970$); (ii) a first subsample of persons who have attended professional theatre in the last four years ($n_2 = 898$); (iii) a second subsample, nested in the previous one, of persons who have been theatregoers in the last year ($n_3 = 501$).

In Table A1 of the appendix, we present the symbols and short definitions of the variables involved in the empirical estimates of the model.[1] In this Table we distinguish the independent varibles in the model and the variables that can be explained. The explanatory variables are categorized as socioeconomic variables,

price and quality variables, knowledge and taste variables, and selectivity bias variables. The latter variables are required to allow for the fact that theatregoing relates to a selected group of individuals who have decided to attend the theatre. They are accordingly constructed on the basis of probability models, explained in Table I.

Not all of the explanatory variables appear in the three samples. We should point out in passing that categorization of the variables into groups was imposed on us as much by the survey itself as by logic. For example, ownership of an automobile is one of the socioeconomic variables. But although it is indeed an indication of wealth, it also facilitates theatre outings and could appear, among the price and quality variables.

We present, in Table A2 of the appendix, the descriptive statistics (means and standard deviations) for all the variables included in the final estimation, with the three samples separated. Three types of dependent variables are presented: (i) dichotomous variables indicating whether or not the individual attended the theatre during a period of either one year or four years (they refer to the theoretical probability of attending the theatre at least once during a certain period); (ii) integer valued variables indicating the frequency of theatregoing during a period of either one year or four years; (iii) a latent satisfaction variable indicating whether or not the individual stated that they "greatly liked" the last play they saw (during the last year).

The theoretical analysis of theatregoing described by the above three variables and presented out in the following section will provide a justification of the econometric methods used and determine the correct variables and the sign of the expected effects.

3. Theoretical Analysis

3.1. Dependence of Current Consumption on Past Consumption

A simple scrutiny of the means already indicates interesting orders of magnitude. Theatregoing seems to be a relatively uncommon type of consumption, essentially confined to city-dwellers. 55.8% of theatregoers for four years attended the theatre at least once during the last year and saw an average of 1.65 plays. Those who attended the theatre during the last year saw an average of 2.95 plays. These figures suggest a significant positive effect of accumulated theatregoing experience on current theatre consumption. Nevertheless, choosing the theatre does not exclude other artistic performances, since theatregoers on average also go to the cinema more often than once a month.

As theatregoing experience is not a simple measurement of innate taste and other theatre demand factors, the static consumer model does not apply. Economists and sociologists readily acknowledge that past consumption is a strong determinant of current consumption, even outside the area of durable goods. But it is seldom

possible to directly verify this assertion as we will do, using individual data and after controlling for many wealth, price and taste variables.

If we admit the role of experience, how do we integrate it appropriately in the theory of consumer choice? There are two possible answers, which have been clearly stated by Pollak (1970, p. 745). The first emphasizes the deterministic and predictable formation of habits or a consumption capital. Whether addiction has a psycho-sociological or physiological origin and whether the consumer's behaviour over time is myopic or forward-looking, the specific feature of this hypothesis is that no one really escapes from this determinism. This consequence may seem far-fetched outside consumption of tobacco, alcohol and drugs. The second possible answer to our initial question is that consumers are unaware of their own tastes and depend on experience to discover them at the end of a process of learning by consuming that takes some time.

We will follow this second avenue, which has been neglected in previous work (see, however, Lévy-Garboua, 1979, and the comments by Stafford, 1979), by adopting the view that any new experience of a good reveals to the consumer an unexpected positive or negative increment in his taste for it, and by treating this increment, ex ante, as a zero mean random variable. Someone who discovers that he has a taste for the threate will normally experience over time repeated pleasant surprises by going to see new plays and will revise his expectations upwards. This representation of the effects of experience has three advantages. First, it is compatible with the strong heterogeneity of tastes and individual choices. Second, it allows for the great differentiation of cultural goods, that is, their individuality by virtue of which they were, according to Ricardo (1821), to be distinguished from reproducible economic commodities. The unique nature of each "cultural" experience provides new possibilities for surprises and implies long learning periods. Finally, the uncertainty regarding preference prevents the individual from correctly anticipating the taste he will acquire for consumption of a differentiated good; as we will see, this preserves in our model intertemporal separability of the utility function conditional on past consumption (defined by Robin and Lévy-Garboua, 1988), contrary to what occurs in the habit formation or rational addiction models (Boyer, 1983; Becker and Murphy, 1988).

3.2. A Demand Model with Learning by Consuming[2]

There are r goods whose consumption may give rise to non-systematic cultivation of taste. The arguments of the intertemporal utility function are the periodic subutilities, which simply take the form (without the time index): $u(s_1 n_1, \ldots, s_r n_r)$, where the $n_i \geq 0$ $[i = (1, \ldots, r)]$ designate the quantities consumed and the s_i designate the "subjective qualities" anticipated before the decision. The subjective qualities of each good depend on previous personal consumption experiences of them. Expectations are individual, and $s_{i\tau}^{t-1} = E_{t-1}(s_{i\tau})$ represents the subjective quality of good i anticipated by the consumer for the future period

τ $[\tau = (t, \ldots, T)]$ conditional on the information available in $(t-1)$. A new experience of the good in t reveals a more accurate estimate of quality:

$$s_{it} = s_{it}^{t-1} + \epsilon_{it}, \quad \text{if } n_{it} > 0\,, \tag{1}$$

and a pleasant or unpleasant surprise (presumed to be additive) by comparison with anticipations: $E_{t-1}(\epsilon_{it}) = 0$. After this experience the consumer supposedly revises his expectations in an adaptive manner and takes account of loss of knowledge by forgetting at the constant rate $\delta_i \geq 0$:

$$s_{i,\,t+1}^{t} = (1-\delta_i)[(1-m_i)s_{it}^{t-1} + m_i s_{it}] = (1-\delta_i)[s_{it}^{t-1} + m_i \epsilon_{it}], \tag{2}$$

where $0 < m_i < 1$ is the likelihood assigned to the results of the latest experience. Applying (1) to (2) by recurrence, expectations in $(t-1)$ for all future periods are calculated:

$$s_{i\tau}^{t-1} = (1-\delta_i)^{\tau-t}\, s_{it}^{t-1} \quad \tau = (t, \ldots, T) \tag{3}$$

Decisions taken in t are therefore based on the following intertemporal utility function, which is presumed to be additive:

$$E_{t-1}U \equiv \sum_{\tau=t}^{T} \rho^{\tau-t} u((1-\delta)^{\tau-t} s_t^{t-1} n_\tau) \tag{4}$$

in which $(1-\delta)^{\tau-t} s_t^{t-1} n_\tau$ represents the vector of the r expected "personalized" quantities and ρ is the discount factor. The subjective qualities depend on all the consumer's previous experiences, as can be seen applying the recurrent relationship (2) backwards.

We can also deduce the following expression from the recurrence relationship (2):

$$s_{it}^{t-1} = m_i S_{i,\,t-1} = m_i(1-\delta_i) \sum_{h=1}^{\infty} (1-\delta_i)^{h-1} \epsilon_{i,\,t-h} \tag{5}$$

This expression of accumulated experience, in which the obsolescence rate is no longer a factor, makes it possible to interpret experience as the accumulation of surprises. Since for the most part it is not possible to observe these, a large degree of heterogeneity in individual behaviour is to be expected. Furthermore, if (non-) consumers of a good are mainly those who experience a succession of (un)pleasant surprises, the random variable should be autoregressive and heteroscedastic.

Utility function (4) is intertemporally separable conditional on past consumption. When there is no learning process, the accumulated experience remains constant and the static formulation applies. In the general case also, the static formulation applies if quantity and price are replaced by their *personalized values*, after correction for the subjective qualities, respectively $s_{it}^{t-1} n_{it}$ and $\frac{\Pi_{it}}{s_{it}^{t-1}}$ for good i. We

can write the constant marginal utility for wealth (or Frisch) demand functions, which are deduced directly from the first order conditions:

$$s_{it}^{t-1} n_{it} = F_i \left(\frac{\lambda \Pi_t}{s_t^{t-1}} \right) \text{ , if } n_{it} > 0 \,. \tag{6}$$

This expression is convenient because λ, designating the marginal utility of anticipated wealth, is invariable over the life cycle and this non-observable factor can easily be linked to socioeconomic variables when current income is not known, as will be the case here. If the period utility functions are simply quadratic, these demand functions will be linear.

We can see at once that a good already greatly appreciated by the consumer will have a relatively low personalized price, but also that less quantity of the good is required to achieve a given utility level. If the price elasticity is greater than unity (in absolute value), the experience of consuming a good will have a positive effect on current consumption when the good was enjoyable overall, and a negative effect when it was not enjoyable overall. In fact, we can rewrite the demand function (6) by removing the indices: $n = \frac{1}{s} F \left(\frac{\lambda \Pi}{s} \right)$ and derive by reference to s:

$$\frac{\partial n}{\partial s} = -\frac{F}{s^2} - \frac{1}{s^2} \frac{\Pi}{s} \frac{\partial F}{\partial \left(\frac{\lambda \Pi}{s} \right)} = -\frac{F}{s^2}(1+e) = -\frac{n}{s}(1+e) \tag{6a}$$

The elasticity of n in relation to s is therefore equal to $-(1+e)$, where e designates the price elasticity. It will be positive, for example, if $e < -1$. These effects of experience change their sign if demand for the good is inelastic, and are nil if the elasticity is equal to unity. *This implication is important, since it provides a way, if the model is accurate, of measuring the price elasticity with survey data when the model measures accumulated experience and taste for consumption.*

With Equation (6) it is also possible to represent *the dynamics* of consumption. Since the dynamic elements of the model are the personalized prices rather than the parameters defining the utility function, the long-term equilibrium is achieved when all the subjective qualities have stabilized in values determined at the end of the learning period; the "true" price and income elasticities are the same in the short-term and the long-term.

3.3. CONSUMER CHOICE

3.3.1. *Unconditional Choice*

Since the quantities of all goods consumed over any period t are, as a result of intertemporal separability conditional on past consumption, the solutions of a "static" program, the index t is omitted to simplify the formulations and an individual index k is introduced instead. We will assign the number 1 to the "theatre". This

good will not be purchased if, and only if, for the optimal consumptions of all other goods, in the absence of the first $n^*_{jk}(j \neq 1)$:

$$\mathrm{UM}_{1k}(0,\ s^*_{2k}n^*_{2k}\,,\ \ldots\,,\ s_{rk}n^*_{rk}) \leq \frac{\lambda_k \Pi_1}{s_{1k}}\,, \tag{7}$$

if we call $\mathrm{UM}_{1k}(0,\ (s_{jk}n^*_{jk})j \neq 1)$ the marginal utility of the first unit consumed of the first good for individual$k$. Instead, we write the inverse condition of theatre attendance ($n_{1k} > 0$):

$$\frac{s_{1k}\mathrm{UM}_{1k}}{\lambda_k \Pi_1} > 1\,. \tag{8}$$

The probability of attending the theatre increases with theatregoing experience to the extent that the consumer on balance enjoyed what he saw. It declines with the price of the theatre and the marginal utility of wealth. Finally, it increases or declines with other forms of consumption, depending on whether these are complements of, or substitutes for, the theatre in utility "production".[3]

In logarithmic form, and using (5) and the random nature of accumulated experience, theatre attendance ($n_1 > 0$) is determined for individual k by the following condition:

$$T_{1k} + v_k > 0,\ \text{with}\, T_{1k} = \log m_{1k} + \log \hat{S}_{1k} - \log \Pi_1 + \log \mathrm{UM}_{1k} - \log \lambda_k\,. \tag{9}$$

$\hat{S}_{lk}$ is here an estimate of the accumulated theatregoing experience at the time of the survey and v_k is a term for zero-mean normal error. This model of the choice of attending ($T = 1$) or not attending ($T = 0$) the theatre can therefore be estimated by a probit model in the form:

$$P_k(T) = \mathrm{Prob}\{v_k > -\beta X_k\}\,, \tag{10}$$

where β is a line vector of parameters to be estimated and X_k a column vector of explanatory variables.

3.3.2. *Conditional Choice*

Another observable choice is going to the theatre during a period ($T_2 = 1$) conditional on past attendance ($T_1 = 1$). We can express the condition describing this *conditional choice*, by rewriting (9) for the two consecutive periods 1 and 2. Intuitively, the equation for the second period expresses the same event as the equation for the first period with a lagged period, the second condition must simply derive from the first through the addition of a corrective term. For simplicity, let $\sum_1$ be the latter (a fuller derivation of this term is provided in Lévy-Garboua and Montmarquette, 1995):

$$T^*_2 = T^*_1 + \sum_1 \tag{11}$$

Condition (11) is definitely respected conditionally on the equation for period 1 ($n_1 > 0$ iff $T_1^* > 0$), if the corrective term in expression (11) is nonnegative; it may still be respected if the term is not too strongly negative. To be more specific and expressed in probability terms:

$$P(T_2 = 1/T_1 = 1) = 1\,, \quad \text{if } \sum_1 \geq 0 \tag{12a}$$

$$P(T_2 = 1/T_1 = 1) = \frac{P(T_2 = 1,\ T_1 = 1)}{P(T_1 = 1)} = \frac{P(T_2 = 1)}{P(T_1 = 1)},\ \text{if } \sum_1 < 0 \tag{12b}$$

From (12a) and (12b) we can conclude that the conditional choice in the second period: (1) no longer depends at all on the factors that determined the same type of choice in the first period if the "surprise" ($\sum_1$) is positive or nil; (ii) does not necessarily obey these factors with the same intensity, and perhaps not in the same direction, if the surprise is negative. The influence of subjective quality on theatre attendance is a good illustration of this: it is positive with regard to the unconditional choice according to (8) or (9), but it should become nil, or, in any case, low when we move to the conditional choice. It would be exactly nil, in fact, if the surprise were nonnegative: the sign would be uncertain if the surprise were negative.

3.4. Satisfaction with Last Play Seen

A question in the Theatre survey indicates whether the respondent "greatly liked" (value 1) or did not greatly like (value 0) the last play seen during the last year. The statement of "satisfaction" in the survey cannot be taken as a direct, simply "qualitative" measurement of the utility or satisfaction experienced by the theatregoer, even on the assumption that he still remembers accurately. Since there is no reason why the implicit satisfaction scales adopted by different, independent individuals should coincide, even if each scale is cardinal, the statements of these individuals could not be correlated on a common scale.

If we put forward the hypothesis that judgements, in order to be valid, must be comprehensible to those who hear them, a purely ordinal value must be attributed to declarations of satisfaction. This is an essential condition to avoid the message being made incomprehensible because of the observer's subjectivity. For a person to say that he is satisfied by a given consumption is therefore to reveal to others that the person will not change his order of preference, and is to state that the person is prepared to make the same choices under the same conditions in light of the experience acquired.

In formal terms, the presentation is as follows. The probability of attending the theatre was, as indicated by (10), a prior (at time 1) and unconditional probability, $P(T_1 = 1)$. On the other hand, the probability of stating that one is satisfied with a performance is a posterior (at time 2) probability that is conditional on having gone

to the performance, which we interpret as a probability of theoretically returning to the theatre under the same conditions:

$$P(\text{SATIS}/T_1 = 1) \equiv P(T_2 = 1/T_1 = 1). \tag{13}$$

This has a number of interesting implications. First, it is to be expected that statements of satisfaction will be at a relatively high level and that the variance will be less than in practice, two facts that it would be difficult to reconcile with the high degree of individual heterogeneity if the stated satisfaction were no more than a measurement of the utility felt by the person making the statement. The reason for this is that one decides to attend the theatre exactly because one hopes to gain satisfaction thereby and that only some unpleasant surprise could make us change our opinion. If one could be certain of one's choice, everyone would report satisfaction a posteriori. But although uncertainty and lack of information may explain the possibility that one is not always satisfied, their effects must not be exaggerated. Thus, we can observe in the Theatre survey that two thirds of people say that they are very satisfied with the last play they saw and 85% "greatly" or "somewhat" liked it (Guy and Mironer, 1998, p. 49). Furthermore, according to the same source, there is little variation in these percentages based on the type of performance or the type of public. Last, the two subsamples of "experienced" and "inexperienced" theatregoers that we assembled[4] report (maximum) satisfaction rates that are strictly identical: 67.65% and 67.35%.

Another characteristic of stated satisfaction that is of interest is simulation of a future choice of theatre attendance, thus allowing to reconstruct, on the basis of survey data, a pseudo-sequence of three successive choices.[5] This is especially important for the test of our "learning by consuming" hypothesis, since the surprises from any consumption during the learning phase continue to upset the demand relationships as they appear to us if we are unable to observe accumulated experiences immediately or only in an imperfect manner. The instability of the parameters estimated from one period to the next results to some degree from the effect of unobservable surprises on later choices.

4. Econometric Consequences of Sample Selectivity

The econometric results are recorded in the columns of Table I. For the complete sample, we attempt to explain in column 1 the theoretical probability of attending the theatre during the last four years, $P(T)$. In column 2 we are interested in the frequency of theatre outings during this period, only of those theatregoers ($n/n > 0$). The sample is reduced considerably in the proportion 1 to 9. After eliminating the large numbers of non-theatregoers, we concentrate on the theatre demand of potential theatregoers during the last year. We consider first, in column 3, the conditional probability that a potential theatregoer will become an actual theatregoer during this period, $P(T_1/T)$, then the frequency of this outing, taking into account only actual theatregoers ($n/n_1 > 0$), in column 4, a total of 501, or by

looking at the larger group of potential theatregoers in column 5 (n_1, $n_1 \geq 0$). The table is completed in column 6 by the probability that the person "greatly liked" the last play seen $P(\text{SATIS}/T_1)$.

Before discussing the results it should be noted that five of the six variables we have just listed are conditional on choices of theatre outings and are observable only in the case of the subsample of persons "selected" on the basis of this criterion.

This property creates selectivity biases: the econometric estimates deduced from the common models – ordinary least squares (OLS) for columns 2 and 4 (frequencies), tobit model for column 5 (frequency including zero) or probit for columns 3 and 6 (dichotomous variables) – are potentially biased (see van de Ven and van Praag, 1981, Maddala, 1983).

We considered a number of econometric methods to allow for these conditional factors and selectivity biases. The first is Heckman's two-step procedure: the inverse of Mill's ratio is constructed using a probit (applied to Equation (9) for T_0), and this variable is included as an explanatory variable in the equation subject to the selectivity bias. The latter equation is estimated by OLS with White's corrected variance-covariance matrix of the estimated coefficients. We applied this procedure to the estimation of theatre attendances (FQ4 and FQ1 in Table I). When the selectivity bias relates to two dichotomous variables, such as the probability conditional on event T_0, $P_i(T_1/T_0)$ in Equation (12), van de Ven and van Praag (1981) have demonstrated the validity of a two-step procedure analogous to Heckman's procedure with correction for heteroscedasticity. This procedure produces results comparable to a bivariate probit model with selectivity bias.

In Table I, we present the results of the two-step method for P(DFQ1/DFQ4), column 3, and those of the bivariate probit model with selectivity bias, for P(SATIS/DFQ1), column 6. We also used a tobit with selectivity bias to explain theatre attendance during the last year, FQ1D (column 5 in Table I). In this application we include the observations with no theatre attendance during the last year (limit below the tobit) if the respondent attended the theatre during the last four years.[6]

5. Econometric Results

We will examine in turn the determinants of theatre attendance (probabilities and frequencies) and stated satisfaction with the last performance, as indicated in Table I. Attendance is captured in several different, but related aspects: unconditional probability $P(T)$ (noted DFQ4 in column 1), conditional probability $P(T_1/T)$ (noted DFQ1 in column 3), conditional numbers of plays seen over four years, n (noted FQ4 in column 2), in one year, n_1 (noted respectively FQ1 in column 4 if zeros are excluded, and FQ1D in column 5 if zeros are included). Stated satisfaction with the last play seen (noted SATIS in column 6) can also be interpreted, as explained in subsection 3.4, as a conditional probability of returning to the theatre under past conditions $[P(T_2/T_1)]$. We have opted for a parsimonious presentation of the results by eliminating from the equations variables with a $|t|$ statistic smaller

Table I. Empirical results: coefficient estimate and *t*-statistics

	Theatregoers (during the last 4 years)			Theatregoers (during the last year)		Satisfaction
Dependent variables	Probability	Frequency	Probability	Frequency		
Explanatory variables	DFQ4 (Probit)	FQ4 (OLS)	DFQ1 (Probit)	FQ1 (OLS)	FQ1D (Tobit)	SATIS (Biv prob.)
Socio-economic and demographic variables						
ENF2	–0.1746					0.2294
	(–3.22)					(1.38)
ENF3	–0.08574	–1.289	0.1489			
	(–1.52)	(–1.74)	(1.83)			
ENF4	–0.2615	–1.501		–0.3520		
	(–4.86)	–2.32)		(–1.20)		
EQUI1	–0.09687		0.1735	1.1597	1.0581	–0.3237
	(–1.23)		(1.38)	(2.28)	(1.50)	(–1.10)
EQUI2	0.19750		–0.0915		–0.4183	–0.3759
	(4.02)		(–1.35)		(–1.40)	(–2.70)
EQUI3	0.2425		–0.2095			0.3198
	(3.64)		(–2.08)			(1.37)
EQUI4	0.2196	1.085				
	(4.30)	(1.54)				
EQUI5	0.2322	3.141		0.7874	0.45651	
	(4.99)	(3.75)		(3.19)	(1.55)	
EQUI6	0.1736					–0.2760
	(2.71)					(–1.77)
SHCENTM	0.1750	1.308	–0.1318			–0.4802
	(2.52)	(1.60)	(–1.81)			(–2.16)
SHCETMP	0.2377	1.463				
	(4.38)	(1.59)				
SPARIS	1.103	3.841				–0.4220
	(12.30)	(2.07)				(–1.88)
SBANLIEU	0.6609	3.249				–0.2372
	(11.49)	(2.48)				(–1.22)
FERME	–0.4964	–2.085				
	(–3.20)	(–1.51)				
SEFAGEC					0.4423	
					(1.45)	
SEEPROF		–1.133				
		(–1.43)				
CADRE	0.5348	1.444		0.3090		
	(8.98)	(1.25)		(1.14)		
ARTCO						–0.3846
						(–1.64)
OUVRI	–0.3507	–1.401				0.2968
	(–5.79)	(–1.37)				(1.20)
SMARIE	–0.2669					
	(–3.78)					

Table I. *(Continued)*

	Theatregoers (during the last 4 years)			Theatregoers (during the last year)		Satis-faction
Dependent variables	Probab-ility	Fre-quency	Probab-ility	Frequency		
Explanatory variables	DFQ4 (Probit)	FQ4 (OLS)	DFQ1 (Probit)	FQ1 (OLS)	FQ1D (Tobit)	SATIS (Biv prob.)
SCONJ	0.2579			0.4678		
	(2.61)			(1.21)		
SENF	–0.6000		0.6520		0.4423	
	(–2.33)		(1.42)		(1.45)	
SAUTR	–0.1145					
	(–1.12)					
ICEMPL	–0.3426					
	(–2.03)					
ICOUVR	–0.7058					
	(–3.51)					
IAACTIF	0.2041					
	(1.82)					
Price and quality variables						
POPTREF		–2.424		–0.8342	–0.3448	
		(–2.87)		(–2.79)	(–1.13)	
POPIT		–2.158		–0.8647		
		(–2.25)		(–2.74)		
POPPSUB		–3.124	–0.4033	–1.338	–1.886	
		(–2.57)	(–2.94)	(–1.99)	(–2.79)	
PM̂A		–0.009	–0.00158	0.00210	0.000993	–0.00110
		(–0.51)	(–0.94)	(0.35)	(0.14)	(–0.24)
PGRAT				1.147		
				(2.69)		
PPARK				0.8033		
				(1.83)		
PRAP				0.7984		
				(2.65)		
Knowledge and taste variables						
CACOMED			0.1341		0.5286	
			(2.24)		(1.93)	
CADROLE		–0.9858				0.3672
		(–1.61)				(2.71)
CAHUMAIN			–0.1090	–0.3707	–0.5592	0.3477
			(–1.65)	(–1.37)	(–1.90)	(2.40)
CATEXT		0.9415	0.1325		0.5570	
		(1.79)	(2.19)		(1.88)	
CCMSFD1						–0.6170
						(–2.04)
CCMSFD3		5.923		2.125	2.1262	
		(3.89)		(5.93)	(5.48)	

Table I. *(Continued)*

	Theatregoers (during the last 4 years)			Theatregoers (during the last year)		Satis-faction
Dependent variables	Probab-ility	Fre-quency	Probab-ility	Frequency		
Explanatory variables	DFQ4 (Probit)	FQ4 (OLS)	DFQ1 (Probit)	FQ1 (OLS)	FQ1D (Tobit)	SATIS (Biv prob.)
CAFCD1						0.8403
						(2.32)
CAFCD3					–0.5235	
					(–1.67)	
NGCMSFD1						–0.3636
						(–2.54)
NGCMSFD3			0.2156		0.9510	–0.4395
			(1.49)		(1.48)	(–1.71)
NGCAFD1						–0.1593
						(–1.13)
NGCAFD3		–1.588	–0.4259		–1.7927	
		(–1.31)	(–2.74)		(–2.51)	
CLRV		–0.6586		–0.6070		
		(–1.12)		(–2.18)		
TTASSID	0.4585		–0.3552		–1.606	0.6781
	(3.35)		(–1.93)		(–1.96)	(1.30)
TTSOUV	0.4779	2.936				0.5696
	(7.63)	(2.62)				(3.06)
TTPARF	0.3434	1.640				0.1616
	(7.57)	(2.25)				(1.20)
JABONN		–5.125	–0.3498	–1.674	–1.876	
		(–6.16)	(–4.72)	(–5.31)	(–6.56)	
HCINEMA		0.1270	0.02151	0.0705	0.1100	
		(5.40)	(3.39)	(2.48)	(3.69)	
HCINEMA2			–0.00024	–0.000796	–0.00122	
			(–2.00)	(–1.58)	(–2.18)	
HONPPTH		–3.346		–1.405		
		(–2.39)		(–1.72)		
Other variables						
CONSTANT	–1.704	3.947	1.136	1.705	0.955	1.090
	(–16.40)	(0.930)	(2.48)	(1.38)	(1.50)	(2.31)
IRMI4		3.384	–0.2291			
		(1.86)	(–3.81)			
IRMI1				0.9774		
				(1.35)		
$\hat{\rho}$ (parameter)		0.4136	–0.4893	0.3734	–0.2863	–0.4956
					(–3.10)	(–1.99)
Other statistics						
Log of likelihood					–3931.09	–834.97

Table I. *(Continued)*

	Theatregoers (during the last 4 years)			Theatregoers (during the last year)		Satisfaction
Dependent variables	Probability	Frequency	Probability	Frequency		
Explanatory variables	DFQ4 (Probit)	FQ4 (OLS)	DFQ1 (Probit)	FQ1 (OLS)	FQ1D (Tobit)	SATIS (Biv prob.)
χ^2 of likelihood ratio	936.90		123.51			
(D of L)	(26)		(18)			
% of correct predictions	89.05		65.37			
$\overline{R}^2$ or Pseudo Maddala	0.11	0.23	0.13	0.22		
Number of observations	7970	898	898	501	898	501 (898)

than 1. For the linear regressions, this rule of practice can be justified. For the nonlinear models, an examination of the χ^2 of the likelihood ratios supported our decisions.

An initial comment will deal with the great similarity of the effects when one moves from the probability of unconditional choice to frequencies, after correction for potential selectivity bias. The signs of the significant effects are usually retained confirming the robustness of the econometric results. Also, it will be observed that the coefficients of the tobit model (column 5) combine those of the probit model (column 3) and of the OLS (column 4), which is to be expected, since the first model describes both non-attendance situations and the frequency of theatre attendance for those who do attend.

It should be noted that most of the variables explain theatre attendance over four years (columns 1 and 2) but have no significant influence on recent attendance or satisfaction (column 3 to 6), after controlling for selectivity biases. The variables or coefficients associated with selectivity bias (IRM4, IRM1, and ρ) therefore seem to capture the individual propensity to attend the theatre. In short, it is quite logical to confirm that the theatre choices of an individual who is already known to be a potential theatregoer are henceforth dependent only on his experiences of the theatre and other recreational activities and on unforeseen changes in his income and prices.

5.1. THEATRE ATTENDANCE

Investigation of the determinants of the probability of attending the theatre is based on condition (8) or (9) in the case of unconditional choice, or (11), (12a) and (12b) for conditional choice, and investigation of frequency of attendance is based on

a linear specification of condition (7). The marginal utility of wealth, current full prices, subjective qualities of theatre and substitutes or complements, objective qualities of these goods, the depreciation (forgetting) rates and obsolescence rates of knowledge enter separately into each of the conditions of interest to us. The contrast between the various predicted effects of the same variable depending on the phenomenon considered (frequency of outings, discrete choice, conditional discrete choice) allows us to envisage a good test of the "learning by consuming" model.

Two factors essentially contribute to the subjective quality of the performance (s): intrinsic taste for the theatre and degree of familiarity with the theatre.

A number of opinions indirectly measure taste for the theatre, such as greater appreciation of the actors and the quality of the text . Two other variables we have constructed (NGCAFD and NGCMSFD) attempt to measure taste directly. We used the appreciation scores from 0 to 10 that the respondents assigned to a list of 56 names; these subdivide into 23 theatrical writers and 33 actors and/or directors. We considered that a fairly large number of very high scores (9 and 10) would constitute evidence of a taste for the theatre. The results obtained lead us to qualify this initial intuition. It seems that the respondents treat writers and actors/directors differently. This appears most clearly for attendance estimated by the tobit model (column 5): the respective appreciations of writers and actors/directors have contrary effects on theatre attendance, negative in the first case and positive in the second. It seems likely that these two variables indicate tastes that are slightly different: first, a taste for reading as a substitute for the theatre among those who like writers a great deal, but necessarily a taste for the theatre among those who like actors/directors a great deal. This interpretation, which makes reading a substitute for theatre outings, is confirmed by the negative effect of regular reading of journals and magazines (CLRV) on the number of evenings spent in the theatre.

The best measurement we have of the degree of familiarity with, or experience of, the theatre is the percentage of actors and directors known (CCMSFD). A person who says he knows more than 80% of the names put to him is considered to know the theatre well (CCMSFD3). And in fact it is necessary to have attended the theatre personally in the past in order to know the actors and directors whose talent can only be appreciated on the stage and in action. Here again, knowledge of the writers (CAFCD) does not have the same significance at all, because it can be based on books – that is what the data suggest – and the writers whose plays one goes to see in the theatre are not necessarily those whose names are on the list given to the respondent. The accumulated knowledge of actors and directors, unlike that of writers, is therefore an excellent measure of previous theatre attendance and predictor of current attendance. For those who know actors and directors well (CCMSFD3), theatre attendance is clearly greater and the tobit model indicates that on average their probability of not attending the theatre (P(FQ1D $= 0$), the threshold) is reduced from 0.49 to 0.02.

If we are right to interpret the above-mentioned variables as indicators of the subjective quality attributed to the theatre, and if our theoretical model is accurate, we can conclude from the significantly positive sign of the corresponding coefficients in the frequency columns (columns 2 and 4, and 5) that *demand for the theatre is price-elastic*. Specifically, we estimate the price-elasticity to be around –1.47 for the theatregoer who knows more than 80% (CCMSFD3) of the names of actors and directors from a list put to him.[7] Compared to price-elasticities of –1 for the others, these results confirm a theoretical prediction of the model (see Equation (6)) that the demand for the theatregoers who have completed their learning process becomes again price elastic. The possibility that a theatre experience will produce unpleasant surprises overall and result in a reduction rather than an increase in subjective quality exists theoretically and would lead to the opposite conclusion of inelastic demand. But apart from the fact that this possibility is at odds with the intuition that theatre is a beneficial habit, unlike tobacco for example, it must be excluded here because we are also using a direct measurement of taste (NGCAFD and NGCMSFD). The latter is positively correlated with the knowledge measurements (Goodman-Kruskal's Gamma statistics is 0.55 for writers and 0.36 for actord/directors). We also find confirmation of the predicted effects of the subjective quality indicators on the unconditional (column 2) and conditional (columns 3 and 6) theatre attendances: positive effect in the first case and nil, low or negative effect in the second case.

The frequency of viewing theatre broadcasts on television is an indicator of taste for theatre, and the non-conditional probability of spending the evening in the theatre increases regularly with it. For example, the average respondent who says he views theatre on television one to three times per month (TTSOUV) increases from 0.075 to 0.173 his unconditional probability of attending the theatre and makes approximately three additional theatre outings.

The cinema also provides the same kind of satisfaction as the theatre and, like it, is an outing. It is therefore understandable that people who regularly go to the cinema also go to the theatre because they like to go out and also know they can find enjoyment of the same kind in the theatre. However, beyond a certain threshold of cinema-going, the complementarity of the two recreations in producing utility may be transmuted into substitutability and the spillover effect that cinema initially had on theatre may become a factor reducing theatre outings. The quadratic form of the effect of the annual number of cinema outings confirms what we have just said. Finally, reading books and magazines also appeared to be a substitute for the theatre.

The price of an evening at the theatre is another important factor in the decision. The survey allows a fairly detailed measurement of this by looking at every aspect, in part summarized by the concept of Becker's full price in time and money.

The monetary aspects of the relative price are contained in three variables. The average ticket price anticipated by the theatregoer (PMA) actually incorporates price and quality elements to which we will return in a moment. A fairly good

index of the inverse of the price of substitutes or, if preferred, an index of their quality (noted POPPSUB) is also available in the expression of the following opinion: "Other recreations or other types of performing arts are more attractive than the theatre". Finally, a third variable (PGRAT) indicates whether the theatregoer received a free ticket. These last two variables are considered exogenous here; one should have a negative and the other a positive effect on theatregoing.

But the price effect here greatly exceeds the simple effect of the ticket price and includes a number of aspects that are not monetary (or only incidentally so) and consideration of the fixed cost of the evening, such as difficulties of transportation and babysitting (POPTREF) or of obtaining information and organizing the evening (POPIT). We can admit that these routine obstacles are exogenous and confirm that they significantly affect the frequency of outings in the direction expected.

In the long questionnaire distributed only to theatregoers, the quality of the outing was measured by a number of questions. Here we are referring to an *objective quality* that everyone measures in the same way and which is not to be confused with the subjective quality that has already been discussed. These two components, objective and subjective, obviously contribute to the total quality that must, in writing the model, replace the subjective quality alone that was considered in section 3. The objective quality of the outing can be captured in terms of use of a parking facility (PPARK) and having a meal after the performance (PRAP); the other quality aspects measured in the survey were shown to have little or no significance. The exogenous nature of the second variable is dubious. However, even if the model structure is simplified and this dichotomous variable is treated as continuous, none of our attempts using the generalized moments method (GMM) converged, and we had to decide to consider it exogenous in our econometric specifications. The two quality indicators selected influence the number of outings positively, suggesting once again the existence of a demand price-elasticity.

Returning to the average ticket price anticipated by the theatregoer (PMA), which incorporates price and quality factors, we treated this variable as endogenous. We therefore instrumented it using all the socio-demographic variables (income and place of residence indicators) that appear for the sample, and the variables indicating appreciation of quality and of the outing. Estimation by ordinary least squares corrected for the theatregoer/non-theatregoer selectivity bias provides us with a generated regression variable ("generated regressor") $\widehat{\text{PMA}}$. This generated regressor problem is especially difficult to analyse in models which combine discrete variables, continuous variables and selectivity bias. However, the results of later estimation stages are unchanged regardless of whether $\widehat{\text{PMA}}$ or PMA is used and are reliable (see Hoffman, 1987) as the effect of $\widehat{\text{PMA}}$ on attendance is always nil. In fact, $\widehat{\text{PMA}}$ could well measure the average price of tickets among those who have a fairly accurate idea of it, but also the subjective value assigned to a seat of medium quality among all those who do not know its price. According to our other results, the coefficient of $\widehat{\text{PMA}}$ should be negative if PMA indicates the ticket price, and positive if PMA indicates the subjective quality. It is quite possible that

the estimated effect on the entire sample is nil because these two effects work in opposite directions. Our result is similar to that of Throsby (1990), who found for three Sydney theatres that the price of seats had a nil or positive effect on the number of theatregoers attending a specific play, whereas the objective quality indices had a cumulative positive effect. However, we must not deduce from this that the true price elasticity of the theatre is nil because the price of seats incorporates both objective and subjective quality factors.

The effect of a fairly large number of socioeconomic variables on the unconditional probability of going to the theatre is obvious, and merely confirms the result of many sociological studies. But the interpretation is of greater interest here than the result as such, because we have brought together under this denomination a number of heteroclite effects. The size of the city is an important factor, perhaps the most important, for the unconditional probability of going to the theatre. From this point of view the hierarchy formed by Paris – suburbs/provincial cities with populations greater than 20,000 – and the rest is clear. Paris and the cities of some size in fact offer many more possibilities of choice and access to the theatre than a rural environment. The existence of children and their number (indirectly captured by their age band) significantly affect both the price of their parents' time and their real income. Ownership of a dishwasher, more than one automobile, an automobile radio or a microcomputer indicates above all a strong income effect stimulating theatregoing. And the socio-occupational class of the head of household, or of the spouse if the spouse is the respondent, captures an income effect (and a price of time effect when the respondent is the spouse of the head of household), but also certainly a positive effect of general theatre knowledge. Finally, another example of the latter effect is the simple finding that people who say they do not often think about the theatre, because there is not much discussion of it in their circle (HONPPTH), go to the theatre infrequently themselves. It is therefore through a series of indices that we identify accumulation of a human capital specific to the higher occupations (senior managers, liberal professions, technicians and intermediate occupations) and the activities of the mind into which the theatre falls. In the same way, accumulation of theatre capital can happen through season tickets, so that very naturally those who have never purchased season tickets[8] (JABONN) of course visit the theatre less frequently than the others.

5.2. THE THEATREGOER'S STATED SATISFACTION

Certain consequences (for example, instability of coefficients) of the conditional nature of satisfaction interacting with possible correction of the selectivity bias have already been discussed above. Another demonstration of the conditional nature of satisfaction is that pleasant surprises encourage us to repeat our experiences or to state we are satisfied, while unpleasant surprises discourage us or make us dissatisfied. The conditional effect of a theatre surprise is expressed in Equation (11), and the lower the subjective quality of the theatre, the greater it will be (this last

statement is demonstrated in Lévy-Garboua and Montmarquette, 1995). Although theatre surprises cannot be observed, they can be correlated with observable factors. Since the surprise is experienced only after consumption, its effect cannot be captured by the selectivity bias variable and is therefore very likely to be partially found in an explanatory variable, even though the latter was used to construct the previous variable. The coefficient of the variable in question contains statistical information regarding the sign of the surprise, rather in the same way as observation of certain characteristics of an insured person provide information as to the risk he represents.

This analysis provides a satisfactory grid for reading the results in column 6. It should be noted first that city-dwellers, who are the most frequent theatregoers, tend to state less satisfaction than the other theatregoers. We calculated, for example, that the probability of a Parisian stating that he is very satisfied is only 0.64, compared with 0.78, on average, for non-Parisians. The reason why city-dwellers are apparently the most subject to unpleasant theatre surprises is that since they have the best access to the theatre, they experience an *adverse selection* phenomenon. Thus, among city-dwellers, a higher proportion than average of non theatre-lovers are among the audience. Inversely, we can observe the positive effect on satisfaction of appreciating the comedy (CADROLE) or humanity (CAHUMAIN) of a play. These two aspects are mainly mentioned by people who attend the theatre infrequently, as shown by the negative sign of the other coefficients, but they still predispose those who prefer them to like the theatre, perhaps without being aware of it themselves. On the other hand, those who neither know nor like the actors and directors (CCMSFD1 and NGCMSFD1) of course experience unpleasant surprises when they go to the theatre, while those who know few writers (CAFCD1) are not much disposed to reading, but can, on the other hand, appreciate the living, real aspect of the theatre. Generally speaking, we can confirm that the conditional effect of a variable on satisfaction tends to appear on the variables associated with lack of theatre experience, therefore at low subjective quality values, as our model predicts.

6. Conclusion

In attempting to identify the specific characteristics of theatre demand, it seemed essential that the estimated demand model allows a large place for the heterogeneity of tastes, the extreme differentiation or uniqueness of cultural goods and services, and the consequences of lengthy, unsystematic learning of his own taste by each individual. We therefore presented a demand model with “learning by consuming” in which the quantity of each good is weighted for its quality, whose essential component here is subjective. This subjective quality reflects the intrinsic taste for, and accumulated experience of, the good and is directly proportional to total surprises, whether pleasant or unpleasant, resulting from past consumption. This demand model is more parsimonious than the addiction or rational habit formation models,

since it retains a hypothesis of intertemporal separability of utility conditional on past consumption.

We have specified several aspects of theatregoing and stated satisfaction with the theatre using this model, and we have tested it econometrically on a single survey carried out on a large random sample. We have constructed a sensitive measurement of knowledge of, and taste for, the theatre and have captured several aspects of the full price, objective quality of the outing and many socioeconomic variables. We have also taken into account the potential selectivity biases by exploiting the nesting of two subsamples of theatregoers in the source sample and have found that they in fact play an important role. The model allows calculation of price elasticities on survey data as soon as the accumulated experience and taste for consumption of the good are measured. We find that demand for the theatre is price-elastic and that the substitution effects of televised theatre broadcasts, cinema and reading are important. In addition, by drawing a distinction between choices not conditional and conditional on past consumption of the good, we can add a dynamic interpretation to the effects measured on survey data and in this case reconstruct a pseudo-sequence of three choices.

From this point of view, the distinctive property of cultural goods is their uniqueness or great differentiation, which is another way of saying that they are hard to reproduce, but it also means that their choice involves long learning processes. Provided these essential distinguishing features are kept in mind, cultural demand seems a promising field for economic analysis.

Appendix

Table A.1. Symbols and definitions of variables

Symbols	Definitions
Dependent variables:	
DFQ4	Attended amateur and professional theatre in recent years: yes = 1; 0 otherwise
FQ4	Attended during the last four years
DFQ1	Attended the theatre during the last year: yes = 1; 0 otherwise
FQ1D	Attended the theatre during the last year. (D) includes the 0s
SATIS	Satisfaction with last performance: Satisfaction: great = 1; 0 otherwise
Explanatory variables:	
Socioeconomic and demographic variables	
	Characteristics of household:
ENF2	Child from 2–9 years
ENF3	Child from 10–14 years

Table A.1. *(Continued)*

Symbols	Definitions
ENF4	Child of +15 years
EQUI1	Has a telephone
EQUI2	Owns a dishwasher
EQUI3	Owns an automobile
EQUI4	Owns more than one automobile
EQUI5	Owns an automobile radio
EQUI6	Owns a microcomputer
SHCENTM	Lives in a city with population 20000–100000
SHCETMP	Lives in a city with population +100000
SPARIS	Lives in Paris
SBANLIEU	Lives in Paris suburbs
FERME	Lives on a farm
	Respondent characteristics:
SMARIE	Married
SEEPROF	Professional training
SEFAGEC	University or grande école
SCONJ	Connection with head of household: spouse
Socio-economic and demographic variables	
SENF	Connection with head of household: child
SAUTR	Connection with head of household: other
ICEMPL	Employee, x SCONJ
ICOUVR	Unskilled x SCONJ
IAACTIF	In labour force, x SAUTR
	Occupation of head:
CADRE	Senior manager, liberal profession
ARTCO	Tradesman, sales
OUVRI	Unskilled
Price and quality variables	
	Reasons given by people for not attending the theatre:
POPTREF	"Opinion" on cost of transportation and children
POPIT	"Opinion" on cost of information and time
POPPSUB	"Opinion" on substitute prices of other forms of recreation
PMA	Average anticipated price
PGRAT	Free ticket
PPARK	Parking
PRAP	Meal after performance
Knowledge and taste variables	
CACOMED	Appreciates actors
CADROLE	Appreciates comedy

Table A.1. *(Continued)*

Symbols	Definitions
CAHUMAIN	Appreciates humanity
CATEXT	Appreciates text of play
CMMSFC	% of directors and actors known on a list presented
CCMSFD1	$= 1$ of CCMSFC $\leq 35\%$ of directors and actors
CCMSFD3	$= 1$ if CCMSFC $> 80\%$
CAFC	% of writers known on a list presented
Knowledge and taste variables	
CAFCD1	$= 1$ if CAFC $\leq 35\%$
CAFCD3	$= 1$ if CAFC $> 80\%$
NGCCMSFC	Number of directors and/or actors highly appreciated (scoring 9 or 10)
NGCMSFD1	$= 1$ if NGCCMSFC ≤ 2
NGCMSFD3	$= 1$ if NGCCMSFC > 9
NGCAFC	Number of writers highly appreciated (scoring 9 or 10)
NGCAFD1	$= 1$ if NGCAFC ≤ 2
NGCAFD3	$= 1$ if NGCAFC > 9
CLJO	Reads newspapers
CLRV	Reads magazines
TTASSID	Views theatre on TV: 1 time per week
TTSOUV	Views theatre on TV: 1–3 times per month
TTPARF	Views theatre on TV: 3–10 times per year
JABONN	Has never had a season ticket
HCINEMA	Cinema visits per year
HCINEMA2	Square of HCINEMA
HONPPTH	"Opinion": people don't talk about the theatre any more
Selection bias variables	
IRDM4	Inverse of MILL's ratio associated with DFQ4
IRDM1	Inverse of MILL's ratio associated with DFQ1

Table A.2. Descriptive statistics: mean and standard deviation[a]

	Theatregoers and non-theatregoers ($N = 7970$)	Theatregoers in the last four years ($N = 898$)	Theatregoers in the last year ($N = 501$)
Dependent variables			
DFQ4	0.113		
FQ4		7.349	
		(9.28)	
DFQ1		0.558	
FQ1D		1.645	2.948
		(2.63)	(2.92)
SATIS			0.669
Explanatory variables			
Socioeconomic and demographic variables			
ENF2	0.249	0.202	0.176
ENF3	0.192	0.170	0.182
ENF4	0.297	0.295	0.311
EQUI1	0.903	0.928	0.934
EQUI2	0.269	0.414	0.419
EQUI3	0.812	0.852	0.836
EQUI4	0.262	0.365	0.391
EQUI5	0.231	0.383	0.401
EQUI6	0.0789	0.174	0.188
SHCENTM	0.127	0.101	0.094
SHCETMP	0.252	0.256	0.247
SPARIS	0.0369	0.119	0.150
SBANLIEU	0.151	0.291	0.305
FERME	0.0459	0.010	0.008
SMARIE	0.708	0.628	0.595
SEEPROF		0.128	0.116
SEFAGEC		0.352	0.399
SCONJ	0.110	0.157	0.170
SENF	0.0108	0.0045	0.006
SAUTR	0.0041	0.145	0.162
ICEMPL	0.0177	0.014	0.012
ICOUVR	0.0202	0.007	0.002
IAACTIF	0.0026	0.086	0.104
CADRE	0.0893	0.264	0.307
ARTCO	0.0666	0.0679	0.066
OUVRI	0.215	0.0969	0.080
Price and quality variables			
POPTREF		0.444	0.411
POPIT		0.245	0.275

Table A.2. *(Continued)*

	Theatregoers and non-theatregoers ($N = 7970$)	Theatregoers in the last four years ($N = 898$)	Theatregoers in the last year ($N = 501$)
POPPSUB		0.057	0.040
PMA		140.30	139.14
		(67.53)	(59.20)
PGRAT			0.080
PPARK			0.074
PRAP			0.184
Knowledge and taste variables			
CACOMED		0.459	0.505
CADROLE		0.553	0.523
CAHUMAIN		0.291	0.278
CATEXT		0.536	0.585
CCMSFD1		0.079	0.068
CCMSFD3		0.109	0.142
CAFCD1		0.073	0.054
CAFCD3		0.374	0.413
NGCMSFD1		0.479	0.469
NGCMSFD3		0.069	0.072
NGCAFCD1		0.566	0.551
NGCAFCD3		0.059	0.050
CLJO		0.539	0.531
CLRV		0.725	0.761
TTASSID	0.017	0.027	0.018
TTSOUV	0.109	0.166	0.172
TTPARF	0.317	0.415	0.437
JABONN		0.761	0.697
HCINEMA		12.20	14.51
		(14.74)	(15.63)
HONPPTH		0.026	0.022

[a] No standard deviation when the variable is dichotomous or polytomous.

Notes

* This is a revised and shorter version of a paper "Une étude économétrique de la demande de théâtre sur données individuelles" presented at a conference on "Approaches comparatives en économie de la culture", Paris, 1995 and forthcoming in "Économie et Prévision". We wish to thank the Département des Études et de la Prospective of the Ministry of Culture for authorizing use of its surveys and publication of the results, and for its contribution to the funding of this study. The second author wishes to thank FCAR Québec for its financial support. We are grateful for the comments and advice of O. Donat, X. Dupuis, J.-M. Guy, F. Rouet and anonymous referees; however, we are solely responsible for any errors and omissions.

1. A set of symbols, definitions of variables and descriptive statistics for the complete data base can be found in Lévy-Garboua and Montmarquette (1995) or is available from the authors. A number of variables were not used in the final estimates (for example, age and gender, certain price and knowledge variables) because they were never statistically significant.
2. We are indebted to a referee for pointing out the models of Fisher and Shell (1968) on taste and quality change and of El-Safty (1976) on adaptive behavior which bear many resemblances to ours. Our model adds the intertemporal choice issue and specifies a learning process that introduces a surprise element when consuming (cultural) goods.
3. It should be borne in mind that two complements in utility production may be substitutes in consumption.
4. The criterion for division into "experienced" and "inexperienced" theatregoers combines the respective percentages of actors/directors and dramatists that the respondent indicates knowledge of from a list of names submitted to him (23 and 33 respectively). The experienced group is defined by CCMSFD3 $= 1$ and CAFCD3 $= 1$, and the inexperienced group is defined by CCMSFD2 $= 1$ and CAFCD1 $= 1$.
5. In reality, the first two choices are not strictly sequential, since the event "attending the threatre at least once during the last four years" contains the second event "attending the theatre at least once during the previous year". But four years is a sufficiently long time compared with one year to allow the first choice to be considered prior to the second without too great an error.
6. Greene (1991, p. 600) presents the probability functions of this model. Table I estimates were carried out with LIMDEP, GAUSS and GAUSSX programs.
7. See Equation (6a) and assuming that the average "experienced" theatregoer knows 85% of the actor/director list, $\overline{s} = 0.85$ and attends more than 3 theatre outings a year, $\overline{n} = 3.87$.
8. Constructing this variable may raise a problem of endogeneity, but it was not possible in this survey to isolate people who had previously held season tickets. We verified that inclusion of this variable did not change the other results but enhanced the explanatory power of the model.

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