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Determinants of the Demand for Live Entertainments: some survey-based evidence

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ABSTRACT

This paper presents estimates, based on survey evidence, of the determinants of total demand by the public for attendance at live events, such as opera, rock music, musicals and theatre. The paper estimates equations for total attendance in the last twelve months as a function of perceptions of price, income, consumption of substitute goods, demographic variables and measures of the 'social network' effect of attendance (including loneliness). The equations are estimated using a fixed effects model for male-female differences. Some differences are established between males and females. There is only limited evidence for a significant role of social network effects.

1. INTRODUCTION

This paper presents estimates of the determinants of total demand by the public for attendance at live events such as opera, rock music, musicals and theatre. We include film in this category, even though the performances are recorded, because it shares with these live performances economically-important elements in the consumption of the good: the person must travel to be in a certain location, for a fixed length of time, to consume the product fully (two half-seen films or half-attended rock and roll gigs are not equal to one full performance of similar 'quality' products). This involves transaction costs and constraints other than price.

There are a number of survey-based studies of attendance by individuals at a single type of live event [see for example, Bille Hansen (1997), O'Hagan (1996), Kracman (1996), Cameron (1993), Colbert *et al.* (1998), Forrest *et al.* (2000), Felton (1989), Gapinski (1984, 1988), Kelejian and Lawrence (1980), Kolb (1997), Lange and Luksetich (1984), Lévy-Garboua and Montmarquette (1996)]. There do not appear to be any investigations for rock/pop concerts, or indeed of musicals — both of which are, in monetary terms, significant genres.

The above studies are interested primarily in the impact of prices and the magnitude of consumer surplus from 'higher' culture. These studies show relatively little evidence of the role of personal characteristics and the social environment in which decisions are made. More specifically there is little focus on gender, bar a token use of a shift dummy on occasions and some work on spousal influence [Upright (2004)].

Studies of the aggregate consumption of live entertainment seem to be extremely rare, although Withers (1980) looks at aggregate data on this (but not surveys). Given the absence of studies of total live performance attendance, there seems to be a case for attempting such a study. The empirical work in this paper uses the results of a one-off survey designed specifically to elicit preferences about support for local theatre. However, it was decided to situate this fully in the context of total household attendance at live events. It therefore provides more detailed relevant information than is normally found in aggregate data or more general household surveys or exit surveys carried out on patrons of live events. Ideally, one could argue that what is really needed is a study which estimates a system of equations for broad types of live performance demand. We are not aware of any suitable dataset existing for such work.

Because this study offers a single set of cross-section results, however, detailed information on price variations is not generated. The paper thus estimates an equation for total attendance in the last twelve months as a function of perceptions of price, income, consumption of substitute goods, demographic variables and measures of a 'social network' effect (including loneliness). We use a pooled fixed effects model for gender effects i.e. there is a shift dummy for female identity and each of the other variables has a gender shift dummy. It is shown that total attendance at live events is a heavily skewed variable. In view of this, we also provide a simple analysis of the tail of the distribution by turning the dependent variable into a dummy, split at 12 attendances per year.

The results indicate that total attendance at live events is significantly related to hours of television viewing, as a substitute, but only for women. There are also notable male-female differences in the age quadratic and price relationships.

2. Theoretical background

The normal place for an economist to begin any study of demand is with the idea of a utility maximising unit. In elementary micro theory no distinction is made between whether it is the household or individual making the decision. Becker's 'economics of the family'/household production model has brought to our attention issues of externalities which arise in such contexts. In addition, it has illuminated the question of measurement of income in terms of the idea of 'full income' which takes account of time as well as earned and unearned sources.

Live entertainment is not a regular repeat buy like food, nor is it a consumer durable which comes up for periodic renewal like fridges. Each act of consumption has a degree of uniqueness, as the event will not be repeated in its exact form again. The comparator entertainment products — delivered via televisions, DVDs, CDs, computer games — have repeat purchase characteristics. They are also linked to capital goods (the playback technology) which lower resistance by providing very low cost low-risk opportunities to sample/consume entertainment products. These products also provide a conversational network externality as a source of utility, in that it is relatively easy to find other people with whom to discuss the experience of consuming them (although this is less true now than 20 years ago, with the proliferation of television channels). Live entertainments also provide network externalities which may have complex elements of snob and bandwagon facets to them. In the case of rock concerts extra utility may be gained from being in a large crowd, but in some cases the smallness and exclusivity of the venue is an additional source of utility.

The Becker model of household production highlights another potential source of network externalities: live entertainment is an input into producing a commodity which may have other inputs of one's own time and other people's time - for example family members. If the family or household (such as a group of flat sharers) is efficient then such positive externalities may be internalised.

Production may be enhanced by co-opting other people (friends, partners or family members) into the live event who automatically provide a network benefit, in terms of company at the event and post-event discussion and pre-event anticipatory conversation. We adopt the assumption that households maximize utility from combining goods and services purchased at exogenously given prices subject to a time constraint.

For an individual, let us assume the utility function:

$$U_i = f\ (LE_i,\ OG_i,\ z_i) \tag{1}$$

maximised subject to :

$$LE_i = f\ (X_i,\ t_i,\ t_{i+1},\ \ldots\ldots t_j) \tag{2}$$

$$OG = f\ (X,\ t_i,\ t_{i+1},\ \ldots\ldots t_j\ ) \tag{3}$$

$$P_x.X = {}^{j}\Sigma_i w_i.H_i + U_i \tag{4}$$

Where *LE* is live entertainments and *OG* is other household production. *X* is a vector of goods and services purchased in the market. The *z* term represents the overall pattern of tastes. Small t_i is the time this individual puts into the production of *LE*. The other *t*'s are the time other individuals put into this production function. The other time inputs may also come from individuals outside the household who might loosely be designated as 'friends'. The *P* term is

the price of goods purchased in the market (*X*), whilst w is the wage rate of the individuals in the purchasing unit. *UI* is unearned income.

Effectively, we are dealing with an aggregate household production function where rock concerts, theatre going, opera etc are incorporated into one composite time-intensive good, which is traded off against a composite less time-intensive aggregate commodity. For the moment let us ignore the issue of the characteristics contained in the *LE* commodity and assume that they are known with perfect certainty and that consumers have perfect information on their tastes regarding these characteristics. We assume that the 'other' good(s) are infinitely divisible, as are the amounts of their time inputs, whilst the LE variable is lumpy. One could quite easily consume 1/16 of a live performance but it would tend to have proportionately lower per-minute utility, as a performance consists of a series of events consumed as a totality and in a particular sequence.

To an extent, one might get utility from attending for 15 minutes to see a famous actor and then leave, but one would lose utility from not sitting through the whole package of the event. Thus there are discontinuities in the production of *LE*. This applies to the time inputs supplied by other people as well. For example, let us say a party of three attends a 90 minute performance, but a fourth person cannot allocate a block of time of more than 15 minutes for the event. Even if the event was zero priced with zero transaction costs of attendance, there would still be a loss of the shared externality gains, in that the 4th person's attendance will be less than a 1/6.

Let us assume further that we are dealing with a single period, which is long enough to have just one live event. Given the lumpiness of *LE*, consumers may be forced into a corner solution of zero *LE* at a particular point in time, when they would ideally have consumed a positive amount. In theory it would seem that this could be overcome by allocation over time so that there is an 'averaging out' process.

We now consider the issues of characteristics and imperfect information/risk in consuming live performances. *LE* can be seen as a combination of characteristics which include:

- the lighting and general stage ambience
- the atmosphere created by the group of other people who choose to attend (i.e. there is a club good or network externality in consumption)
- the performers
- the material — songs, script etc.
- the genre — whether the material/performance provides comic relief or dramatic tension.

The use of characteristics as proxies will be more likely if the individual experiences regret from *ex post* reflection on the outcome of 'bad' decisions made in a risky environment. Thus the producer can consider deliberately including safety enhancing characteristics as a way of lowering consumer resistance.

The issue of rational addiction [Becker and Murphy (1988)] also arises. The consumer of *LE* may experience a higher marginal utility at any given performance because past attendance has led to an investment being made in appreciation capital for the good. It follows from this that those who end up at a zero *LE* corner solution in an early phase of their life cycle, due to lumpiness, may be set upon a spiral of less than optimal life cycle consumption. They might be said to be building up 'involuntary resistance' due to the cumulative effect of being time-constrained to miss the live experience. In other words there may be a deficit of live performance appreciation capital due to the lumpiness of the time constraint. This deficit could be further deepened by associative factors such as a thin market for 'friends' for certain types of consumption which could lead to 'second best' choices of types of entertainment, or a corner solution for aggregate entertainment in a given period. Given all the above, the derived demand for tickets for live events is subject to a complex combination of factors beyond simple price and income measures available in national statistics.

3. DATA

This is effectively a case study using paired sampling sites which are close to each other and have regular flows between them for work, leisure and shopping. One of the sites, Leeds, is one of Britain's largest cities and the regional capital of its area of the north of England. The other, Harrogate, is a short distance north of Leeds and is an expensive and attractive residential and tourist area with attractions in terms of its beauty and history, having once been a Spa town.

A questionnaire instrument was used in face-to-face street interviews in Harrogate and Leeds, North Yorkshire, in July and August, 2003. The actual questionnaire is reproduced in the case-study chapter of Cameron (2005). The interviews were conducted by two research students, who filled in the questionnaire as they spoke to the respondents. Interviews were conducted on two days a week, in the central shopping areas, in the period around lunch time, in order to obtain a representative sample. As there were potential demographic biases in this method, some interviews were conducted on Saturdays, in an attempt to upsample under-represented groups.

The number of usable interviews obtained was 106 from Harrogate and 104 from Leeds. Not all questions proved equally usable as some elicited responses that were of little use and were thus generally not filled in by the interviewers. When the responses had been gathered, they were entered individually into a spreadsheet by the chief researcher, who checked back with the interviewers to clarify, where possible, improbable or ambiguous responses.

Questions were deliberately kept simple and the overall number of questions kept fairly low in order to seek to ensure accurate responses. Thus complicated scenario questions of the 'What would you do in the circumstance of a, b, c, d etc' were avoided. The questions used were either scales of preference, straightforward requests to state a money amount (sometimes in intervals) or basic data such as age, gender, marital status etc.

Because of the factors discussed in section 2 and the exigencies of dealing with individual responses, strong decisions were made in asking about price and income variables. We decided to work with the subjective perception of the individual rather than measured prices and incomes. In any case, price would not vary by product for individuals in a cross-section at a period in time other than through occasional exogenous factors such as age-subsidised ticket pricing.

The descriptive statistics for the variables of interest are shown in table 1, which also provides definitions. This is split into overall, male and female. One feature of note is the marked skew in attendance at live events (the variable TOTGOOuT is the number of attendances at live events in the last 12 months).

Table 1: Descriptive Statistics

Variable&definition	*Mean or %-All*	*Male*	*Female*
Leeds(dummy=1 for Leeds)	49.5	51	48
Tvhrs (hours of television watched per week)	18.62	18.2	18.97
Radiohrs (hours of radio watched per week)	14.76	15.68	14
Alone(dummy=1 if regularly attends events alone)	9.57%	11.7%	7.83%
Numparty (usual number of people in a party for an evening out)	3.78	3.88	3.69
Urge (maximum price would ever pay for a ticket divided by Rsnprice)x100	233.7%	233.8%	232.04%
Rsnprice (idea of a reasonable price of a ticket for an evening out)	12.12	12.3	11.98
Female (dummy=1 if female)	55.24%	-	-
Single (currently single)	40.95%	42.53%	39.66%
Grossinc (gross income of family unit)	42153.2	34969.8	47938
Noccup (no current occupation)	36.2%	27.6%	43.1%
Degplus (highest qualification is degree)	28.1	34	23.3
Age	38.42	38.82	38.1
Alevel (highest qualification is 'A' level)	16.67	13.83	18.97
Totgout (total number of live events attended in last twelve months)	10.3	10.9	9.84
Go out >12 times per year	25%	27.7	23.3
N = 210			

The full distribution is shown in Table 2. This indicates a long tail, giving rise to some quite extreme figures, with most observations clustered at the lower end. This is reflected in the differences between the mean (10.3) and the medi-

an of 6. The skewness statistic is 2.803 (standard error 0.169) with the kurtosis statistic being 9.155 (standard error 0.337). The lower quartile point is at three attendances per year with the upper quartile at 13. It seems likely from inspection of the statistics that the extreme right tail observations are a product of habitual consumption — most notably weekly attendance at pub/club venues which feature rock music.

Table 2: TOTGOOUT: Frequency distribution

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Valid	.00	18	8.6	8.7	8.7
	1.00	10	4.8	4.8	13.5
	2.00	23	11.0	11.1	24.6
	3.00	14	6.7	6.8	31.4
	4.00	11	5.2	5.3	36.7
	5.00	19	9.0	9.2	45.9
	6.00	13	6.2	6.3	52.2
	7.00	5	2.4	2.4	54.6
	8.00	14	6.7	6.8	61.4
	9.00	9	4.3	4.3	65.7
	10.00	3	1.4	1.4	67.1
	11.00	10	4.8	4.8	72.0
	12.00	5	2.4	2.4	74.4
	13.00	9	4.3	4.3	78.7
	14.00	5	2.4	2.4	81.2
	15.00	4	1.9	1.9	83.1
	16.00	1	.5	.5	83.6
	17.00	2	1.0	1.0	84.5
	18.00	4	1.9	1.9	86.5
	19.00	2	1.0	1.0	87.4
	20.00	2	1.0	1.0	88.4
	21.00	3	1.4	1.4	89.9
	23.00	1	.5	.5	90.3
	24.00	2	1.0	1.0	91.3
	25.00	1	.5	.5	91.8
	26.00	1	.5	.5	92.3
	28.00	1	.5	.5	92.8
	29.00	1	.5	.5	93.2
	30.00	1	.5	.5	93.7
	31.00	1	.5	.5	94.2
	36.00	3	1.4	1.4	95.7
	49.00	2	1.0	1.0	96.6
	50.00	2	1.0	1.0	97.6
	55.00	1	.5	.5	98.1
	62.00	1	.5	.5	98.6
	66.00	1	.5	.5	99.0
	75.00	1	.5	.5	99.5
	76.00	1	.5	.5	100.0
	Total	207	98.6	100.0	
Missing	system	3	1.4		
	Total	210	100.0		

4. Estimation and results

The initial estimating equation can be summarized as:

TOTGOOUT = *f* (Wealth, Gender, Social Network Factors, Price Factors, Availability of substitutes, Appreciation Capital, disturbance term) (5)

The wealth factor is captured by gross family income (GROSSINC), the absence of a current occupational variable (NOCCUP) and human capital variables (ALEVEL and DEGPLUS). NOCCUP would be expected to have a negative coefficient and the other variables would be expected to have positive coefficients, with DEGPLUS being larger than ALEVEL as it is a higher level of education.

The FEMALE dummy is coded from the individual's stated gender, being 1 if they were female. Where slope dummies are used in the estimation equations, 'FEM' has been prefixed to all variables that have been multiplied by this dummy. The SINGLE dummy is coded from questions on relationship status.

There are two price variables (RSNPRICE and MAXPRICE) to measure the price people think is reasonable for an evening out and the maximum price they say they will ever pay, respectively. We do not include actual prices as these will not vary, for the same items, in a single cross-section. The MAXPRICE and RSNPRICE variables will to some extent proxy a strong taste for live entertainment, which may also reflect acquired appreciation capital. Thus the price variables may act as measures of appreciation capital rather than prices in the normal sense in economic models. The RSNPRICE variable was entered directly and an additional variable was constructed as:

URGE = (MAXPRICE/RSNPRICE)*100

to show the maximum price offer as a percentage of the reasonable price offer perception.

The substitute home entertainment factor is measured by hours of television and radio and should have negative coefficients, due to issues of time intensity, time divisibility and relative riskiness. TVHRS and RADIOHRS are constructed from the answers to questions on how many hours per week respondents normally watched television and listened to the radio. The social network factors are measured by two direct variables (ALONE and NUMPARTY). We would expect NUMPARTY to have a positive coefficient as it will measure/proxy greater social network capital.

The ALONE dummy is constructed from responses to a question on whether people normally attended events alone, whilst the 'number in party' question asks how many people are in the party respondents normally attended with. The ALONE dummy would be expected to have a negative coefficient, as it is an inverse measure of sociability.

We include variables for age (in quadratic form as AGE and AGESQ), gender (FEMALE) and marital status (SINGLE). The LEEDS dummy is includ-

ed as a control, as we are using a pooled sample, although we have no particular expectations about the sign or magnitude of its coefficient.

Table 3: Demand for Live Entertainments Equations

Dependent Variable:	TOTGOOUT	GOM12
Estimation Method:	OLS	
Variable	*Coefficient (abs. 't' in brackets)*	*Coefficient (abs. 't' in brackets)*
(Constant)	26.410	1.189
LEEDS	-.367 (0.06)	-7.247E-02 (0.39)
TVHRS	8.056E-02 (0.53)	4.954E-03 (1.1)
RADIOHRS	-.144 (1.46)	-1.287E-03 (0.43)
ALONE	-2.748 (0.41)	-3.690E-02 (0.18)
NUMPARTY	.517 (0.99)	1.530E-02 (0.96)
URGE	-6.765E-03 (0.36)	-4.093E-04 (0.71)
RSNPRICE	-.602 (1.46)	-1.952E-02 (1.57)
FEMALE	-31.566 (1.3)	-1.473 (1.99)
SINGLE	7.212 (1.26)	.185 (1.07)
GROSSINC	1.102E-05 (0.27)	1.716E-07 (0.14)
NOCCUP	-6.925 (1.13)	-.103 (0.56)
DEGPLUS	4.421 (1.04)	-3.952E-02 (0.31)
AGE	-.500 (0.74)	-4.074E-02 (1.98)
AGESQ	6.614E-03 (0.83)	4.874E-04 (2.01)
ALEVEL	-9.803 (1.36)	-.193 (0.89)
FEMLEE	4.465 (0.59)	.261 (1.14)

...continued

...continued	FEMTVH	-.299 (1.61)	-1.175E-02 (2.11)
	FEMRAD	.105 (0.76)	-2.185E-03 (0.52)
	FEMALO	5.128 (0.6)	.283 (1.09)
	FEMNUM	-.333 (0.36)	-1.255E-03 (0.04)
	FEMURG	-9.016E-04 (0.03)	5.392E-05 (0.07)
	FEMRSN	1.278 (2.37)	4.466E-02 (2.74)
	FEMSIN	-8.428 (1.19)	-.250 (1.16)
	FEMGRO	-5.959E-06 (0.14)	5.421E-07 (0.41)
	FEMNOJ	13.819 (1.88)	.297 (1.33)
	FEMAGE	.942 (0.91)	5.711E-02 (1.83)
	FEMAGESQ	-1.403E-02 (1.14)	-7.555E-04 (2.03)
	FEMDEG	-6.547 (1.1)	.154 (0.85)
	FEMALE	14.761 (1.75)	.308 (1.2) 0.326 131
	R^2 =0.282 N=131	0.282	0.326

The results are shown in Tables 3 and 4. Table 3 gives the OLS estimates of the attendance equation and the heavy tail analysis. The heavy tail analysis (where the dependent variable is a dummy = 1 if attendance is >12 times per year) was also performed using logit estimation, shown in Table 4.

The table shows the male coefficients first (with the female intercept) followed by the female shift slope coefficients, which are described in the format FEM plus the first three letters of the corresponding variable. There is no notable evidence of any income effects. There are some interesting gender differences in the coefficients for the substitute (recorded) entertainment goods. There is very little evidence of any effect of tv viewing hours on male attendance but, for females, there is considerable support for the expected negative

relationship. This is significant at just outside the 5% level, on a one-tailed test in the first equation in Table 3 and this is repeated at higher levels of significance in the other results. For radio, the expected negative relationship is found only for men, but fails to be statistically significant at acceptable levels.

Table 4: Logit Equation for Frequent Attendance at Live Events

Dependent Variable: =1 if attend >12 or more events per year; 0 otherwise
Estimation Method: ML

Variable	*Coefficient*	*Standard error*	*Exp(B)*	*Crit. Sig. (2-tail)*
LEEDS	-.940	1.405	.504	.391
TVHRS	.036	.032	.261	1.036
RADIOHRS	-.009	.022	.689	.991
ALONE	-.515	1.616	.750	.598
NUMPARTY	.076	.108	.477	1.079
URGE	-.005	.005	.371	.995
RSNPRICE	-.172	.100	.085	.842
FEMALE	-17.915	7.928	.024	.000
SINGLE	1.658	1.355	.221	5.250
GROSSINC	.000	.000	.668	1.000
NOCCUP	-.611	1.300	.638	.543
DEGPLUS	-.351	.875	.689	.704
AGE	-.272	.158	.086	.762
AGESQ	.003	.002	.076	1.003
ALEVEL	-1.998	1.778	.261	.136
FEMLEE	3.912	2.303	.089	50.004
FEMTVH	-.167	.068	.014	.846
FEMRAD	-.052	.063	.411	.949
FEMALO	3.624	2.733	.185	37.489
FEMNUM	.187	.381	.623	1.206
FEMURG	.003	.013	.840	1.003
FEMRSN	.570	.202	.005	1.768
FEMSIN	-2.528	2.047	.217	.080
FEMGRO	.000	.000	.626	1.000
FEMNOJ	3.062	1.971	.120	21.364
FEMAGE	.639	.300	.033	1.894
FEMAGESQ	-.009	.004	.017	.991
FEMDEG	-.762	1.871	.684	.467
FEMALE	3.210	2.418	.184	24.773
Constant	5.492	3.656	.133	242.638

Goodness of fit statistics

Step 1

-2 Log likelihood	85.854
Cox & Snell R^2	.344
Nagelkerke R^2	.525

Contingency Table of Rounded Predictions vs Outcomes

		Predicted		
		GOM12		
Observed		.00	1.00	Percent correct
GOM12	.00	98	5	95.1
	1.00	16	14	46.7
Overall percentage				84.2

The sociability variables (ALONE, NUMPARTY) are not significant in any of the results. In no case is the URGE variable statistically significant, but there are dramatic gender differences in the impact of the perceived 'reasonable price' variable. The signs of the coefficients are opposite: the male coefficient is negative but the female slope coefficients are large enough to make the female price response positive. All three female slope dummies for RSNPRICE are statistically highly significant. Results for the male coefficient are much weaker, making the 10 per cent level on a two-tailed test in the third case but not in the others. The FEMALE shift dummy is negative in all cases and is statistically significant except in the first equation. Its point estimates may appear to be rather implausibly large but these will be offset by the slope dummy coefficients.

There is no evidence of significant age effects in the total going-out regression, for either males or females. It should be borne in mind that this is an aggregate live entertainments equation and may therefore be concealing genre substitution over time. For example, an individual may decrease live 'rock and roll' concert attendance, but be increasing attendance at musicals. However when we come to the equations for >12 live attendances per year, there are strikingly different age effects for males and females. For both sexes there is a statistically significant quadratic in age, but the male quadratic is U-shaped whilst the female quadratic has an inverted U-shape. The turning points from the results in Table 3 are at (rounding) 33 years old for women and 42 years old for men.

5. Conclusion.

This paper presents estimates of a demand function for total entertainments based on survey evidence. We have estimated an equation for total attendance in the last twelve months, as a function of perceptions of price, income, consumption of substitute goods, demographic variables and factors reflecting the social network of the derived demand for live entertainment.

It has been shown that total attendance at live events is a heavily skewed variable. In view of this, we also provide some simple analysis of the tail of the distribution, by turning the dependent variable into a dummy split at 12 attendances per year.

The results indicate that total attendance at live events is significantly related to hours of tv viewing as a substitute good, but only for women. The influence of perceived reasonable price is opposite for men (negative) and women (positive). A further contrast is that the female age quadratic is an inverted U-shape, whilst the male age quadratic is U-shaped. Interestingly there is little evidence of any statistically significant effects for social network factors relating to loneliness and membership of social circles, nor for income.

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ENDNOTES

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