



DEMAND FOR SEXUAL SERVICES IN BRITAIN: DOES SEX EDUCATION MATTER?

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ABSTRACT

On survey data from 1999 to 2001 and 2010 to 2012, we estimate the demand for commercial sex among British men. We estimate a zero-inflated count model, which takes into account the probability of not participating in the sex market and number of times with a prostitute. We find that sex education in school has a negative and significant role in the demand for paid sex. We also find that men with a typical middle-class income are more likely to buy sex. Travelling abroad or living in London increases the likelihood of British men buying sex.

I INTRODUCTION

The main goal of our paper is to estimate the demand for commercial sex among British men. We estimate the impact of observed variables on demand for paid sex, based on a zero-inflated count model estimated on British survey data from 2010 to 2012. One of the variables is whether the men have learned about sex in school or not.

In Britain, prostitution is legal, but a number of related activities, including soliciting in a public place, kerb crawling, keeping brothel, pimping and pandering, are illegal. The Policing and Crime Act 2009 makes it illegal to pay for sex with a prostitute who has been 'subjected to force' and this is a *strict liability offence*. The legal age for solicitation is 18 (House of Common Home Affairs Committee, Prostitution, Third Report of Session 2016–17). In spite of the problematic aspects related to prostitution, its demand has increased from 1990 to 2010 (White and Johnson, 2014).

In the literature, prostitution is widely studied including topics such as violence, sex tourism, drug abuse, HIV risk and necessity of regulation (Gerthler and Shah, 2011; Immordino and Russo, 2015). An important branch of the empirical literature on sexual behaviour focuses on sexually transmitted infections: Men paying for sex are considered to be a bridging population of the diffusion of such type of diseases, since their paid partners are often

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individuals at high risk for what concerns sexually transmitted infections (White and Johnson, 2014).

Of special interest for our paper are studies of the British sex market. Cameron and Collins (2003) study the male decisions concerning whether or not to buy sex. They used data from a national survey of sexual attitudes and lifestyles in the United Kingdom in 1990/1991. Two logit probabilities are estimated; the probability of ever have been together with a prostitute and the probability of have been together with a prostitute during the last 5 years. They find that important determinants for buying sex are health risk and religious denomination. Ward *et al.* (2005) based their analysis on the national probability sample surveys of sexual attitudes and lifestyles ('Natsal') of men aged 16–44 resident in Britain. Their data sets are from 1990 and 2000. They find that paying for sex is more frequent among men aged between 25 and 34 years, who were never married and who lived in London. They do not find any association with ethnicity, social class, homosexual contact or injecting drug use. Men who paid for sex are more likely to report 10 or more sexual partners in the previous 5 years; only a minority of their lifetime sexual partners (19.3%) were prostitutes. They were more likely to meet prostitutes abroad. Drawing on 50 in-depth interviews, Sanders (2008) found that the typical male client in the sex market in Britain is an ordinary person searching for intimacy with a woman. However, the sample is small and skewed towards white middle-class men. Jones *et al.* (2015) use the British Natsal-3 data set. They report that over the past 20 years, young people refer to school lessons as their main source of information about sex. However, in 2010–2012, as much as 68.1% of young men reported not knowing enough when they first felt ready for sexual experience.

Recently, there have been a few international studies concerning the impact of sex education programme on the sexual behaviour of young people. Kirby (2011) gives a review of several international studies assessing the effectiveness of sex education programmes in reducing risky sexual behaviour and number of partners among adolescents and young people. Reis *et al.* (2011) studied the significance of sex education in schools and its effects in promoting healthy sexual behaviour among university students in Portugal. The sample included 3278 students. The most notable finding is that students who had sex education in school mentioned more often having had fewer sexual risk behaviours (less occasional partners, less sex associated to alcohol and drugs, less unwanted pregnancies and abortions). Wylie (2010) reviews the international experiences concerning the impact of sex education in school on sexual behaviour.

To our knowledge, there have been no studies that analyse the effects of sex education in school on the demand for paid sex. For this reason, we focus on sex education in Britain, but many other variables are also included in explaining the behaviour of British men in the commercial sex market. The econometric model we apply to study this phenomenon assumes that zero contacts with prostitutes occurs in two ways: as a realization of taking part or not in the market for sexual services and as realization of a count process,

that is, number of times with a prostitute ever in life. The model we employ is a zero-inflated Poisson model, see Cameron and Trivedi (2005) for further details.

The most notable finding from a policy point of view is that learning about sex in school has a significant and sizeable negative marginal effect on buying sex from a prostitute. If politicians want to reduce prostitution in Britain, our result gives support to the proposal in Britain, saying that *all* schools across the system should have compulsory Sex and Relationship Education (SRE) programme.

Moreover, we find that drugs users, and men declaring that they are religious, are more inclined to participate in the sex market. We find a strong and significant association between buying sex and being abroad and with living in London. Somewhat in line with Sanders (2008), we find that men with medium and medium-high income, which indicates a middle-class background, are more likely than other men to participate in the sex market. Masturbation seems to be a substitute for how often men buy sex, while unprotected sex is associated with how many times sex is bought.

The paper is organized as follows. The next Section gives a brief description of sex education in Britain schools. Section III describes the econometric model. Section IV gives details about the data used to estimate the model. Our main data source is the British survey Natsal-3 (2010–2012), but we also use data from the previous survey Natsal-2 (1999–2001) and the pooled cross section data of the two surveys. In Appendix A, we report the results from using Natsal-2 and the pooled data.

II SEX EDUCATION IN BRITAIN SCHOOLS

Sex education programmes are not yet compulsory in all British schools. Some aspects are compulsory and some others depend on school teaching programmes. The Education Act 1996 requires that sex education should inform pupils ‘about sexually transmission infections and HIV and encourage pupils to have due regard to moral considerations and family life’ (Sex and Relationship Education (SRE, 2010; networks.nhs.uk, 2011). Schools are recommended to offer, even if it is not compulsory, the broader subject of Sex and Relationship Education (SRE) as part of Personal, Social and Health Education (PSHE) and Citizenship. SRE should help students to learn about the emotional, social and physical aspects of growing up, relationships, sex, human sexuality and sexual health. It seeks to equip children and young people with the information, skills and positive values to have safe, fulfilling relationships, to enjoy their sexuality and to take responsibility for their sexual health and well-being.

The topics included in SRE differ from school to school. Both primary and secondary schools must have an up-to-date policy that describes the content and organization of SRE taught outside the Science Curriculum. Even if a school *decides not* to teach non-compulsory SRE components, it must document this choice. Each school’s governing body is responsible for developing

their school's policy and inform parents who have the right to withdraw their children from SRE taught outside the Science Curriculum.

Table 1 shows the number of people who receive sex education lessons at school per age group. Not only a number of people who have learned sex education at school decrease as the age increases but also older men have learned about sex when they went to school. Table 1 is based on the Natsal-3 survey. Apparently, sex education in British schools varies across schools and a considerable number of men, at all ages, declare in the survey that they did not learn about sex at school. This can be because sex education at school has not been compulsory. On 1 March 2017, the government tabled a proposal of amendments, saying that all schools across the system will be bound by the same obligation,¹ making education of sex compulsory in all schools.

In Table 2, we report sex education at school across Britain regions. Again, we observe that according to the answers given in the survey, there is a variation in Britain with respect to sex education in schools.

The survey data make it also possible to estimate the probability of having had sex education in school as a function of observed covariates. In Table 3, we show the estimate of the probability of having had sex education in school

Table 1

British men receiving sex education at school, by age group, Natsal-3, 2010–2012

Respondent's age group	Learned sex education at school		Total
	No	Yes	
20–24	188	629	817
25–29	223	613	836
30–34	197	417	614
35–39	146	226	372
40–44	155	244	399
45–49	172	220	392
50–54	158	189	347
55–59	186	135	321
60–64	262	101	363
65–69	255	78	333
70–74	182	57	239
Total	2124	2909	5033

¹ Proposal of amendments on sex education at school, 1 March 2017: Schools to teach 21st century relationships and sex education, From: Department for Education and The Rt Hon Justine Greening MP. Part of: School and college qualifications and curriculum (available at: <https://www.gov.uk/government/news/schools-to-teach-21st-century-relationships-and-sex-education>).

School and college qualifications and curriculum Sex education to be compulsory in England's schools. By Katherine Sellgren BBC News education reporter (available at: <http://www.bbc.com/news/education-39116783>).

The national curriculum: <https://www.gov.uk/national-curriculum/other-compulsory-subjects>.

Table 2

British men receiving sex education at school, by Britain regions, Natsal-3, 2010–2012

Region	Sex education at school		Total
	No	Yes	
North East	115	142	257
North West	302	365	667
Yorkshire And The Hum	202	233	435
East Midlands	165	269	434
West Midlands	173	238	411
South West	163	261	424
East	225	333	558
London	225	277	502
South East	260	384	644
Wales	121	154	275
Scotland	173	253	426
Total	2124	2909	5033

Table 3

Estimates of the probability of having had sex education in school

Variable	Estimates	<i>t</i> -values
Constant	0.640	9.75
Attended single sex class	-0.808	-10.84
Boarding School	0.066	0.49
Father's occupation when the boy was 14 years:		
Farm workers	-0.545	-2.70
Skilled manufacturing	-0.294	-3.48
Unskilled manufacturing	-0.352	-3.99
Manager, administrator	0.210	1.99
Salesman	-0.126	-0.72
Other work	-0.211	-2.01
Number of observations	5033	
Log likelihood	-3348.715	

(Probit) when our observed adult men were school pupils. When the sons were 14 years old, we observe father's occupation.

If the man, when he was at school, attended a school with only boys in the class, the probability of having had sex education is lower compared to if he went to schools with both gender in class. With respect to father's occupation, sons of managers and administrators had higher chance to go to schools where sex education took place than among sons of fathers with other and not so well paid jobs.

We could have used this estimated probability or an indicator function in the estimation of demand for sex, that is in the zero-inflated Poisson model outlined in the next section. However, we prefer instead to use the observed Yes/No dummy.

III THE ECONOMETRIC MODEL

We will apply a zero-inflated Poisson model, see Cameron and Trivedi (2005) for a discussion of this and related models. Let $y = 0, 1, 2, \dots$ be the number of times with a prostitute and let $f_1(\cdot)$ be a density that accounts for a binary process. If the binary process takes value 0, with the probability $f_1(0)$, then $y = 0$. If the binary process takes the value 1, with probability $f_1(1)$, then y takes the count values 0, 1, 2, from the count density $f_2(\cdot)$. Note that $f_1(1)$ is the probability of participating in the sex market, while $f_2(\cdot)$ gives the density related to number of times with prostitutes. The main feature of the zero-inflated Poisson model is that the zero counts occur both as a realization of the binary process and as realization of the count process. The densities that go into the likelihood function used in estimating the model are:

$$g(y) = f_1(0) + (1 - f_1(0))f_2(0) \quad \text{if } y = 0 \quad (1)$$

$$g(y) = (1 - f_1(0))f_2(y) \quad \text{if } y \geq 1 \quad (2)$$

In STATA, there are two choices with respect to type of probabilities when estimating a zero-inflated count model: Logit or Probit. We have chosen $f_1(0; X_i\alpha)$ to be a Probit probability and $f_2(y; Z_i\beta)$ to be a Poisson density or more formally the probability mass function $\Pr(Y_i = y_i) = \frac{e^{-\mu_i} \mu_i^{y_i}}{y_i!}$, $y_i = 0, 1, 2, \dots$, where $\mu_i = \exp(Z_i\beta)$. We assume that a vector X_i of observed covariates affects the Probit probability and vector Z_i the Poisson density. The subscript i indicates male i .

Della Giusta *et al.* (2009a,b) assume that participation in the prostitution market is driven by three sets of variables: income and opportunities, loss of reputation and moral thresholds. Here, we try to specify an empirical model in accordance with that theoretical model. Let X_{1i} be a vector of observed variables that represent the reputation issue and moral threshold, while X_{2i} is a vector of other observed variables that represent income and opportunities. The two vectors constitute the vector $X_i = (X_{1i}, X_{2i})$ in the Probit probability $f_1(0; X_i\alpha)$.

In the vector X_{1i} , we include variables that may represent moral threshold characteristics and variables that may be related to loss of reputation and trust if it is discovered that the man has been together with prostitutes. If a man considers himself as religious, we take this as an indicator of high moral. Moreover, we consider having a permanent partner, children and having grown up with both parents as characteristics that may make it harder for the man to be together with prostitutes. Finally, we also include whether the man has a leading position at his workplace. Our conjecture is that the loss of reputation, if it is discovered that he has had sex with prostitutes, is higher compared to men with no leading position where they work. We have also included sex education in school. The justification is that this education may prepare pupils for adulthood and enable them to better take care of themselves and future partners.

In the vector X_{2i} , we include variables like age and age squared, use of drugs, early start in life with having sex, sex and not necessarily love and

relationship, opportunities to having sex abroad, income and living in London. Our justification for this choice of variables is that the older a man is, the higher is the chance that he has been tempted to have sex with a prostitute. Use of drugs, early experience with having sex and preference for sex, but less interest in establishing a relationship with a woman, accord with conjectures about the characteristics of men who are more inclined than others to buy sex. The justification for income is that paid sex can be costly. London is included, because it is a very big city with many opportunities in the sex market. For the same reason, we include sex abroad in this set of variables.

Z_i is a vector of variables that we assume have an impact on the number of times a man has been together with a prostitute up to the time of the survey. Age and age squared are included in the vector and we expect that the older the man is at the time of the interview, the more prostitutes he has been together with. Moreover, we have included whether he has used condoms when having sex with the prostitutes. Also at this stage, we have included the preference for sex, but less interest in establishing a relationship with a woman. Finally, we have included a variable representing whether he performs masturbation or not; masturbation could be a complement or a substitute for having sex with a prostitute.

The X and Z covariates could of course influence the alternative parts (hurdle and count) of the model. The justification for our choice is based on the discussion in Della Giusta *et al.* (2009a,b) and on our intuition. However, in the Appendix, we have lumped all variables together and estimates the hurdle part of the model (a Probit model) on two waves of the British survey. To some extent, the results give support to our main model.

To estimate the model we have to form the likelihood for the sample we observe, which consists of N_0 number of men who have never participated in the prostitution market; $y_i = 0$, and N_1 who have participated; $y_i \geq 1$. Below, L is this joint probability of the sample we observe.

$$L = \prod_{i=1}^{N_0} [f_1(0, X_i\alpha) + (1 - f_1(0, X_i\alpha))f_2(y_i, Z_i\beta)] \prod_{i=1}^{N_1} (1 - f_1(0, X_i\alpha))f_2(y_i, Z_i\beta);$$

$$y_i = 0, 1, 2, \dots, \quad (3)$$

IV DATA

We use the National Surveys of Sexual Attitudes and Lifestyles ('Natsal-2 and Natsal 3), which are surveys undertaken during 1999–2001 and 2010–2012 respectively. The surveys are interviews of a representative sample of men and

Table 4

Descriptive statistics of men who paid for sex in Britain regions, aged 20–74

Region	Mean	SD	Total Freq.
North-east	0.089	0.286	257
North-west (including old Mersey region)	0.132	0.339	667
Yorkshire and the Humber	0.108	0.311	435
East Midlands	0.092	0.290	434
West Midlands	0.102	0.303	411
South-west	0.111	0.314	424
East	0.108	0.310	558
London	0.167	0.374	502
South-east	0.143	0.350	644
Wales	0.091	0.288	275
Scotland	0.131	0.338	426
Total	0.120	0.325	5033

women aged, respectively, 16–44 and 16–74 living in private households in Britain.² Data collection was carried out using computer-assisted personal interview (CAPI) techniques along with computer-assisted self-interview (CASI) for the more sensitive questions.

The data provide a detailed understanding of patterns and variability in sexual behaviour in Britain. The data explore sexual behaviour (paying for sex included) and sexual function and satisfaction over the life course, health conditions and problems that may affect sexual lifestyles.

We focus on men paying for sex. Selection was constrained to men only since the original data set includes about 1% cases only of women paying for sex, although there is an increase in this demand. We also consider only heterosexual orientation since different sexual orientation is a small percentage of the sample and consequently impossible to consider for consistent estimation.

The data, given our aim to investigate participation among men in the sex market, have some limits. In fact, they do not give information on prices for paid sex, awareness of reputation losses, amount of freely exchanged sex and other specific personal characteristics.

We use Natsal-3 (2010–2012) in estimating the zero-inflated model outlined above. However, we also use Natsal-2 (1999–2001) and pooled cross sections to estimate the participation in the commercial sex market. The reason for doing this is to check whether the result we obtained for the non-participation of the zero-inflated model estimated on data from Natsal-3 is in accordance with estimate from an earlier data set and with a bigger data set, covering the two periods 1991–2001 and 2010–2012.

² Johnson, A., London School of Hygiene and Tropical Medicine. Centre for Sexual and Reproductive Health Research and Nat Cen Social Research, *National Survey of Sexual Attitudes and Lifestyles, 2010–2012*. Colchester, Essex: UK Data Archive, September 2015. This work is the result of a collaborative team from five organizations: University College London (UCL); London School of Hygiene & Tropical Medicine (LSHTM); National Centre for Social Research (NatCen); Public Health England (PHE) (formerly the Health Protection Agency); University of Manchester. SN: 7799, <https://doi.org/10.5255/ukda-sn-7799>

Table 5
 Descriptive statistics: 5033 observations: 604 Men Paying for Sex (MPS) and 4429 Men Not Paying for Sex (MNPS) over age 20–74, Natsal-3, 2010–2012

Variables	Whole sample				MNPS ¹⁾	MPS ²⁾
	Mean	SD	Min	Max	Mean	Mean
Paying for sex						
Ever paid money for heterosexual sex : dummy 1/0	0.12	0.33	0	1	0.00	1.00
Total number of heterosexual paid sex partner, life	15.74	73.91	0	3300	13.39	33.00
Total number of different women paid money to have sex with	0.67	4.96	0	200	0.00	5.60
X₁						
Manager: dummy 1/0	0.24	0.42	0	1	0.23	0.25
Professional: dummy 1/0	0.25	0.43	0	1	0.25	0.26
Skilled: dummy 1/0	0.25	0.43	0	1	0.25	0.26
Elementary occupation: dummy 1/0	0.12	0.32	0	1	0.12	0.10
Married: dummy 1/0	0.57	0.49	0	1	0.58	0.53
Cohabiting: dummy 1/0	0.55	0.50	0	1	0.55	0.49
Sex education at school: dummy 1/0	0.58	0.49	0	1	0.59	0.49
Having any natural child: dummy 1/0	0.52	0.50	0	1	0.52	0.53
Grew up with two parent: dummy 1/0	0.78	0.41	0	1	0.79	0.75
Household size (number of people who live regularly in household (including respondent))	2.54	1.33	1	8	2.57	2.32
Belong to any religion: dummy 1/0	0.45	0.50	0	1	0.45	0.48
X₂						
Income and opportunities						
Age	41.28	15.95	20	74	41	42.6
Drugs user (if ever injected drugs of any kind): dummy 1/0	0.42	0.49	0	1	0.39	0.59
Age first intercourse 13–15: dummy 1/0	0.26	0.44	0	1	0.24	0.34
Sex abroad (if any new paid sex partner while outside United Kingdom, last 5 years): dummy 1/0	0.10	0.30	0	1	0.08	0.26
Household income (£) (including benefits, pensions etc.) pre tax per year:						
Income <2,500: dummy 1/0	0.03	0.16	0	1	0.03	0.02
Income 2,500–4,999: dummy 1/0	0.04	0.19	0	1	0.04	0.04
Income 5,000–9,999: dummy 1/0	0.07	0.25	0	1	0.07	0.08

Table 5 (Continued)

Variables	Whole sample				MNPS ¹⁾		MPS ²⁾	
	Mean	SD	Min	Max	Mean	Max	Mean	Max
Income 10,000–19,999: dummy 1/0	0.15	0.36	0	1	0.15	1	0.15	1
Income 20,000–29,999: dummy 1/0	0.15	0.36	0	1	0.15	1	0.15	1
Income 30,000–39,999: dummy 1/0	0.13	0.34	0	1	0.13	1	0.13	1
Income 40,000–49,999: dummy 1/0	0.10	0.30	0	1	0.10	1	0.10	1
Income >=50,000: dummy 1/0	0.20	0.40	0	1	0.20	1	0.20	1
Leaving in Great London: dummy 1/0	0.10	0.30	0	1	0.09	1	0.14	1
Employee: dummy 1/0	0.77	0.42	0	1	0.77	1	0.14	1
Self-employed: dummy 1/0	0.14	0.35	0	1	0.78	1	0.16	1
Having sex without love: dummy 1/0	0.64	0.48	0	1	0.62	1	0.77	1
Ever masturbated: dummy 1/0	0.95	0.22	0	1	0.94	1	0.99	1
Unsafe sex: dummy 1/0	0.07	0.25	0	1	0.06	1	0.10	1
Greatly HIV/AIDS risk: dummy 1/0	0.27	0.44	0	1	0.25	1	0.35	1

1) MPS (Men Paying for Sex), 2) MNPS (Men Not Paying for Sex).
 For dummy_i, the statistics are computed as: column MNPS_i: (frequency if dummy_i = 1)/(total of MNPS); column MPS_i: (frequency if dummy_i = 1)/(total of MPS).

From the original data set Natsal-3, including 15162 men, we selected age 20–74 since for our purpose age 16–20 includes few cases that do not seem important in the market of paid sex. Due to the selection of age and to a quite number of missing value, data reduces to 5033 observations: 604 Men Paying for Sex (MPS)³ and 4429 Men Not Paying for Sex (MNPS).

The reported proportion of MPS is 12% of our sample (in line with Jones K.B. *et al.*, 2015).

Considering MPS across regions, we note that London and the regions of North and South-west have higher percentage of men buying sex (see Table 4).

In Table 5, we show descriptive statistics of the sample used in the estimation. We report data for MNPS vs. MPS.

In the following, we comment on some of the variables related to characteristics and family history of the interviewees. The interviewees pertain to singles or to married/cohabitant family and to a family with up to eight members.

Heterosexual behaviour strongly differs between MPS and MNPS: Men who paid for sex have on average 33 sexual partners compared to 13.4 partners for men not paying. Concerning the working status, we note that there are more managers, professionals and skilled workers paying for sex among MPS than among MNPS. This is not the case for elementary occupation.

Learning about sex is an important aspect of sex behaviour: 59% of MNPS learnt about sex from lessons at school compared to 49% of MPS. Only 5% has an easy parent–child relationship and mostly from mothers. Around 26% of the interviewees learn mostly about sex from friends of about same age. Only 2% learn from pornographic sources. Data do not say if sex education is taught at schools within areas where there are social problems. It would be interesting to know if sex education made them more conscious of their behaviour, or implied risk aversion, or has changed some other personal perceptions. However, this we do not observe.

About 78% of the respondents declare they lived more or less continuously until age 14 with both natural parents, and the mean differs between MNPS and MPS, 79% and 75%, respectively. It is more frequent to observe MPS in small families than in large families. Another interesting aspect is about religion: 45% of interviewed declared they belong to a religion. Analysing age we observe that demand for paid sex is highest in the group 40–44, while it is lower in the group of young 20–34, and after the age of 65 (Table 5). MNPS tend to be younger than MPS: 41 and 42.6 respectively.

There is a considerable difference in the drug use: MPS 59%, while MNPS 39%. Considering the age of first heterosexual intercourse (13–15) we observe that among MNPS, it is 24% and 34% for the MPS. Paying for sex remains strongly associated with foreign partners outside the United Kingdom and being in London. The discussion of the variables has been shortened (Table 6).

³ We define as MPS a man who declares to have paid for sex at least once. MNPS otherwise. From here on we will use the abbreviations MPS and MNPS.

Table 6
Descriptive statistics of MPS at different age group. Fractions

Man's age at interview, years, grouped	Mean	SD	Group Freq.
20–24	0.06	0.242	817
25–29	0.13	0.338	836
30–34	0.13	0.339	614
35–39	0.11	0.310	372
40–44	0.16	0.365	399
45–49	0.15	0.358	392
50–54	0.14	0.346	347
55–59	0.15	0.354	321
60–64	0.15	0.354	363
65–69	0.09	0.287	333
70–74	0.09	0.290	239
Total	0.12	0.325	5033

V ESTIMATES AND MARGINAL EFFECTS: THE ZERO-INFLATED COUNT MODEL ESTIMATED ON BRITISH DATA FROM THE NATSAL-3 SURVEY, 2010–2012

In Table 7, we report the results of the zero-inflated Poisson count model. The first set of coefficients is related to variables in the Probit probability of being in the ‘Always Zero’ group, that is, those who never had sex with prostitutes. The second part relates to the variables in the count part of the model. Table 8 reports the marginal effects of observed variables on the unconditional expectation of number of times with prostitutes. The unconditional expectation relates to the zero-inflated as well as the count part of the model.

We start with commenting on the estimates of the probability of **not** having sex with a prostitute (the zero-inflate part of the model) and the count part. However, the most interesting results are the marginal effects on the unconditional expectation of number of times with a prostitute, including zero, which will be discussed in this article.

The estimates of coefficients related to the “threshold” variables, the X_{1i} vector, meet our a priori expectations, with two exceptions. First, the coefficients attached to the professional status, represented by the four dummies described in Section III (the reference case is *elementary occupation and unemployed*) are not significant and they all have a *negative* sign. That is contrary to our expectation, since men with a professional status may have more to lose; if it becomes known that they have had sex with a prostitute. Second, belonging to a religion has a significant and *negative* effect on the probability of not having sex with a prostitute. Again, this result is contrary to our expectation. It should be noted that the variable religion includes a variety of beliefs and the dummy variable is based on the answers the respondent give in the survey. To our knowledge, there are no other similar comprehensive study of sex clients in which participation and number of times with prostitutes are jointly estimated.

Table 7

Estimate of the zero-inflated Poisson regression (probability of not participating in the sex market and count of the number of time with a prostitute). British men aged 20–74. 2010–2012

	Estimates	Robust Std. Err.	t-values
<i>Inflate part, Probit probability of not having sex with prostitutes</i>			
<i>X₁: Reputation loss and moral threshold</i>			
Constant	3.2690	0.3072	10.64
Manager: dummy 1/0	-0.0108	0.0862	-0.12
Professional: dummy 1/0	-0.0366	0.0819	-0.45
Skilled: dummy 1/0	-0.0200	0.0811	-0.25
Married: dummy 1/0	0.0751	0.0608	1.24
Sex education at school: dummy 1/0	0.2141	0.0537	3.99
Having any natural child: dummy 1/0	0.0006	0.0610	0.01
Grew up with two parent: dummy 1/0	0.1114	0.0609	1.83
Household size	0.0306	0.0238	1.29
Belong to any religion: dummy 1/0	-0.1632	0.0515	-3.17
<i>X₂: Income and opportunities</i>			
Age/10	-0.6870	0.1248	-5.51
Age/10 square	0.0640	0.0134	4.77
Drugs user (if ever injected drugs of any kind): dummy 1/0	-0.4593	0.0563	-8.16
Age first intercourse 13–15: dummy 1/0	-0.1559	0.0558	-2.79
Sex without love	-0.2236	0.0615	-3.64
Sex abroad (if any new paid sex partner while outside United Kingdom, last 5 years): dummy 1/0	-0.8813	0.0715	-12.33
Household income (£) (including benefits, pensions etc.) pre tax per year:			
Income 2,500–4,999: dummy 1/0	-0.0660	0.1449	-0.46
Income 5,000–9,999: dummy 1/0	-0.1884	0.1169	-1.61
Income 10,000–19,999: dummy 1/0	-0.1286	0.0972	-1.32
Income 20,000–29,999: dummy 1/0	-0.1221	0.0947	-1.29
Income 30,000–39,999: dummy 1/0	-0.2552	0.0996	-2.56
Income 40,000–49,999: dummy 1/0	-0.3670	0.1015	-3.61
Income >=50,000: dummy 1/0	-0.0945	0.0961	-0.98
Leaving in Great London: dummy 1/0	-0.2204	0.0793	-2.78
Employee	-0.0156	0.1091	-0.14
Self-employed	-0.0033	0.1281	-0.03
<i>Count part: A Poisson density</i>			
Constant	-0.2656	0.8930	-0.30
Age/10	0.9928	0.3272	3.03
Age/10 squared	-0.0784	0.0372	-2.11
Ever masturbated: dummy 1/0	-1.3743	0.5324	-2.58
Unsafe sex: dummy 1/0	0.3538	0.2671	1.32
Having sex without love	0.6774	0.2232	3.04
Number of obs. : 5033; Zero obs.: 597; Non-zero obs. 4436			
Wald χ^2 (5)	39.48		
$p > \chi^2$	0.00		
Log likelihood	-5164.193		

Table 8

Marginal effects of variables in the inflated zero-count model on the unconditional expectation of number of times with a prostitutes; $E(Y_i|X_i, Z_i)$

	Marginal effect	
Manager: dummy 1/0	0.0080	
Professional: dummy 1/0	0.0271	
Skilled: dummy 1/0	0.0148	
Married: dummy 1/0	-0.0557	
Sex education at school: dummy 1/0	-0.1587	***
Having any natural child: dummy 1/0	-0.0004	
Grew up with two parent: dummy 1/0	-0.0826	*
Household size (number of people who live regularly in the household)	-0.0227	
Belong to any religion: dummy 1/0	0.1210	***
Drugs user (if ever injected drugs of any kind): dummy 1/0	0.3405	***
Age first intercourse 13–15: dummy 1/0	0.1155	***
Sex abroad (if any new paid sex partner while outside United Kingdom, last 5 years): dummy 1/0	0.6533	***
Household income (£) (including benefits, pensions etc.) pre tax per year:		
Income 2,500–4,999: dummy 1/0	0.0489	
Income 5,000–9,999: dummy 1/0	0.1396	
Income 10,000–19,999: dummy 1/0	0.0953	
Income 20,000–29,999: dummy 1/0	0.0905	
Income 30,000–39,999: dummy 1/0	0.1891	***
Income 40,000–49,999: dummy 1/0	0.2720	***
Income \geq 50,000: dummy 1/0	0.0701	
Leaving in Great London: dummy 1/0	0.1634	***
Employee	0.0116	
Self-employed	0.0024	
Age/10	0.9275	***
Age/10 squared	-0.0805	***
Having sex without love: dummy 1/0	-0.5789	**
Ever masturbated: dummy 1/0	0.1747	
Unsafe sex: dummy 1/0	0.4076	***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The coefficients related to the working status, employee and self-employed, have the expected negative sign, but they are not significant.

Marriage may prevent individuals for having sex with prostitutes. As expected, the estimate of the coefficient is positive, but it is not significant.

Sex education at school; the coefficient is positive and significant.

The sign of the coefficient related to have any child is positive but not significant. We got the same results if we replaced it with the number of children.

Living until age of 16 in traditional families with the presence of both parents has a positive impact on non-participation in the sex market, but the coefficient is not completely significant. We get the same result for using the size of the household; the coefficient is positive, but not significant.

Turning to the estimates of the coefficients attached to the variables in the X_{2i} vector we observe from Table 8 that as the age increases up to the age of

around 54, there is a decrease in the probability of not having participated in the sex market.

Drug abusers are represented by the dummy *drug use*, which equals 1 if ever injected any kind of drugs and equal 0 otherwise. Drug abuse is widespread and abusers have a stronger inclination to have sex with a prostitute; the coefficient related to not buying sex is negative and highly significant.

The variable age at first heterosexual intercourse is represented by a dummy, which is equal to 1 if the individual had a sexual intercourse between the age of 13 and 15 and equal to 0 if older. The coefficient is negative and significant, confirming that those who started early with having sex are also more likely to enter the commercial sex market as an adult.

The coefficients attached to being abroad last 5 years and living in London are negative and significant. To be abroad or living in London may give more opportunities to find prostitutes and less possibilities to be observed being with a prostitute.⁴ The latter means that this variable could also belong to the X_I -vector.

The coefficient attached to men asking for sex without love, that is, without any obligation or sentimental value, is negative and significant. Thus, these men are more inclined to buy sex.

Men with a high income, given the professional status, may be more vulnerable socially if observed with prostitutes. However, to buy sex could be expensive, and hence, higher income may have a positive impact on participation in the sex market, in particular if sex takes place indoor in hotels and apartments. Our estimates partly confirm that latter expectation and show that only for those with an income around 30,000–50,000 pounds per year the coefficients are negative and significant. Men with these incomes are typically middle-class men.

In the estimate of the expected number of times with a prostitute, age is significant and implies that the expected number of times with a prostitute, given participation in the sex market, increases up to the age 61–62.

The estimates show that masturbation (ever or not) has a negative and significant impact (given participation), which indicates that masturbation is a substitute for having sex with a prostitute. Like in the participation probability, the impact of sex without love on the expected number of times with a prostitute is positive and significant. A worrying result is that the expected number of times with a prostitute is higher among those who are not using condoms than among those who do.

Table 8 gives the marginal effects of the observed variables on the unconditional expectation of times with prostitutes in the zero-inflated count model, that is (using one variables as an example)

$$\frac{\partial E(Y_i|X_i, Z_i)}{\partial X_{ij}}. \quad (4)$$

⁴ Third Report of Session 2016–17 on Prostitution of House of Commons, Home Affairs Committee reports: ‘Among men ever having paid for sex, 62.6% reported paying for sex outside the UK, most often in Europe and Asia.’

We observe that there are several large and clearly significant marginal effects. First, we observe that the expected number of times with the prostitute increases with the age up to around 55.

The expected number of times with prostitutes is clearly higher among men travelling abroad or living in London, which accords with the result reported in Ward *et al.* (2005). The same is the case with drug users, men not using condoms and who started early in life with having sex also. The expected number of times with prostitutes is higher among men with middle-class income than among men with lower or higher income. Sanders (2008) found a similar result. It could be that the lower income men cannot afford having sex with prostitutes and the rich men may have too much reputation to lose if they are caught being with prostitutes. Like Cameron and Collins (2003), we find that sex clients are more exposed to health risk (drug use, no use of condoms) than men not having sex with prostitutes. An unexpected finding is that the expected number of times with prostitutes is higher among those who declare that they are religious.

From a policy point of view, it is interesting to note that the expected number of times with prostitutes are lower among those men who had sex education at school compared to those men who did not have this education.

VI CONCLUSION

We have used data from Britain's third National Survey of Sexual Attitudes and Lifestyles (Natsal-3) with a sample of men aged 20–74 in the estimation of expected number of times with prostitutes. Men travelling abroad, living in London, drug users, religious men and men with middle-class income are more often together with prostitutes than other men.

The most notable finding from a policy point of view is that learning about sex in school has a significant and sizeable negative marginal effect on the expected number of times with a prostitute. To require that sex education at school should be compulsory in all schools could therefore help in reducing prostitution in Britain.

This policy implication accords well with the government amendment proposed on 1 March 2017: "Relationships education, RSE, and PSHE are designed to ensure pupils are taught the knowledge and life skills they will need to stay safe and develop healthy and supportive relationships, particularly dealing with the challenges of growing up in an online world". (See "Gov. UK" and "House of Commons" in the reference list).

The results obtained based on the survey data from 2010 to 2012 (Natsal-3) is rather equal to the results obtained using data from 1999 to 2001 (Natsal-2) and using the pooled data based on these two surveys, see Appendix.

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CONFLICT OF INTEREST

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APPENDIX

ESTIMATION OF THE PROBABILITIES OF BUYING SEX, BRITAIN 1999–2001, 2010–2012 AND POOLED DATA.

In order to use more information about the demand for paid sex, we pooled the two last available National Survey of Sexual Attitudes and Lifestyles (Natsal-2 and Natsal-3).

The two original data sets have some differences: Natsal-2 refers to age 16–44 while Natsal-3 refers to age 16–74. Furthermore, Natsal-2 does not report any information about income, while Natsal-3 does. Some of the entries in the questionnaire are not similar in the two surveys. To get the pooled cross section, we had to make some variables homogeneous, and we use education level as a proxy of income. We also had to limit our analysis to men aged 20–44. The pooled cross section gives us also the opportunity to observe a larger number of men who paid for having sex (i.e. 849).

Table A1
Summary Statistics of Natsal-2 (wave 1999–2001), Natsal-3 (wave 2010–2012) and the pooled data

Variables	Pooled cross section				wave 1999–2001				wave 2010–2012			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Paying for sex:												
Ever paid money for heterosexual sex : dummy 1/0	0.116	0.320	0	1	0.117	0.322	0	1	0.115	0.319	0	1
Total number. of heterosexual paid sex partner, life	14.133	32.518	0	1000	14.624	37.337	0	1000	13.447	24.236	0	400
Total number of different women paid money to have sex with	0.442	2.971	0	150	0.434	3.095	0	150	0.453	2.790	0	100
X1												
Reputation loss and moral threshold												
Manager: dummy 1/0	0.288	0.453	0	1	0.305	0.460	0	1	0.265	0.441	0	1
Professional: dummy 1/0	0.094	0.292	0	1	0.082	0.274	0	1	0.111	0.314	0	1
Administrative: dummy 1/0	0.136	0.343	0	1	0.131	0.337	0	1	0.144	0.351	0	1
Skilled: dummy 1/0	0.266	0.442	0	1	0.270	0.444	0	1	0.260	0.439	0	1
Elementary occupation: dummy 1/0	0.163	0.369	0	1	0.169	0.375	0	1	0.154	0.361	0	1
Married: dummy 1/0	0.511	0.500	0	1	0.531	0.499	0	1	0.482	0.500	0	1
Sex education at school: dummy 1/0	0.229	0.420	0	1	0.191	0.393	0	1	0.282	0.450	0	1
Having any natural child: dummy 1/0	0.428	0.495	0	1	0.464	0.499	0	1	0.378	0.485	0	1
Grew up with two parent: dummy 1/0	0.772	0.420	0	1	0.802	0.399	0	1	0.730	0.444	0	1
Household size (number of people who live regularly in household (including respondent))	2.819	1.428	1	12	2.827	1.459	1	12	2.807	1.385	1	8
Belong to any religion: dummy 1/0	0.409	0.492	0	1	0.430	0.495	0	1	0.379	0.485	0	1
X2												
Education and opportunities												
Age	31.380	6.986	20	44	32.515	6.828	20	44	29.797	6.897	20	44
Non-smoker: dummy 1/0	0.629	0.483	0	1	0.608	0.488	0	1	0.658	0.474	0	1

Table A2

Probability of British men participating in the sex market. Pooled cross section data, wave 1999–2001 and wave 2010–2012, age 20–44

Variables	Pooled cross section			wave 1999–2001			wave 2010–2012		
	Estimates	t	Marginal effect	Estimates	t	Marginal effect	Estimates	t	Marginal effect
Constant	-5.196	-10.120		-4.708	-6.940		-5.85	-7.21	
X₁			Reputation loss and moral threshold			Reputation loss and moral threshold			Reputation loss and moral threshold
Manager	-0.013	-0.210	-0.002	-0.121	-1.450	-0.020	0.14	1.32	0.023
Professional	-0.125	-1.340	-0.020	-0.168	-1.350	-0.026	-0.04	-0.26	-0.006
Administrative	0.067	0.930	0.012	0.044	0.470	0.008	0.10	0.89	0.017
Skilled	-0.003	-0.040	0.000	-0.100	-1.260	-0.017	0.13	1.33	0.022
Married	-0.070	-1.440	-0.012	-0.050	-0.790	-0.009	-0.09	-1.16	-0.014
Sex education at school	-0.200	-3.720	-0.031	-0.203	-2.690	-0.032	-0.20	-2.61	-0.031
Having any child	-0.142	-2.760	-0.024	-0.239	-3.490	-0.041	-0.03	-0.40	-0.005
Grew up with two parents	-0.078	-1.600	-0.013	-0.038	-0.570	-0.007	-0.11	-1.57	-0.019
Belong to a religion	0.142	3.370	0.024	0.122	2.240	0.021	0.17	2.52	0.028
X₂			Income and opportunities			Income and opportunities			Income and opportunities
Age/10	1.654	5.280	0.278	1.392	3.360	0.239	2.03	4.11	0.323
(Age/10) squared	-0.201	-4.220	-0.034	-0.159	-2.530	-0.027	-0.26	-3.45	-0.042
Heavy smoker	0.140	2.530	0.025	0.120	1.760	0.022	0.20	2.01	0.034
High alcohol use	0.230	2.780	0.044	0.202	1.430	0.039	0.25	2.42	0.046
Drug injection	0.557	4.240	0.129	0.515	2.530	0.119	0.55	3.15	0.121
Age first intercourse 13_15	0.208	4.500	0.037	0.218	3.580	0.040	0.18	2.56	0.031
Sex abroad	0.747	14.800	0.171	0.632	9.680	0.140	0.92	11.35	0.216
Degree	0.008	0.100	0.001	0.156	1.520	0.028	-0.26	-2.02	-0.039
A-level	0.145	1.800	0.026	0.275	2.650	0.053	-0.08	-0.62	-0.012
O-level	0.077	1.160	0.013	0.158	1.870	0.027	-0.10	-0.87	-0.015

Table A2 (Continued)

Variables	Pooled cross section			wave 1999–2001			wave 2010–2012		
	Estimates	<i>t</i>	Marginal effect	Estimates	<i>t</i>	Marginal effect	Estimates	<i>t</i>	Marginal effect
Unsafe sex	0.233	3.260	0.045	0.343	3.760	0.071	0.06	0.55	0.011
Masturbation	0.556	4.630	0.067	0.446	3.210	0.059	0.85	3.38	0.078
Living in London	0.281	5.530	0.053	0.288	4.790	0.054	0.23	2.35	0.042
Wave_2010–2012 (dummy)	0.130	2.920	0.022						
Number of observations		7295			4249			3046	
LR χ^2 (22)		542.69			299.70			276.00	
$p > \chi^2$		0.00			0.00			0.00	
Pseudo R^2		0.104			0.098			0.1273	
Log Likelihood		-2345.258			-1385.386			-946.30819	

Estimates confirm that the probability of demand for paid sex increased from 2000 to 2010. Estimates also (mostly) confirm results found in the analysis reported in Table 7 above for men aged 20–74 in Natsal-3. In particular, having had sex education in school has a negative and significant impact on buying sex both in pooled cross sections and in each wave. In the expanded set of covariates, we observe that men with a risky life profile (sex without condoms, use of drugs, heavy smoking and high consumption of alcohol) are more inclined to buy sexual services from prostitutes than other men.

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