



Estimates of a Model of Male Participation in the Market for Female Heterosexual Prostitution Services

SAMUEL CAMERON

samcameron@lineone.net

Bradford Centre for International Development, University of Bradford, Pemberton Building, Richmond Road, Bradford, West Yorkshire, BD7 1DP UK

ALAN COLLINS

alan.collins@port.ac.uk

Department of Economics, University of Portsmouth, Milton Campus, Locksway Road, Southsea, Hampshire, PO4 8JF UK

Abstract

In this paper a simple model is presented that considers the factors influencing male decisions concerning whether or not to consume, at the margin, female prostitution services. Data from an extensively piloted and sophisticated national survey of sexual attitudes and lifestyles were used to test the predictions. Health risks of consumption, religious denomination and factors signalling variations in inherent risk disposition are shown to explain consumption of such services.

Keywords: prostitution, demand, risk, sex, services

JEL Classification: K4 D1 I1

1. Introduction

Since prehistoric times prostitution services have continued to be supplied and demanded in virtually every town and city in the world. Indeed, in some societies these services have been characterised by quite sophisticated institutional arrangements.¹ Remarkably then, this commercial activity in the urban economy has attracted very little research attention by economists. Until recently this was understandable, given the scale of the empirical problems in accurately discerning consumption patterns in this potentially sensitive area of expenditure. This sensitivity relates largely to the risk of discovery of the use of such services on the survivability of an existing marriage or partnership, the social stigma associated with simply using prostitutes and the stigma and penalties associated with arrest and conviction for soliciting prostitution services. Such stigma has not always been evident in history, or some contemporary societies. Indeed, the profession afforded considerable esteem to women when in ancient history it was typically sanctioned by, and housed in religious temples, e.g. the *hetaerae* of Ancient Rome. Ryley-Scott (1996) discusses the phenomenon of religious prostitution, and proceeds to describe the more positive and cordial standing of female prostitutes found in Japan and many parts of India. Yet in the United Kingdom today (as in many other countries) soliciting for prostitution services remains technically

illegal, though most local police forces selectively practice varying degrees of toleration, preferring to concentrate on other more serious offences.

This paper develops a model that helps explain the decision of males regarding whether or not they should engage in consuming prostitution services. Hitherto, there have been relatively few economic studies on any aspect of the market for prostitution services. Of those that do exist, they have tended to focus on simple description of the market and/or regulatory policy issues in North America (Reynolds, 1981; Trebilcock, 1993; Larsen, 1996) and a unique paper by Fels (1971) exploring US military policy towards prostitutes in Vietnam. A detailed and wide ranging narrative account of the institutional background and operations of prostitution enterprise is presented in MacCoun and Reuter (2001). The focus of that work is to provide lessons from a range of illicit markets including prostitution to inform the development of policy regarding the illicit drug market. An interesting purely theoretical demand and supply analysis, considering the linkages with the marriage market and other international markets, is provided by Edlund and Korn (2002). They highlight in theoretical terms the attraction of prostitution to single women in terms of high remuneration, the likely migration and trafficking incentives this provides and also the likely deleterious effects in terms of marriage market participation. The only empirical economic study relates to supply estimates of various homosexual male prostitution services (Cameron, Collins, and Thew, 1999) which does not have any real bearing on the demand for female heterosexual prostitution services as analysed in this study. Medical statisticians (Wellings et al., 1994) have performed limited multivariate analysis of the data used in this paper. They tested for the influence of age, marital status, social class, working away from home and ever having had a homosexual experience, on the probability of ever having paid for sex. They summarise their work as follows,

“The factors associated with ever paying for sex in bivariate analysis were examined in a logistic regression model that includes age, marital status, social class, work away from home and a homosexual partner ever. Age and marital status exerted the dominant effects in the model with the odds ratio for commercial sex increasing rapidly with age. Men who were cohabitantes or widowed, separated and divorced were significantly more likely than married men to report contact with prostitutes. After controlling for other variables in the model, single men did not differ significantly from married men in the odds of reporting experience of commercial sex. This contrasts with the bivariate models, which suggest a lower prevalence among single men. The difference in effect is due to confounding by other variables in the model, particularly age. Working away from home was sustained as an independent effect in the model. A history of a homosexual partner ever was associated with significantly raised odds of commercial sex contact.”

[Wellings et al. (1994)]

To furnish this analysis, data from the National Survey of Sexual Attitudes and Lifestyles in the United Kingdom is used to test predictions from a simple economic model, and to provide a platform for future work in the area.

The organisation of the paper is as follows. In the next section some background economic considerations on the consumption of prostitution services are presented. A simple model is unfolded in Section 3, and in Section 4 the data is described, and the estimation process

discussed. The results are examined in Section 5. The final section provides a summary and some concluding remarks highlighting some of the legal implications of our study.

2. Prostitution services: Some background economic considerations

Following Scitovsky (1976) and Fair (1978), the need for variety, with respect to relationships (including purely sexual ones), can be considered as an important argument in an individual's utility function. Individuals may contemplate satisfying variety demand or dealing with sexual frustration (from a shortfall in satisfying current sexual needs) by obtaining a partner (or paramour, if one is in a committed relationship), or by consuming prostitution services. The former may involve (a) unwanted emotional involvement (at worst leading to the "*Fatal Attraction*" syndrome), (b) a high perceived threat to existing relationship survivability and assets (children, house etc.), and/or (c) prohibitive search costs. Using prostitution services, however, typically excludes (a) and (c) though (b) may feature if discovered. In many countries, including the United Kingdom, the risk of discovery is greater in connection with consumption in only one small segment of the prostitution market, namely that of street-based prostitution services. In the United States this segment has been calculated to account for approximately 20% of working prostitutes (Prostitutes' Education Network, 1999). The reason for this greater risk of discovery is that this segment of the market is the most likely to be affected by episodic, though typically pre-announced clampdowns and offensives by police, against street crime, or even longer term area-based "zero tolerance" initiatives. In the United States 85–90% of those arrested for prostitution related offenses worked on the street (Prostitutes' Education Network, 1999).

Episodic enforcement essentially depresses in the intervening period the expected probability of detection to a negligible, or even zero level. Such a pattern of enforcement is understandable given that in the face of generally high crime rates, it is rational for relatively scarce police enforcement effort to be directed to higher priority crimes with greater negative externalities. Arguably, only senior police officers, intent on serving their own managerial utility functions, might contemplate the more perverse strategy. This consists of the concentration of police resources on less serious, easy-to-arrest crimes, to raise the overall arrest rate (the measure which may be serving as a managerial performance indicator) (Benson, Kim, and Rasmussen, 1994).

Even with "zero tolerance" initiatives, aimed at eliminating all street crime, the effects on the overall level of prostitution are unlikely to be dramatic. Street-based prostitution may not only spatially migrate, but might also be displaced into off-street prostitution which has an inherently lower risk of police detection. There is also some evidence that technical change, through the advent of cheaper media advertising and cheap mobile phones in some British towns and cities has helped significantly reduce the number of prostitutes plying their trade on the streets (Cameron, Collins, and Thew, 1999). Some men, however, will continue to specifically demand street-based prostitution services. This is despite the higher risk of arrest and the possible 'residualisation' of the supply pool of available street prostitutes. This residualisation is inevitable as some prostitutes move on to relatively less stressful and less dangerous off-street sex work. In such an environment, sex work can be conducted with a reduced probability of involving pimps in the "management" of the supply of their services.

Such residualisation must also raise the health risks of consumption. Such health risks are often linked to drug dependency amongst street-based prostitutes (McKeganey et al., 1992; Feucht, 1993; Gossop et al., 1994; Bretteville-Jensen and Sutton, 1996; Jones et al., 1998; Cusick, 1998; Jones et al., 1998; McKeganey, 1998). Yet this persistent demand remains because the very act of 'kerb crawling' may be a source of significant ludic utility in a sexual context (Cameron and Collins, 1999), i.e. some individuals enjoy playing the pursuit game as well, or even as least as much, as the sexual contact actually acquired. Illegality *per se* increases the riskiness of consumption because there is no government regulation of prostitute hygiene in the UK. Street-based prostitution may also stimulate opportunistic demand in the form of 'passing trade' from the arbitrary passer-by.

Regarding the use of prostitutes by men in existing relationships, such consumption is likely to be motivated by a range of factors (Gebhard and Johnson, 1979). These include *inter alia*, a need to satisfy a higher frequency of sexual contact than one's relationship partner is willing to make, the aforementioned need for variety, or a need to engage in specific sexual activities, which the existing relationship partner is not prepared to engage in. It may also provide a sexual outlet during bouts of marital conflict (the 'sexual refuge' motive), or an outlet for other forms of stress and tension. Using a prostitute may satisfy all these needs without the need for any emotional complications, since the existing relationship may, in general, be providing adequate companionship and emotional support. Indeed, prostitutes are renowned for treating sex as work, and typically maintaining emotional detachment from clients. Some men can become ruinously infatuated with a specific prostitute, but this is the exception rather than the rule.

Since many consumers of prostitution services are in existing relationships, they are more likely to endure considerable social disapproval if discovered. Widespread realisation of this helps account for the increasing phenomenon of community action, as opposed to police action, against the negative externality of 'kerb-crawling' (Hubbard, 1998). Such community action may feature vigilante patrols to harass prostitutes and potential clients, and also the use of cameras, hand-held video equipment and manual recording of vehicle number plates. Such actions may be aimed at supporting the threat of possible 'naming and shaming' tactics in local newspapers and other media, or even the threat of direct contact with the family and spouses of discovered 'kerb crawlers'. The rise of this phenomenon lends further weight to the view that the full expected punishment cost from being discovered as a prostitute client, goes much further than simply the possible imposition of state imposed fines following arrest and conviction (which are in any case monetarily small and invariably non-custodial). It must also include, for example, the costs of relationship/marital conflict and/or possible marital dissolution or relationship termination. Accordingly, the 'entry' price to a prostitute's services can be expected to be negligible when compared to the monetised risks of detection, and disease (particularly with respect to street-based services).

Of course, users of prostitutes may not be in existing relationships. Such individuals may use their services owing to a wide range of psychological, genetic, economic, social and geographical factors. At the margin, these factors raise the relative search costs of finding willing sexual partners (or partners willing to engage in specific sexual activities) in an *ad hoc* or formal social context, and in a given time period. Of the psychological and genetic factors, these may include, *inter alia*, dislike of emotional entanglements, low self-esteem in

conventional social gatherings and perceptions about one's level of physical attractiveness (e.g. matters relating to height, build or looks). Of the other factors, these may include, *inter alia*, unsocial working hours, persistent gender imbalances at work, thin markets for potential sexual partners in some rural areas and pervasive social controls (community disapproval) in some religious communities against pre-marital sexual activity. We now distill the above considerations into a more formal framework that partially exploits the work of Becker (1968) as a starting point.

3. Model

Below is presented a simple economic model of the decision of males regarding their use, or otherwise, of prostitution services. Its characteristics reflect the fact that our empirical work is exclusively concerned with the determinants of moving off the corner solution, rather than determining the interior solution. That is to say, the focus of the model is the decision as to whether a man will actually engage in consuming prostitution services, as opposed to determining a man's optimal level of prostitution service consumption. Utility maximising behaviour is assumed with the functions being twice differentiable and continuous. The subjective expected utility function for a male is,

$$SEU = U(S_{1x}, S_{2x}, Z_x) + (1 - p)U(S_{1y}, S_{2y}) - p(U(C)) \quad (1)$$

This characterises the decision regarding whether to consume paid sex, as satisfying the axioms of the Von Neumann-Morgenstern utility function. S_1 and S_2 are two distinct types of sexual activity. The male has the choice of deriving utility from one relationship partner (x) and/or one paid sex partner (y).

S_1 and S_2 can of course be zero quantities from either supplier. Z denotes other sources of utility from a relationship partner e.g. child rearing. Spousal relationship utility may involve zero or less than the freely determined optimum values for some arguments due to partner rationing of one or both types of sexual activity. The probability p is exogenously determined. C represents the relationship disturbance costs associated with consuming paid sex, which will vary according to personal and social factors such as levels of religiosity. C is assumed to be the monetary equivalent of the damage inflicted. This may include actual monetary losses from divorce, earnings loss due to reputation effects, but also the money equivalents of psychic costs such as anguish from reputation loss or partner hostility.

We may note that in the presence of strong variety demand there would be a greater tendency to non-additivity in the S (sex) arguments of the utility functions.

Expression (1) is the utility function assuming that there is a non-zero likelihood of the person paying for sex. If the person does not pay for sex the above function simplifies to:

$$U(S_{1x}, S_{2x}, Z_x) \quad (2)$$

Therefore if

$$(1 - p)U(S_{1y}, S_{2y}) - p(U(C)) > 0 \quad (3)$$

it will be worthwhile to consume in the paid sex market. The value of this expression will rise if there is diminishing marginal utility of sex to the relationship partner.

4. Data and estimation

The data used in the econometric analysis are taken from the National Survey on Sexual Attitudes and Lifestyles carried out by professional market researchers, in the United Kingdom in 1990/1. This was a rigorously conducted survey of 18,876 adults of ages from 16 to 59. The questions were extensively piloted and a lengthy in person interview was combined with separate self-completion schedules. Although the purpose of this study (and other similar studies elsewhere, ACSF Investigators, 1992), was to examine responses to the threat of HIV/AIDS (Johnson et al., 1992) it was done in the context of a thorough examination of the overall lifestyles and socio-economic circumstances of the individuals. The sexual content was revised carefully in order to ensure the maximum participation, across all demographic groups, by avoiding fall out due to embarrassment or distaste. It should be noted that the interview part of the study was largely non-sexual whilst the mainly sexual content was filled in privately in a booklet.

Two samples are available. The 'long' version comprises 4,548 individuals and contains a detailed investigation of sexual activity. The 'short' version contains all of the respondents. From the 'short sample we extracted 11,150 men, 546 of whom admitted to having paid for heterosexual sex at some time. Of these, 146 admitted to having paid for heterosexual sex in the last 5 years. The Economic and Social Research Council Data Archive maintained at the University of Essex provided the data on CD-ROM.

Table 1 shows the distribution of number of women paid for sexual encounters in the sample. This indicates that most men have been to a relatively small number of prostitutes. Unfortunately, the actual level of participation (the usage rate) for paid sex is not recorded. Hence, we resort to modelling the probability of having ever paid for heterosexual sex

Table 1. Number of women paid for sex.

Number	Frequency	Number	Frequency
0	2818	12	6
1	188	15	9
2	116	16	1
3	344	21	24
4	425	25	2
5	35	30	3
6	15	38	1
7	4	40	4
8	6	100	1
10	22		

Note: 60 individuals did not give a precise figure for the number of women paid for sex (source: NSSAL 1999).

(BUYSEX) and having ever paid for heterosexual sex in the last five years (BUYSEX5), rather than time allocation *per se*. The variables used in the econometric analysis are defined in Table 2 and the relevant descriptive statistics presented in Table 3.

Looking at Table 2 the age variable reflects the cumulative likelihood of usage of commercial sex opportunities. There are also 13 variables that proxy earnings and wealth, including highest level of educational attainment, where in terms of attainment, DEGREE > ALEVEL > OLEVEL. There are also a number of variables that represent the locus of

Table 2. Variable definitions and expected signs of coefficients.

Name	Definition	
BUYSEX	= 1 if reported having paid for sex at any time	
BUYSEX5	= 1 if reported having paid for sex in the last 5 years	
GOCHURCH	frequency of attendance at church converted to annual equivalents from interval answers	<0
FAITH DUMMIES		
HINDU	= 1 if Hindu	>0
JEW	= 1 if Jewish	>0
MUSLIM	= 1 if Muslim	>0
RCATH	= 1 if Roman Catholic	>0
SIKH	= 1 if Sikh	>0
All remaining faiths set = 0		
BLACK	= 1 if gives ethnic origin as black	?
ASIAN	= 1 if gives ethnic origin as Asian	?
OTHRACE	= 1 if non- white, black or Asian	?
AGE	current declared age in years	+
OLEVEL	= 1 if highest educational qualification is 'O' levels	>0
ALEVEL	= 1 if highest educational qualification is 'A' levels	>0
DEG	= 1 if highest educational qualification is degree	>0
OTHQL	= 1 if highest educational qualification is other than above	>0
POOR	= 1 if live in a housing area deemed to be poor	<0
MIDDLE	= 1 if live in a housing area deemed to be of 'middle' income status	>0
AFFLUENT	= 1 if live in a housing area deemed to be affluent	>0
BUNGALOW	= 1 if lives in a bungalow	>0
DET	= 1 if lives in a detached house	>0
SEMI	= 1 if lives in a semi-detached house	>0
OWNHOUSE	= 1 if a homeowner	>0
DIVORCED	= 1 if divorced	>0
MARRIED	= 1 if married	<0
WIDOWED	= 1 if widowed	?

(Continued on next page.)

Table 2. (Continued).

Name	Definition	
UNEMP	= 1 if currently unemployed	<0
LONGUNEM	= 1 if unemployed for more than six months	<0
AWAYLOT	= 1 if away from home a lot	>0
AWAYOCC	= 1 if away from home occasionally	>0
INMOVE	= 1 if have been in the area <5 years	>0
SHIFT	= 1 if employed in shift work	<0
BIGFAG	= 1 if heavy smoker	>0
LITFAG	= 1 if light smoker	>0
EXFAG	= 1 if former smoker	>0
EMBARRASS	= 1 if the respondent appeared to be embarrassed	<0
LISTEN	= 1 if there was someone else possibly listening during the interview	<0
SHORTMAN	= 1 if less than 5 ft. 6 ins tall	?
TALLMAN	= 1 if greater than 6 ft. tall	?
CIRC	= 1 if circumcised	?
CONTROL	= 1 if felt in control of one's life	?
LAXWELL	= 1 if expressed lack of concern about personal health	>0
AIDSHI	= 1 if thought that multiple partners caused a high risk of catching HIV/AIDS	<0
METHIV	= 1 if had ever met a person with HIV/AIDS	<0
HOMEVER	= 1 if had ever had a homosexual experience	>0
The following dummies are =1 for the name of the region stated		
EANGL	East Anglia	?
EMIDS	East Midlands	?
GLOND	Greater London	>0
NWEST	North West	?
SCOTL	Scotland	?
SOUTHE	South East	?
SOUTHW	South West	?
WALES	Wales	?
WMIDS	West Midlands	>0
YANDH	Yorkshire and Humberside	?

informal sexual opportunity. Whilst we would not go as far as Reynolds (1981) who contends that with respect to prostitute clients, "...the majority are middle class male conventioners away from home" [p. 35], clearly, working away from home (AWAYALOT, AWAYOCC) provides the opportunity to use prostitutes with minimal deception effort and reducing the risks of relationship disturbance. In a similar vein a leading directory of 'massage parlour' services in the UK explicitly notes proximity to soccer grounds around the country so that away supporters may find some sexual services more conveniently. Away trips by soccer

Table 3. Descriptive statistics.

Variable	<i>N</i>	Mean	Standard deviation
AFFLUENT	11150	.2337	.4232
AGE	11150	37.1324	12.0259
AIDSHI	11150	.6120	.4873
ALEVEL	11150	.2970	.4570
ASIAN	11150	1.561E-02	.1239
AWAYLOT	11150	5.417E-02	.2264
AWAYOCC	11150	.1739	.3790
BIGFAG	11150	.2467	.4311
BLACK	11150	2.422E-02	.1537
BUNGALOW	11150	4.897E-02	.2158
BUYSEX	11150	4.897E-02	.2158
BUYSEX5	11150	1.283E-02	.1125
CIRC	11150	.1469	.3540
CONTROL	11150	.5421	.4982
DEG	11150	.1166	.3209
DET	11150	.1391	.3461
DIVORCED	11150	.1536	.3606
EANGL	11150	3.821E-02	.1917
EMBARASS	11150	6.027E-02	.2380
EMIDS	11150	7.247E-02	.2593
EXFAG	11150	.2015	.4012
GLOND	11150	.1161	.3204
GOCHURCH	11150	5.7203	14.9674
HINDU	11150	5.381E-03	7.316E-02
HOMEVER	11150	5.794E-02	.2336
INMOVE	11150	.2281	.4196
JEW	11150	5.740E-03	7.555E-02
LAXWELL	11150	5.399E-02	.2260
LISTEN	11150	.3886	.4875
LITFAG	11150	.1550	.3619
LONGUNEM	11150	.1890	.3915
MARRIED	11150	.4484	.4974
METHIV	11150	6.529E-02	.2471
MIDDLE	11150	.3178	.4657
MUSLIM	11150	9.955E-03	9.928E-02
NWEST	11150	.1100	.3130
OLEVEL	11150	.2987	.4577

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Table 3. (Continued).

Variable	N	Mean	Standard deviation
OTHQL	11150	1.937E-02	.1378
OTHRACE	11150	1.345E-02	.1152
OWNHOUSE	11150	.6526	.4762
POOR	11150	.2346	.4238
RCATH	11150	9.561E-02	.2941
SCOTL	11150	9.498E-02	.2932
SEMI	11150	.2938	.4555
SHIFT	11150	.1712	.3767
SHORTMAN	11150	.2279	.4195
SIKH	11150	2.601E-03	5.093E-02
SOUTHE	11150	.1921	.3940
SOUTHW	11150	7.928E-02	.2702
TALLMAN	11150	.1897	.3921
UNEMP	11150	9.776E-02	.2970
WALES	11150	5.202E-02	.2221
WIDOWED	11150	2.700E-02	.1621
WMIDS	11150	9.534E-02	.2937
YANDH	11150	8.601E-02	.2804

supporters provide effective deception opportunities (McCoy's Guides, 1998) to minimise the risk of discovery. Another opportunity related variable relates to recent arrival into the geographical area within the last 5 years (INMOVE). This variable captures the effect of an individual having an insufficient social network to acquire enough potential sexual contact without recourse to prostitutes. Marital status clearly impacts on the time budget and the psychic costs (guilt) of individuals, such that we would expect the coefficient on the MARRIED dummy to be negative. Personal characteristics such as height (SHORTMAN) are included as it might be expected to be associated with lower success in social dating circles and thus push such men towards the paid sex market. There are no variables in the dataset relating to the perceived attractiveness of individual males. Other personal characteristics are included as control variables. Turning to the taste related variables, any homosexual experience ever (HOMEVER) is included as an expected positive variable, since it connotes a desire for greater variety demand. Such experiences in men who would describe themselves as heterosexual are suggestive of an interest in exploring a wider menu of sexual experiences and sexual experimentation. Though following the reasoning of Posner (1992), one might expect a negative effect from this variable reflecting what he considers to be the impact of the lower costs of acquiring non-prostitution related homosexual sexual encounters as compared to non-prostitution related female heterosexual sexual encounters (effectively the 'homosexuality as an inferior good' argument). This is an interesting assertion warranting empirical verification. While it cannot be provided by this study one can legitimately state

that such reasoning features slight or no explicit regard for any variety demand considerations. Religiosity (GOCHURCH) is included to capture the expected negative impact of potential intrinsic moral restrictions on payment for sex. Risk preferences are captured by 7 variables. Perception of a high risk of contracting HIV/AIDS (AIDSHI) is expected to have a negative impact on prostitute service usage, as is familiarity with the disease by having knowingly met an HIV positive individual (METHIV). Tobacco smoking is included to reflect general risk attitudes such that heavy smokers (BIGFAG) are expected to more likely to resort to prostitute usage than ex-smokers (EXFAG) or light smokers (LITFAG). A unique feature of this study is the use of variables to explicitly capture response bias effects. Signs of respondent embarrassment (EMBARRASS) and the presence of a third party during the course of the interview (LISTEN) are expected to lead to some understatement, and thus a negative statistical impact on the probability of reported prostitution usage.

Omitted variable considerations might lead one to consider the absence of the fee for prostitution services, and explicit formal punishment variables in the models to be estimated, as leading to serious potential biases. However, within a given market segment, (e.g. street trader, massage parlours, high-class call girls) supporting evidence indicates that the required payments to prostitutes exhibit remarkable uniformity. This evidence comprises reference to Brewis and Linstead (2000), telephone surveys, interview data, and various consumer satisfaction reports (McCoy's Guides, 1998; World Sex Atlas, 1999; World Sex Bank, 1999; World Sex Guide, 1998). This applies to female heterosexual prostitution and male homosexual prostitution (Cameron, Collins, and Thew, 1999). The overall price is thus best conceived in hedonic terms. This is because costs related to search effort and risk considerations are likely to overwhelm any out-of-pocket expenditure elements in most market niches. Furthermore, whilst arrest and litigation as a consequence of using prostitutes would make clear a man's infidelity to their spouse or partner, it is generally tolerated by the police in the U.K. Accordingly, contributions to the costs of relationship disturbance tend not to emerge via this route.

Regional dummies are included in the estimating equation to discern differences in the perceived risk of arrest in some police force jurisdictions. Given the survey was undertaken in 1990 and asks about use of prostitution services in the preceding 5 years, these dummies were intended to pick up any effect arising from the mid-eighties corruption scandal that embroiled the West Midlands police force in England. Our expectation relates to even greater than usual toleration of vice related crimes in this area at that time, and that this would impact on the perceived risk of detection, and hence level of prostitution service consumption.

Given the nature of the data available and the greater likelihood of inaccuracy in self-reporting of the absolute numbers of encounters with prostitutes, we resort instead to estimating logit equations. Models were developed to predict (i) the probability of ever having been to a prostitute and (ii) recent visitations (in the last 5 years). All model estimation was based on the standard logit formulation viz.

$$\Pr(\text{BUYSEX}) = \frac{e^{\beta'x}}{1 + e^{\beta'x}} \quad \text{and} \quad \Pr(\text{BUYSEX5}) = \frac{e^{\beta'x}}{1 + e^{\beta'x}}$$

where, x_I is the vector of explanatory variables and the error terms (not shown above) conform to a Weibull distribution.

5. Results

The results of estimating the basic likelihood of usage logits are shown in Tables 4 and 5. They indicate strong support for the view that male decisions to use prostitute services are conditioned by risk disposition, religion, the range of opportunities to conceal consumption available to males, and the desire to satisfy variety demand. These are very encouraging for the application of applied economics to the demand for prostitution and are some advance on the restricted model used earlier by medical statisticians (Wellings et al., 1994). One notable contrast is that the AGE variable is only significant in the lifetime cumulated probability equation; when we restrict ourselves to recent usage (Table 4) the AGE term is not

Table 4. Logit equation to predict ever having paid for heterosexual intercourse.

Variable	B	S.E	Wald	Sig	Exp(B)
AFFLUENT	.0573	.1339	.1835	.6683	1.0590
AGE	.0474	.0052	81.6888	.0000	1.0486**
AIDSHI	-.4909	.0942	27.1544	.0000	.6121**
ALEVEL	.1538	.1397	1.2127	.2708	1.1663
ASIAN	.3463	.5307	.4257	.5141	1.4138
AWAYLOT	.8624	.1522	32.1063	.0000	2.3688**
AWAYOCC	.2186	.1188	3.3836	.0658	1.2443
BIGFAG	.5287	.1243	18.0817	.0000	1.6966**
BLACK	.3512	.2917	1.4495	.2286	1.4207
BUNGALOW	-.0127	.2198	.0033	.9539	.9874
CIRC	.3950	.1075	13.5130	.0002	1.4845
CONTROL	-.0232	.0943	.0604	.8059	.9771
DEG	.0848	.1760	.2323	.6298	1.0886
DET	.0696	.1401	.2467	.6194	1.0721
DIVORCED	.1411	.1543	.8363	.3605	1.1515
EANGL	.0160	.3354	.0023	.9620	1.0161
EMBARRASS	-.3563	.2236	2.5388	.1111	.7002
EMIDS	.3706	.2821	1.7260	.1889	1.4486
EXFAG	.3446	.1245	7.6665	.0056	1.4114
GLOND	.6246	.2611	5.7207	.0168	1.8675
GOCHURCH	-.0159	.0042	14.6411	.0001	.9842**
HINDU	.2195	.7827	.0787	.7791	1.2455
HOMEVER	.7678	.1441	28.4065	.0000	2.1550**
INMOVE	.2850	.1092	6.8108	.0091	1.3298
JEW	1.2192	.3628	11.2943	.0008	3.3846**
LAXWELL	-.0152	.2042	.0055	.9407	.9849
LISTEN	-.0560	.0988	.3212	.5709	.9456

(Continued on next page.)

Table 4. (Continued).

Variable	B	S.E	Wald	Sig	Exp(B)
LITFAG	.0743	.1577	.2222	.6374	1.0772
LONGUNEM	-.3550	.1670	4.5152	.0336	.7012
MARRIED	-.0727	.1233	.3474	.5556	.9299
METHIV	-.1846	.1755	1.1074	.2927	.8314
MIDDLE	-.1779	.1310	1.8438	.1745	.8370
MUSLIM	1.3772	.4904	7.8868	.0050	3.9637*
NWEST	.3881	.2662	2.1255	.1449	1.4741
OLEVEL	.1488	.1389	1.1473	.2841	1.1605
OTHQL	.6636	.2612	6.4528	.0111	1.9418
OTHRACE	-.2035	.4278	.2263	.6343	.8159
OWNHOUSE	-.1918	.1168	2.6980	.1005	.8255
POOR	-.1305	.1581	.6807	.4093	.8777
RCATH	.5374	.1679	10.2483	.0014	1.7116*
SCOTL	.0750	.2875	.0680	.7943	1.0778
SEMI	-.1972	.1181	2.7882	.0950	.8210
SHIFT	.1306	.1167	1.2525	.2631	1.1395
SHORTMAN	-1.6163	.2080	60.3794	.0000	.1986**
SIKH	.0847	1.1886	.0051	.9432	1.0883
SOUTHE	.5138	.2494	4.2430	.0394	1.6716
SOUTHW	.2244	.2863	.6144	.4331	1.2516
TALLMAN	.0796	.1100	.5231	.4695	1.0828
UNEMP	-.0263	.1918	.0188	.8910	.9741
WALES	.0451	.3290	.0188	.8910	1.0461
WIDOWED	-.6413	.4115	2.4292	.1191	.5266
WMIDS	.2518	.2768	.8271	.3631	1.2863
YANDH	-.2992	.3101	.9307	.3347	.7414
Constant	-5.1298	.3720	190.191	.0000**	
Chi-Square (53 df)	538.168				

Significance values are two-tailed.

**Significant at 1% level, *Significant at 5% level.

significant, suggesting that AGE *per se* is not a significant factor in usage. Rather, increasing age simply expands the probability through sheer level of exposure, to the prospect of sex market transactions.

Let us turn now to the specific blocks of other variables discussed in the previous section. There are some very strong results for the deterrent effect in both equations of perceived risk from sexually transmitted diseases (AIDSHI), and the probability enhancing effects of a risk-taking disposition as proxied by smoking status variables in the lifetime equation. The heavy smoker (BIGFAG) has a much higher log odds ratio than the ex smoker in the

Table 5. Logit equation to predict ever having paid for heterosexual intercourse in the last 5 years.

Variable	B	S.E	Wald	Sig	Exp(B)
AFFLUENT	.0398	.2628	.0229	.8796	1.0406
AGE	-.0033	.0108	.0958	.7569	.9967
AIDSHI	-1.1365	.1958	33.6786	.0000	.3209**
ALEVEL	-.1369	.2851	.2307	.6310	.8720
ASIAN	-.3487	1.0173	.1175	.7317	.7056
AWAYLOT	.9204	.2719	11.4563	.0007	2.5104
AWAYOCC	.2196	.2195	1.0009	.3171	1.2456
BIGFAG	.5053	.2215	5.2055	.0225	1.6575
BLACK	-.1865	.6555	.0809	.7760	.8299
BUNGALOW	-.0845	.4900	.0297	.8631	.9190
CIRC	.3622	.2138	2.8699	.0903	1.4365
CONTROL	.2313	.1843	1.5761	.2093	1.2603
DEG	.0845	.3250	.0677	.7948	1.0882
DET	-.0020	.2853	.0000	.9944	.9980
DIVORCED	.3674	.2749	1.7860	.1814	1.4440
EANGL	.1150	1.0181	.0128	.9100	1.1219
EMBARRASS	.3729	.3491	1.1407	.2855	1.4519
EMIDS	.7442	.8310	.8021	.3705	2.1049
EXFAG	.1579	.2529	.3898	.5324	1.1710
GLOND	1.6151	.7495	4.6441	.0312	5.0283
GOCHURCH	-.0227	.0098	5.3423	.0208	.9775
HINDU	.9582	1.3907	.4748	.4908	2.6070
HOMEVER	.6968	.2533	7.5689	.0059	2.0074
INMOVE	.6536	.1884	12.0405	.0005	1.9224**
JEW	1.2454	.6058	4.2262	.0398	3.4744
LAXWELL	-.7701	.4709	2.6741	.1020	.4630
LISTEN	.0126	.1921	.0043	.9479	1.0126
LITFAG	-.4561	.3233	1.9897	.1584	.6338
LONGUNEM	-.6944	.4103	2.8647	.0905	.4994
MARRIED	-.5670	.2320	5.9714	.0145	.5672
METHIV	.1598	.2843	.3158	.5742	1.1732
MIDDLE	-.1465	.2569	.3253	.5684	.8637
MUSLIM	2.7122	.9662	7.8795	.0050	15.0627*
NWEST	1.0212	.7766	1.7292	.1885	2.7765
OLEVEL	-.1567	.2900	.2920	.5890	.8549
OTHQL	.9002	.4665	3.7237	.0536	2.4600

(Continued on next page.)

Table 5. (Continued).

Variable	B	S.E	Wald	Sig	Exp(B)
OTHRACE	-5.7242	7.0846	.6528	.4191	.0033
OWNHOUSE	.0438	.2156	.0412	.8392	1.0447
POOR	.1243	.2993	.1724	.6780	1.1323
RCATH	.6491	.3227	4.0467	.0443	1.9139
SCOTL	.9830	.7901	1.5479	.2134	2.6724
SEMI	.0971	.2147	.2045	.6511	1.1019
SHIFT	.0245	.2203	.0124	.9114	1.0248
SHORTMAN	-2.3622	.5980	15.6044	.0001	.0942**
SIKH	-3.8640	16.1164	.0575	.8105	.0210
SOUTHE	1.6731	.7385	5.1332	.0235	5.3287
SOUTHW	.9155	.8177	1.2534	.2629	2.4980
TALLMAN	-.0036	.1988	.0003	.9857	.9964
UNEMP	-.2341	.4053	.3337	.5635	.7913
WALES	.6695	.9241	.5249	.4688	1.9532
WIDOWED	-.5046	1.0418	.2346	.6281	.6038
WMIDS	1.5091	.7613	3.9299	.0474	4.5228
YANDH	.3913	.8505	.2117	.6455	1.4789
Constant	-5.3103	.8983	34.9442	.0000**	
Chi-Square(53 df)	266.772				

Significance values are two-tailed.

**Significant at 1% level, *Significant at 5% level.

'ever used' equation, and with heavy smoking significant at the 1% level and ex-smoking at the 0.6% level, this reinforces the connection between sexual, and other health related, risk taking.

The locus of opportunity variables proves to be fairly successful. Working away from home (AWAYLOT) enhances the likelihood of usage in the lifetime equation. The statistical significance of the INMOVE variable in the last 5 years equation supports the view that men with less developed social networks are more likely to pay for sex.

Significant results are also found for the religious denomination variables. This suggests that those men who may experience severe social controls and supply constraints in their community-specific sexual opportunities (e.g. Roman Catholics and Muslims) are inclined to substitute, at the margin, towards the paid arena. Perhaps unsurprisingly, the intensity of religious conviction as observed in service attendance (GOCHURCH) is significantly negatively associated with lifetime prostitution usage.

The well-established connection between prior homosexual experiences (HOMEVER) (an indicator of a desire for Scitovsky-type variety demands) and heterosexual prostitute usage is confirmed in both equations at the 1% and 0.6% levels respectively. The greater significance at the 1% level would suggest that over one's lifetime, latent variety demand is more likely to eventually become manifest. Contrary to our a priori expectations the

SHORTMAN variable is significantly negative in both equations. One possible explanation lies in a linkage with the earlier risk disposition arguments. It may be that shorter men are less disposed than taller men to using prostitution services because of the perceived allied risks in maintaining their personal safety in unfamiliar surroundings, or in dealing with agents in illicit, quasi-criminal markets.

In accordance with our expectations regarding the history of police corruption in the West Midlands police force, this regional dummy helps explain a greater probability of prostitute usage in 'the last five years' model. The thirteen variables, which capture aspects of wealth and earnings, are generally not significant and are occasionally of the wrong sign, suggesting paid sexual consumption over 5 years and over lifetimes will become manifest if desired, regardless of income differences.

The response bias variables are not generally significant; the strongest result is for the EMBARRASS variable which is significant in the lifetime usage equation but only at the 11.11% level on a one-tailed test.

6. Summary and concluding remarks

This paper offers the first empirical economic investigation of the demand for female prostitution services, employing data drawn from a rigorously conducted survey in the United Kingdom. The study reveals strong results for the deterrent effect of perceived risk from sexually transmitted diseases, and the probability enhancing effects of a risk-taking disposition (as indicated by smoking status) and membership of some religious denominations featuring greater constraints on recreational sexual opportunities. The locus of opportunity variables are also significant in helping to explain the use of prostitution services. Further confirmatory work from other countries would help establish the robustness of these results. Yet, in overall terms this empirical study paints a picture of the man who pays for sex as a rational economic actor.

Whilst there are no direct legal implications of the study, due to the absence of substantial, or identifiable, legal interventions in the data, it is possible to draw some policy conclusions from the featured variables. The results suggest that men are responsive to risk and situational opportunity in terms of their recourse to prostitutes. In the U.K. the burden of prosecution has tended to fall mainly on the prostitute. Although there are some consequences for the customer these have not reached the level of some parts of the USA where 'naming and shaming' can reach the level of posting the man's picture on the internet and punishment has, on occasions, involved the imposition of reformatory education. This takes the form of attending 'John's school' where the user is lectured to by former prostitutes. Given that our findings suggest men are responsive to perceived risks and situation (i.e. taking advantage of lower risk of detection) it would seem that shifting the burden of risk and punishment cost on to the man may prove an efficient strategy in reducing the level of prostitution. This, of course, refers to the low-price street prostitution and 'massage parlour' enterprise (effectively a bordello market). In high priced escort markets the opportunities for detection are greatly reduced and this sector tends to be more tolerated by police, when exercising regulatory discretion, due to its lower negative externality rate-viz. it does not involve neighbourhood spillover effects on traffic flow, children, cognate activities like drug dealing

and so forth. Whether or not a policy of increasing the burden of punishment on the consumer is optimal depends on many, difficult to measure, factors to the point where it is difficult to conclude whether it is Pareto superior to regulated legalisation. For a given volume of trade, legalisation may reduce health risks and other negative externalities. However, given the statistical significance of the risk and opportunity variables in this paper, there may also be a potentially substantial increase in the volume of trade.

Acknowledgments

The authors are grateful for the comments of Dale Cloninger, Barry Murphy, Martin Snell, Rebecca Taylor, Paul Walker, as well as the editors and anonymous referees of this journal who made a number of helpful suggestions. The usual disclaimer applies.

Note

1. Taylor (1996) notes that since the Iron Age there is increasing evidence in Europe for female sex professionals. In particular, he points to much physical evidence from ancient Rome, namely, brothel tokens. Later time period tokens had higher values as the Roman era was inflationary, but of particular interest in this study context, is the fact that these coin-like objects each depicted a different sexual act and accordingly a different relative value. To the lay-person the rationale for why fellatio should be cheaper than vaginal intercourse may not be clear, but Taylor points to some Polish blind-test research with present-day Warsaw prostitutes, in which the ordinal pattern of their declared sexual service tariff replicated precisely that of the Roman era. The survey results revealed that for prostitutes who see a lot of clients, one of the greatest problems is vaginal soreness. Hence deep penetrating positions, such as sex from behind, are more painful and thus cost more.

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