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Does Prostitution Constrain Sex Crimes?

- Micro-evidence from Korea

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Abstract: This paper investigates empirically whether prostitution reduces sex crimes. Theoretical predictions suggest two contradicting effects: substituting or complementing. By using survey data of sex offenders in Korea, I find that prostitution increases the probability of committing sex crimes. Also, the experience of buying sex with a minor exacerbates the severity of sex crimes. These results indicate that prostitution intensifies one's propensities for more violent sexual behaviors, suggesting a complementary relationship between prostitution and sex crimes. The main findings do not alter after accounting for the endogeneity of the model by applying an exogenous instrument – the location of red-light districts.

JEL-codes: D01; J16; K42

Keywords: sex crime; prostitution; complementary effects; substitution effects; risky sexual behaviors

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1. Introduction

Sex trade is typically not considered as a normal economic exchange, despite the fact that prostitution has long existed in our society. Whether or not prostitution should be recognized as a legal transaction of services is a controversial issue in many countries. Some countries legalized prostitution (e.g. Germany and the Netherlands), while in many parts of the world, prostitution is still illegal. One of the commonly used arguments for prostitution is that it could create positive externalities such as reducing sexual violence. This argument is based on the prediction that potential sex offenders may find prostitution as an alternative to rape for satisfying their sexual impulses. Furthermore, it is argued that, by legalizing prostitution, law enforcement resources can be reallocated and used to prevent sex crimes, rather than raiding red-light districts.

However, this view for the legalization of prostitution is challenged by counter-arguments that experiencing commercial sex may increase one's propensities towards more violent, riskier sexual behaviors. Under this prediction, there could be a complementary relationship between prostitution and sex crimes. As a result, the acceptance of prostitution may accelerate the prevalence of sex crimes, instead of replacing them.

The literature investigating the effects of prostitution also suggests conflicting empirical evidence. Cunningham and Shah (2014) examined the effect of legalization of prostitution in Rhode Island in the United States, and found that its legalization reduced sex crimes, suggesting positive externalities. On the other hand, in a global study by Cho et al. (2013), it has been shown that legalizing prostitution induced more sex trafficking as increased demand for prostitution cannot be fully satisfied by the voluntary supply of prostitution. The finding of Cho et al. is shared by Kotsadam and Jakobsson (2013a) who investigated the effects of legal prostitution in European countries.

So far, these studies have focused on macro-level evidence by investigating whether the legal status of prostitution affects sexual violence. While one suggests a constraining effect on rape, the other finds a positive effect increasing in sex trafficking. Their findings do not necessarily rule each other out because prostitution may reduce rape while inducing more sex trafficking. It rather signals that the conflicting implications of prostitution suggested by the current literature

are subject to further investigation. Indeed, empirical evidence on the effects of prostitution is scarce in literature¹, mainly because both prostitution and sex crimes are hidden problems and it is therefore difficult to obtain quality data. Thus, it will be necessary to look into the issue through various different perspectives, so that a new piece of evidence can be contributed to the currently inconclusive literature.

In this paper, I extend the literature by examining the effects of prostitution on sex crimes through micro-analyses. To do so, I exploit survey data of sex offenders in Korea (Jeon et al. 2007) that includes questions about individuals' past experiences with prostitution, sex crimes, and violence, as well as their demographic information and values. Through regression analyses, I test for different hypotheses on the relationship between prostitution and sex crimes based on the following theoretical predictions: (i) prostitution substitutes and therefore constrains sex crimes; (ii) prostitution complements and therefore increases sex crimes; and (iii) prostitution is fundamentally different from sex crime and therefore there is no relationship between the two.

My findings suggest that the experience of buying sex increases the probability of one committing a sex crime. This result remains robust after taking into account the endogeneity of the model by employing an exogenous instrument – the location of red-light districts. Also, paying for commercial sex with a minor creates an additional effect of exacerbating the severity of sex crimes. Furthermore, I find that the effects of observable and unobservable factors that influence prostitution are widely different from those for sex crimes – besides the endogenous effects between the two. Overall, the empirical results support a complementary relationship between prostitution and sex crimes, and that sex crimes are an increasing function in prostitution.

In my study, I attempt to identify a behavioral relationship between prostitution and sex crimes by using micro-level evidence from survey data. As mentioned above, the results are drawn

¹ Presently, there are several studies that discuss the determinants of prostitution on the demand side: health concerns (Schei and Stigum 2010; Della Giusta, Di Tommaso, Shima, and Strom 2009); risks of being caught under the prohibition of prostitution (Kotsadam and Jakobsson 2013b); clients' reputation and social status (Della Giusta, Di Tommaso and Strom 2009); and social attitudes towards gender equality (Kotsadam and Jakobsson 2011).

through an analysis of sex offenders.² Therefore, these observations may have some limitations to applying to the entire populations. However, given the absence of expansive empirical evidence, these findings could shed some light on the uncertainty about the consequences of prostitution.

2. Conceptual Framework: Prostitution and Sex Crimes

In this section I will provide theoretical arguments on the relationship between prostitution and sex crimes. The experience of buying sex may influence one's decision to commit a sex crime (and vice versa), given that both behavioral choices involve trading sexual acts – through a commercial exchange for the former and coercion or violence for the latter. Theoretical predictions propose three different relationships between them; prostitution is a substitute for sex crimes; prostitution complements sex crimes; and buying sex is a fundamentally different behavioral choice from committing a sex crime.

2.1. Substitution Relationship

One may buy sex rather than committing a sex crime, if he (a client of prostitution and a sex offender can refer to a gender-neutral term, but the majority of them are males) perceives both acts similar or comparable. Whether prostitution can be a substitute for sex crimes is, indeed, a controversial issue. Some argue that prostitution provides protection for other women (non-prostitutes) because the sexual desires of men can be satisfied by seeing prostitutes instead of raping other women (Dever 1996). In line with this argument, a recent study by Cunningham and Shah (2014) has shown empirical evidence from Rhode Island in the United States that the decriminalization of prostitution reduced sexual violence – not only due to the reallocation of enforcement capacities and empowerment of prostitutes but also possibly due to the substitution effect between prostitution and sex crimes.

² This is mainly due to the unavailability of data collected from population samples. There are several survey-datasets including questions about values and attitudes towards prostitution (e.g. the World Value Survey), but, to the best of my knowledge, surveys that ask questions about the personal experience of committing sex crimes and buying commercial sex are extremely rare.

Prostitution may substitute sex crimes, if the motivations of buying sex and committing a sex crime are identical or similar to a great extent. For instance, if one commits a sex crime because of an unsatisfied sexual desire on the spur of moment, making prostitution available and affordable might be an alternative to sex crimes.

If this is the case, when does one choose prostitution over sex crimes? The choice between buying sex and committing a sex crime depends on the cost function – i.e. one hires a prostitute if it is less costly than rape. Typically, the decision of choosing one good or service between two substitution options depends on price level. However, because prostitution and sex crimes are both illegal (prostitution is legal in some countries, but prohibited in Korea) there are additional factors that enter into the cost function. According to Becker (1968), one's decision of committing a crime is determined by gains, the probability of being caught, and the severity of punishment. Therefore, the cost function should include the risk factors (i.e. the probability of arrest and punishment level for each criminal act). In addition, both prostitution and sex crimes are not only illegal but also generally considered to be socially undesirable behaviors. Thus, committing such sexual acts involves the costs of social stigma and loss of reputation (Della Giusta et al. 2009a). In other words, in order for prostitution to substitute sex crimes, the conditionality of low costs – i.e. $C_{\text{prostitution}}(\text{price, risk, reputation}) < C_{\text{sex crimes}}(\text{price, risk, reputation})$ – should be fulfilled.

Comparing the costs of prostitution and sex crimes is not always straightforward. On the one hand, one has to pay for sex with a prostitute, while the monetary costs of committing a sex crime are almost zero (disregarding any additional costs, such as purchasing weapons used for physical threats). On the other hand, the risk factors such as the probability of arrests and the level of punishments are definitely greater for committing a sex crime. In Korea, rape is subject to an imprisonment term of three years or longer (Criminal Law Penal Code 297, Government of Korea 2013), while the punishment for soliciting prostitution is usually a monetary fine between 500 and 1,000 US dollars (Criminal Law Penal Code 21). Also, enforcement against sex crimes is much stricter than enforcement efforts against prostitution. Furthermore, one can safely surmise that the social stigma attached to committing a sex crime is greater than that of buying sex.

Regarding the monetary costs of buying sex, a recent study on the prostitution markets in Korea (MOGEF 2010) provides some estimated price levels. According to this study, the price of prostitution per transaction is on average 130,000 won (about 120 US dollars), but depending on locations, one can find much cheaper offers. For example, prostitution that takes places in a motel can cost as low as 29,000 won (26 US dollars). Given the higher risks and social stigma imposed on sex crimes, it is unlikely that the price level of hiring a prostitute³ dominates the costs of punishments and reputation losses for sex offenders. With this calculation, the costs of buying sex are likely lower than those of committing a sex crime.

Under this prediction, I hypothesize that prostitution can be a substitution for sex crimes, and thus decrease them.

H₀. An increase in the frequency of buying sex (prostitution) decreases sex crimes ($\frac{\partial \text{sex crimes}}{\partial \text{prostitution}} < 0$).

2.2. Complementary Relationship

A counterargument to the substitution hypothesis predicts the exactly opposite effect of prostitution on sex crimes. It suggests that the experience of buying sex may increase one's propensities to commit a sex crime. In this case, prostitution increases sex crimes, rather than constraining them.

This argument can be plausible if one takes into account the high prevalence of sexual violence and assaults observed in the commercial sex industry (Farley et al. 2003). Through interviews with 854 sex workers in nine countries⁴, Farley and her co-authors found that 71% of prostitutes have been physically assaulted and 63% of them have experienced rape. This study signals that prostitution shares violent characteristics with sex crimes.

³ Given the purchasing power level of Korea (35,485 US dollars in 2014, IMF 2015), the minimum price level of buying sex (26 US dollars) is likely affordable to the majority of potential clients of prostitution.

⁴ Canada, Colombia, Germany, Mexico, South Africa, Thailand, Turkey, United States, and Zambia.

One may argue that such similarities may support the role of prostitution as a substitute to sex crimes. However, one can also predict that experiencing one type of violent sexual contacts – such as prostitution – enhances one’s desire for more violent sexual acts – such as rape. In other words, the experience of buying sex may provide a threshold to accumulate one’s propensities for sex crimes (Schei and Stigum 2010).

Under this prediction, there can be two patterns of behavioral development that a prostitution consumer demonstrates: (i) committing a sex crime in addition to buying sex (the diversification of risky sexual behaviors); and (ii) committing a sex crime followed by prostitution (the intensification of risky sexual behaviors). Moreover, the act of buying commercial sex itself may also turn out to be a sexual offense, for example if a client rapes a prostitute (the combination of prostitution and sex crimes). In any of these cases, prostitution is predicted to increase sex crimes.

In fact, the survey data of sex offenders in Korea (Jeon et al. 2007) corresponds with these predicted patterns. It shows that almost 40% of sex offenders purchased commercial sex in the past year, while the share of prostitution consumers is about 27% only among the total population (MOGEF 2014). Moreover, the percentage of sex buyers becomes greater for sex offenders who used violent means for rape (47% of those who used physical violence and 54% of those who confined victims of rape). These descriptive patterns suggest that there can be a positive linkage between prostitution and sex crimes.

With the argument that prostitution can lead to increasing sex crimes, I propose the following hypothesis of a complementary relationship as an alternative to the substitution hypothesis above.

H₀. An increase in the frequency of buying sex increases sex crimes ($\frac{\partial \text{sex crimes}}{\partial \text{prostitution}} > 0$).

2.3. No Relationship between Prostitution and Sex Crimes

The two hypotheses above assume that demand for prostitution is closely related to the probability of one committing a sex crime, despite the fact that each hypothesis proposes a conflicting direction of the effects of prostitution on sex crimes. However, this assumption may

not hold, if clients of commercial sex are fundamentally different from sex offenders, and/or buying sex has different motivations and reasons from raping someone. In this case, the utility function of demand for prostitution differs from that of sex crimes, and therefore, the consumption of prostitution services does not alter the decision of committing a sex crime.

On the one hand, both types of the sexual behaviors involve sexual intercourse without developing a personal relationship with the counterpart (either a prostitute or a victim of sex crime) and often share violent characteristics during the sexual transactions. In this regard, the prediction of assuming no relationship between the two may not be very convincing at the first glance. However, when one looks into the reasons for rape stated by sex offenders, it provides a somewhat different outlook. According to the survey with sex offenders in Korea (Jeon et al. 2007), less than 20% of the respondents answered that they committed rape in order to satisfy their sexual impulses, while sexual satisfaction is presumably the primary motivation of buying sex. The rest of the sex offenders gave various other reasons – e.g. anger, love, possession, curiosity, alcohol, prevention of another crime, etc. (see appendix 3). Some of these reasons may overlap with the motivation of buying sex to some extent – for example, alcohol consumption or curiosity, but some are not – for example, the prevention of another crime and the cases of love. With these observations, the association between prostitution and sex crimes may not be as strong as previously suggested. Thus, I propose a third hypothesis below.

H₀. Prostitution does not have any effect on sex crimes ($\frac{\partial \text{sex crimes}}{\partial \text{prostitution}} = 0$).

3. Descriptive Patterns of Sex Crimes and Prostitution in Korea

3.1. Sex Crimes in Korea

In Korea, the sex crime data provide aggregated statistics of sexual violence – including rape and other forms of sexual assaults (UNODC 2015). In 2012, the total number of sexually violent acts reported by police was 19,619 (UNODC 2014). This number indicates that 40 incidences of sex

crime occurred per 100,000 persons. This crime rate places Korea in the middle of OECD countries with a rank of 15th out of 29 available countries (UNODCD 2014, see appendix 4).⁵

The statistics collected by the Supreme Prosecutors' Office of Korea (2014) provide some more detailed information about sex criminals. Among them, 60.8% have a previous criminal record. The unemployment rate of sex criminals is 21.9% - much higher than the unemployment rate at the national level (3.1% in 2013, KOSTAT 2015). 32.9% completed high-school education, 17.6% are college graduates, and 6.6% are currently enrolled in a college – i.e. more than a half of sex criminals have a high school or higher level of education.

The main motivations for committing a sex crime are: impulsive motives (38.4%), curiosity (13.2%), and seduction (6.0%). These motives presented in the macro-level crime statistics correspond with the findings of the micro-level survey with 658 sex criminals (Jeon et al. 2007). In the micro data, the stated primary reason for committing a sex crime is 'being drunk', followed by sexual desires and curiosity (see appendix 3). Being drunk in the micro-data can partly reflect impulsive motives that are presented as the dominant reason for committing a sex crime in the macro-data above (there is no category 'being drunk' in the macro-data and the category of 'impulsive motives' is missing in the micro-data).

However, the educational and occupational characteristics of sex offenders in the micro-survey data demonstrate somewhat different patterns from the macro-level statistics. Among sex offenders surveyed, only 7.7% are college graduates, and another 26% completed high school – much lower levels of education compared to the patterns in the macro-data. On the other hand, the unemployment rate of sex offenders in the survey data is 11.2% – a significantly lower level than that of the macro-statistics, 21.9%. It seems that, compared to the entire group of sex criminals in Korea, individuals in the micro-data are less educated but also fewer are unemployed. The average age of sex criminals in this survey is 28.6, while information on the average age is unavailable in the macro-data.

⁵ The reported crime prevalence can also be driven by reporting rates, and therefore, a higher crime rate may, at least partially, mean a higher level of reporting to the police, rather than a higher level of actual prevalence.

3.2. Prostitution in Korea

Prostitution is prohibited by law, however, it is commonly seen in many cities in Korea. In 2004, the National Assembly of Korea passed the Special Law on Sex Trade strengthening enforcement against prostitution (particularly brothel complexes in major cities) and providing supports for victims of forced prostitution and prostitutes who want to leave their current occupations (Government of Korea 2004). Upon the adoption of the Special Law, public awareness against prostitution increased. 93.1% of men surveyed by the Ministry of Gender Equality and Family (MOGEF, 2014) answered that they were aware of the illegality of prostitution. However, awareness is relatively low among clients of prostitution – 57.7% among 224 attendees of the John school (educational intervention programs for those arrested for soliciting sexual services) who were surveyed between 2012 and 2013 (MOGEF 2014).

Despite the high level of public awareness, the prostitution markets are sizable in Korea. A study estimating the size of the prostitution markets (MOGEF 2010) suggests that the revenues of the prostitution industry reach 5.5 billion US dollars – 0.5% of the GDP of Korea in 2010. The relative size of the prostitution markets in Korea is similar to that of Germany where prostitution is legal – an estimate of 14.6 billion euro of annual sales revenues that account for 0.55% of its GDP (Die Welt 2013).

Among men sampled from the population and surveyed (MOGEF 2014), 27% answered that they purchased commercial sex in the previous year (MOGEF 2014). The share of clients of prostitution is higher among sex offenders, as presented in section 2.2. 38% of surveyed sex offenders paid for commercial sex in the previous year (Jeon et al. 2007). Among them, the share of sex buyers is higher for the less-educated than that of others with higher education (45% of sex offenders with a middle school or lower level of education, 37% for high school education, and 32% for college levels, see appendix 1). The proportion of clients of prostitution is similar between the employed and the unemployed with a small difference – 37% and 33%, respectively. Interestingly, married or partnered men, among sex offenders, are more often clients of prostitution than singles – 50% and 36%, respectively. The age group between 30 and 39 has a greatest tendency to be clients of prostitution, followed by the age group of the 20s – 58% and 45.5%, respectively. The shares of prostitution clients across different age groups demonstrate

somewhat different patterns among John School attendees. The age group of the 30s forms the group with the highest prevalence, followed by those in their 40s. It seems that, among sex offenders, younger groups (20-30s) more likely visit prostitutes, while, among non-sex offenders, the dominant groups of clients are older ones (30-40s).

4. Empirical Framework

4.1. Baseline Model: Determinants of Sex Crimes

To examine whether the experience of buying sex affects the probability of one committing a sex crime, I construct an estimation model that takes the following form.

$$\text{Crime}_i = \beta \text{prostitution}_i + M_i \gamma + I_i \tau + X_i \omega + u_i \quad (1)$$

The dependent variable is a dummy indicating whether person i has committed a sex crime in the previous year – one-calendar year prior to the survey. To construct the dependent variable of sex crimes, I used three survey questions; (i) whether the respondent had forced sex with someone (stranger) without her will; (ii) whether he had forced sex with his wife or girlfriend without her will; and (iii) whether he has committed any type of sexual assaults (i.e. unwanted sexual contact and harassments between the victim and the offender). Accordingly, the three dependent variables are formed as below.

$$\text{Crime (1 if committed; 0, otherwise)} = \begin{cases} \text{Sexual Assaults} \\ \text{Forced Sex (stranger)} \\ \text{Forced Sex (partner)} \end{cases}$$

The *Prostitution* variable indicates how often the respondent purchased commercial sex in the previous year. Two questions from the survey were used to create the prostitution variable: (i) how often the respondent paid to have sex with an adult; and (ii) how often the respondent paid to have sex with a minor (under 20 years old). For each question, the respondents select one of six options: never, once, twice, three times, more than four times, and not applicable. By using this information about the frequency of paying for commercial sex, I have constructed two variables (*prostitution of adults* and *prostitution of minors*) on a five-point scale (from score 0 for ‘never’ to score 4 for ‘more than four times’), respectively. In addition, the two variables are aggregated

with an equal weight to create a third variable, *prostitution*, that measures the frequency of paying for sex with adults and minors in total on a nine-point scale (from 0 to 8), by summing up the two variables.

$$\text{Prostitution} = \begin{cases} \text{Prostitution (sum, scale 0 – 8)} \\ \text{Prostitution (adults, scale 0 – 4)} \\ \text{Prostitution (minors, scale 0 – 4)} \end{cases}$$

Besides the independent variable of main interest – the prostitution variables, I also include variables that reflect (mis)perceptions about rape and prostitution – so-called rape and prostitution myths. Rape myths are cultural beliefs that blame victims of sex crimes for their misfortune, and are typically expressed as ‘women enjoy being raped’ or ‘victims of rape are promiscuous and/or responsible for their victimization’, ‘if one resists, one can always escape from being raped’ (Grubb and Turner 2012). The acceptance of rape myths tends to be highly correlated with men’s propensities to commit a sex crime (Burt 1980). On the other hand, prostitution myths prescribe the beliefs that prostitution decreases sex crimes by providing an alternative way to act on sexual impulses. The prostitution myths variable reflects *values* for the consumption of sexual services, while the prostitution variables account for an *act* of buying commercial sex. To measure the degrees of embracing such myths, two questions from the survey were used. These questions asked respondents to indicate how much they agree with the following statements: (i) women like men who handle them roughly (for rape myths); and (ii) if there is no prostitution, sex crimes would increase (for prostitution myths). The degrees of the acceptance of rape and prostitution myths are measured on a five-point scale (score 1 strongly disagree; 2 disagree; 3 neither agree nor disagree; 4 agree; and 5 strongly agree), respectively. In equation (1) above, vector M consists of these two myth variables.

Additionally, vector S contains two variables reflecting self-assessments. First, literature suggests that men with fragile self-esteems tend to be more prone to committing sex crimes because they have fewer opportunities to access to women without using violence (Joseph and Black 2012). To capture the degree of fragile self-esteems, the question, *I am a failure in life*, from the survey is used. Respondents answered how much they agree with this statement. The variable is created on a five-point scale from score 1 (strongly disagree) to 5 (strongly agree). In addition to fragile self-esteems, a variable measuring one’s propensities to take risks is also included in vector S because

the costs of committing a sex crime will be lower for risk-loving individuals than risk-averse ones. The risk variable is constructed based on the degree of agreeing with the following statement, *if a task is thrilling and fun, I would do it even if it is dangerous*. Again, the degree is measured on a five-point scale from strongly disagree (1) to strongly agree (5).

Lastly, vector X includes demographic factors of sex offenders: education levels, age (at the point of committing a sex crime), marital status, employment, and childhood experience of being abused by parents (also see appendix 2 for descriptive statistics of demographic factors among sex offenders). Detailed information about all variables used in the regression analysis is presented in appendix 5.

As the dependent variable has a dummy structure, I employ a probit regression method with robust standard errors that are applied to correct for heteroscedasticity. The survey data with 658 sex offenders, either in prison or under probation in Korea (Jeon et al. 2007), are exploited for the analysis. Out of the sample of 658 individuals, 480 are available for the estimations due to missing answers.

4.2. The Endogeneity of the Model

Equation 1 above is modelled to identify whether the experience of buying sex affects the likelihood of an individual committing a sex crime. However, this model is subject to endogeneity because some important variables are likely omitted.⁶ In the baseline model, I try to include all available variables relevant to explaining sex crimes. However, some potentially important factors of sex crimes are either unobservable – e.g. personality or sexual preference – or unobserved in this survey – e.g. questions on family backgrounds. As these omitted factors of sex crimes also possibly affect one’s choice of buying sex, the experience of prostitution and sex crimes likely have endogenous processes jointly determining each other. This problem can be further exacerbated due to the simultaneity of the two events (i.e. sex crimes and prostitution).

⁶ The results of the Wald test (see table 2) also indicate that the model is endogenous. The Wald test checks for whether error terms in the first stage and second stage regressions are *uncorrelated*. The presence of correlation between the two error terms singles that prostitution is endogenous to sex crimes. The results show that there are significant correlations between the two error terms, except columns 4 and 5.

The survey data includes variables indicating (i) whether one committed sexual assaults/forced sex, and (ii) partook in prostitution in the previous year, without further clarification about the chronological order of the two events.

In the presence of endogeneity, the estimators produced by the baseline probit estimations will be biased. Therefore, I employ an instrumental variable approach estimating the effect of the endogenous variable by using information obtained through an exogenous excluded instrument.

My chosen instrument exploits information about whether a sex offender resided in a city that hosted brothel complexes (i.e. red-light districts in parts of a city).⁷ Brothel complexes tend to have a negative association with the prosperity of prostitution businesses in Korea after the adoption of the Special Law on Sex Trade in 2004. Upon the approval of this new legislation, police enforced strict regulations against prostitution, mainly in places with brothel concentrations, and as a result, many prostitution services moved out of these areas (Kim and Ha 2012). With this observation, one can surmise that in a city where red-light districts were formerly located, the availability of prostitution became constrained, while risks of being arrested increased for clients of prostitution. Thus, the location of brothel concentrations is likely to have a high (negative) correlation with the frequency of buying sex.

To check for the explanatory power of the instrument over the endogenous variable, I run a first-stage regression below (equation 2), with *prostitution* (the frequency of buying sex) as the dependent variable and *brothel* (dummy indicating whether an individual resided in a city with brothel concentrations) as the main explanatory variable. A probit method with endogenous regressors is used for the instrumental variable estimations and robust standard errors are applied.

$$\text{Prostitution}_i = \psi \text{brothel}_i + Z_i' \chi + e_i \quad (2)$$

$$H_0: \psi = 0$$

The results are shown in table 3 (the first-stage regression). The coefficient of *brothel* is between -2.08 and -0.65 , suggesting that residing in a city with a red-light district reduces the purchase of

⁷ As the survey includes no information about the residency of respondents prior to their imprisonment, I take a proxy of the location of a prison/probation center, given that most inmates are placed in a prison nearby their residential areas.

prostitution services by between 7% (in total) and 40% (prostitution of minors). All of the coefficients are statistically significant at the 1% level, rejecting the null hypothesis above.

On the other hand, whether the instrument, *brothel*, is exogenous to sex crimes is more challenging to show. To satisfy the exclusion criteria of an instrument, one's residing nearby a brothel complex should not have a direct effect on sex crimes, but explain the probability of committing a sex crime only via the channel of prostitution. However, it may not be the case, if brothel complexes also provide environments favorable to committing a sex crime (or alternatively, sex offenders intentionally live nearby red-light districts). To test for the exogeneity of the chosen instrument, I include the instrument as an explanatory variable in the baseline model and run regressions as below (see equation 1'). As *brothel* should not have a direct effect on sex crimes, the estimated coefficient is expected to be zero, as long as the prostitution variable is also included. Once the prostitution variable is excluded (see equation 1''), *brothel* should have an effect on sex crimes, because it will absorb the effect of prostitution.

$$\text{Crime}_i = \beta' \text{prostitution}_i + M_i' \gamma' + I_i' \tau' + X_i' \omega' + \phi' \text{brothel}_i + u'_i \quad (1')$$

$$H_0: \phi' = 0$$

$$\text{Crime}_i = M_i' \gamma'' + I_i' \tau'' + X_i' \omega'' + \phi'' \text{brothel}_i + u''_i \quad (1'')$$

$$H_0: \phi'' \neq 0$$

Table 3 shows the results of the regressions. As expected, the coefficient of the brothel variable is statistically insignificant when prostitution is controlled for (columns 1, 3, and 5). However, when the prostitution variable is excluded from the model (columns 2, 4, and 6), the coefficient turns out to be significant at the 1-5% levels with the expected negative sign. This result supports the validity of *brothel* as an instrument that it affects *sex crimes* only via its association with *prostitution*.

4.3. Extension of the Model

In addition to identifying the effect of prostitution on sex crimes, I further investigate the reasons for buying sex. By doing so, I will compare the determinants of prostitution with those of sex crimes to find whether there are common determinants between the two. If so, one may argue that sex offenders buy prostitution services for same reasons as committing a sex crime (and vice

versa) and therefore the two sexual behaviors are substitutes for each other. The model of determinants of prostitution takes the following forms (equations 3 and 3').

$$\begin{aligned} \text{Prostitution}_i &= M_i'\theta + I_i'\rho + X_i'\kappa + \varepsilon_i & (3) \\ \text{Prostitution}_i &= \lambda \text{crime}_i + M_i'\theta' + I_i'\rho' + X_i'\kappa' + \varepsilon'_i & (3') \end{aligned}$$

In fact, equation 3 is identical to the first stage regression (equation 2) in section 4.2. Vector M includes prostitution and rape myths, and vector I self-assessments (risk-taking and fragile self-esteem). X is a vector containing one's demographic and childhood information. In addition, I further include the experience of committing sexual assaults/forced sex (equation 3') in order to account for any effects running from a sex crime to prostitution. As *prostitution* is a count variable scoring from 0 to 8, I employ a non-negative binomial method with robust standard errors.

On the other hand, the experience of buying sex may not only determine whether one commits a sex crime, but also affect the severity of sexual offenses, if this experience leads to increasing propensities for sadistic, violent sexual acts. To examine this aspect, I make a use of information about specific forms of rape that sex offenders committed, and select three severe types of rape: acquaintance rape, raping minors (i.e. under 20 years old), and raping with sadistic means (e.g. confinement). The estimation model is formulated below.

$$\text{Severe}_i = \beta_1 \text{prostitution}_i + M_i'\gamma_1 + I_i'\tau_1 + X_i'\omega_1 + S_i'\mu_1 + v_i \quad (4)$$

The dependent variable, *Severe*, is a dummy variable consisting of the aforementioned three severe forms of sex crimes, respectively. These three forms of sex crimes are the crimes responsible for the current imprisonment of the sex offenders (different from the sexual assaults/forced sex that they committed in the past). The explanatory variable of main interest is *prostitution*. In addition to the set of the control variables used in equation 1 (rape and prostitution myths, self-assessments, and demographic and childhood information), I include additional variables that describe situations involved in the occurrence of the specific sex crime in question. The information about situations is available for the sex crime responsible for the current imprisonment but not available for past crimes (therefore this information could not be included in equation 1).

The situation variables (vector *S*) control for various factors that affect not only the decision of committing a sex crime but also the severity of the act. Namely, vector *S* contains: reasons for rape (desires, power, or anger, see Groth 1979); substance use (alcohol consumption of the rapist, see Grubb and Turner 2012); victim's vulnerability (victim's age and alcohol consumption of the victim, see Grubb and Turner 2012; and Zimmerman and Benson 2007), and the degree of victim's resistance (verbal and physical, respectively, see Angelone et al. 2014). Given that the dependent variable has a dummy structure, a probit method with robust standard errors is applied.

5. Results

5.1. Does Prostitution Constrain Sex Crimes?

To examine whether the experience of buying sex increases or decreases the probability of committing a sex crime, I modeled the determinants of sex crimes, having *prostitution* as the explanatory variable of main interest, as presented in equation 1.

Table 1 shows the results of the regressions based on equation 1. The coefficient of prostitution is positive and statistically significant at the 1-5% levels across all specifications – with an exception of column 3. It implies that if a sex offender more often visited prostitutes in the past year, he was more likely to commit a sex crime in the same year. This effect holds for all types of sex crimes (sexual assaults, forced sex with a stranger, and forced sex with a partner) and for all age groups of prostitutes (adults and minors). The only exception is that if a sex offender visited a prostitute under 20 years old, the probability of committing sexual assaults does not increase (see column 3). However, the experience of paying for sex with a minor increases forced sex (see columns 6 and 9). Quantitatively, a one-standard deviation increase in the frequency of buying sex in the past year increases the probability of committing sexual assaults by between 3.1% and 4.4%; forced sex with a stranger by between 3.6% and 9.4%; and forced sex with a partner by between 2.5% and 4.7%.

Turning to the effects of the control variables, there is some evidence that more strongly agreeing with rape myths increases the probability of committing forced sex with a partner. A one-standard deviation increase in the level of accepting rape myths increases the probability of

committing this type of sex crime by 2% (see column 8). However, prostitution and rape myth variables are widely irrelevant when explaining sex crimes under the other specifications. On the other hand, more risk-loving attitudes increase the probability of committing forced sex – either with a stranger or a partner. A one-standard deviation increase in risk-taking attitudes increases the probability of forcing sex by between 2% (with a partner) and 2.5% (with a stranger). This result corresponds with the cost function of sex crimes that risk-loving attitudes reduce the costs of committing a crime (see section 2.1.). If one has a lower level of self-esteem (*fragile-self*), it is translated into increasing the probability for committing sexual assaults (a one-standard deviation increase in fragility is associated with 3.1%–4.1% increase in the probability of committing sexual assaults). This supports the prediction that sex crimes are an outcome of frustration, lack of self-confidence, or inferiority (Joseph and Black 2012).

Among the variables of demographic and personal backgrounds, the age of sex offenders seems to explain sex crimes – i.e. the coefficients for *age* and *age*² are respectively positive and negative with statistical significance at the conventional level. Generally speaking, the probability of committing a sex crime increases until one reaches 50 years old, and decreases afterwards. However, when controlling for the experience of paying for sex with a minor, the probability increases only until 31–33 years old (columns 3 and 6), and declines afterwards. This result indicates that the prostitution of minors absorbs some of the age effects. The education of sex offenders seems to be unimportant when explaining their deviant sexual behaviors. Omitting *college graduates* as a reference category, the coefficients of most education variables are insignificant, except some college (either college drop-out or enrolled in a college) that turned out to have a positive effect on sexual assaults at the 10% level of significance. Being abused by parents during one's childhood does not seem to explain sexual assaults and forced sex with a stranger, however, the experience of parental abuses increases the probability of committing forced sex with a partner by 2.5%.

The results suggest that the experience of buying sex is a crucial determinant in explaining the probability of one committing a sex crime. By adding up the prostitution variable, the explanatory power of the model increases to a substantial extent. R^2 increases from 0.07 (without prostitution) to 0.09 (with prostitution) for sexual assaults. For forced sex with a stranger, it increases from 0.07 to 0.21, and for forced sex with a partner, from 0.09 to 0.16. This means that

prostitution accounts for 2–14% of the total variations in the probability of committing a sex crime. In addition, prostitution captures 2%–15%⁸ of the residual variations that are not explained by the control variables.

The probit analysis of the baseline model is, however, subject to endogeneity, because unobserved characteristics of an individual that influence one's probability of committing a sex crime also likely affect one's propensities to consume prostitution services – for instance, sexual preference, personality, or family backgrounds that are not captured in this model. To account for the effects of omitted variables, I employ an exogenous, excluded instrument (the location of brothel complexes) and estimate the model with a two-stage probit method. Table 2 presents the results of the instrumental variable estimations. The positive and significant effect of prostitution remains unchanged and the magnitudes of the effect become larger after accounting for unobserved effects. The size of the coefficient increases largest for sexual assaults: from 0.02 to 0.11 – almost 6 times larger. For forced sex with a stranger, the coefficient increases by about 33% (from 0.06 to 0.08), and for forced sex with a partner, the effects become about three times larger (from 0.03 to 0.10). The sizes of the IV estimators suggest that a one-standard deviation increase in the frequency of seeing prostitutes increases the probability of committing a sex crime by 12–24%. It seems that the baseline model underestimated the effect of prostitution because some unobserved factors of sex crimes were negatively correlated with the experience of buying sex.

On the other hand, the coefficients of some control variables – particularly the age variables – lose their statistical significance, probably due to multi-collinearity caused by the first stage estimation. However, the positive effects of risk-loving and fragile self-esteem still hold to some extent.

The findings of the baseline and instrumental variable estimations support the prediction that the experience of prostitution increases one's propensities to commit a sex crime instead of constraining it. This result implies that the relationship between prostitution and sex crimes is complementary rather than substitutive.

⁸ Calculation is done based on the following formula: $(R^2 \text{ including prostitution} - R^2 \text{ excluding prostitution}) / (1 - R^2 \text{ excluding prostitution})$ (See Alesina et al. 2013).

5.2. Determinants of Committing a Sex Crime and Buying Sex

To further elaborate on the relationship between sex crimes and prostitution, I compare factors that determine each of the sexual behaviors, respectively. By doing so, one can find whether or not these factors influence both sex crimes and prostitution in the same manner.

Appendices 1 and 2 present the descriptive statistics of those who committed a sex crime and those who paid for commercial sex. The comparisons based on the descriptive information suggest that both prostitution and sex crimes are positively associated with low education, being married, and the age group between the 20s and the 40s, however, there are also considerable variations across the different types of sex crimes and prostitution.

To have a more systematic comparison between sex crimes and prostitution, I ran regressions based on equations 1 and 3 (3'), respectively. Table 4 presents the results of the determinants of prostitution, and table 1 the determinants of sex crimes that we already discussed above.

Among the potential determinants of prostitution that were tested (table 4), the experience of having committed a sex crime in the past year robustly explains variations in paying for commercial sex during the same period. Those who committed sexual assaults or forced sex tend to buy sex between 3.4% (0.31 points on the nine-point scale of the frequency of buying sex in total) and 36% (1.83 points on the five-point scale of the frequency of buying sex with minors) more often than others. This result provides further evidence of simultaneity between prostitution and sex crimes, in addition to the finding in table 1.

Turning to other factors, supporting prostitution myths increases the actual acts of buying sex (see table 4). This finding is robust across different specifications. On the other hand, prostitution myths do not have explanatory power over sex crimes, while rape myths do to some extent (see table 1). Interestingly, fragile self-esteems constrain prostitution, but such fragility increases sex crimes – an exactly opposite effect. The only common effect that applies to both prostitution and sex crimes is the positive effect of risk-taking.

Regarding demographic effects, the frequency of buying sex increases until the ages of 35–38, and declines afterwards. The positive effect of age stops earlier when explaining the frequency of seeing under-aged prostitutes – it increases only until 27–33 years old (see table 4). On the other hand, the positive effect of age remains longer for sex crimes – 50 years old when controlling for prostitution in general and 31–33 years old when controlling for prostitution of minors (see table 1). Having abusive parents also has a positive and significant effect on prostitution, different from no effect on sex crimes.

The regression results suggest that the observed determinants of prostitution are widely different from those of sex crimes – except a common effect of risk-taking. However, there might be some common unobserved characteristics that affect both prostitution and sex crimes in the same way. To check for the potential effects of unobservables, I ran residual tests and the results are shown in table 5. Basically, unobserved factors affect sex crimes and prostitution differently – increasing the former (+), while constraining the latter (–). Alongside the findings of observed determinants, no common effect of unobserved characteristics is suggested here.

The findings presented in tables 1 and 4 show that sex crimes and prostitution affect each other simultaneously, signaling that one sexual act increases propensities for the other act. On the other hand, the other determinants of buying sex are not shared by those of committing a sex crime, failing to support a substitution relationship between the two.

5.3. Does Prostitution Exacerbate the Severity of Sex Crimes?

So far, the results suggest that the experience of buying sex increases the probability of committing a sex crime, probably by increasing one’s propensities towards more violent sexual behaviors. To further examine this linkage, I tested for whether prostitution exacerbates the severity of sex crimes.

For this purpose, I selected several severe forms of rape that sex offenders committed – acquaintance rape, raping under-aged victims, and using more sadistic means (e.g. confinement) for rape. Table 6 shows the results of regressions based on equation 4.

In general, the experience of buying sex does not seem to exacerbate the severity of rape. However, paying for sex with an under-aged prostitute increases the probabilities of committing these three severe types of rape. A one-standard deviation increase in the frequency of buying sex with a minor increases the probabilities of committing acquaintance rape, raping a minor, and using sadistic means by 6.1%, 5.4%, and 1.4%, respectively. A possible interpretation of this result is that buying sex with a minor is an almost rape-like behavior and thus its association with more violent sex crimes is stronger. Interestingly, buying sex with an adult has a constraining effect on raping under-aged victims. This negative relationship, however, does not necessarily suggest a substitution effect between them, given the positive relationship between paying for sex with a minor and raping a minor. It may rather indicate that raping a minor has a completely different utility function from that of hiring adult prostitutes.

Among the control variables, reasons of power and anger explain cross-individual variations in raping acquaintances, while it is sexual desires that lead to raping minors. This finding supports the argument that rape is not only a function of sexual impulse, but also that of dominance (see appendix 3). The prominent role of domination and power in explaining rape provides further evidence against the claim that the provision of prostitution can constrain sex crimes by satisfying the sexual desires of potential offenders.

Regarding substance effects, it is rather the alcohol consumption of rapists than that of victims that increases the probability of acquaintance rape. On the other hand, the alcohol consumption of under-aged victims decreases the probability of being raped, contradicting the prediction. The resistances of victims have opposite effects, depending on the types of rape: constraining the rape of minors but exacerbating the usage of sadistic means. This finding contradicts the widely spread rape myths that victims can always escape from rape by resisting (Gerger et al. 2007).

Overall, it is less clear whether the experience of buying sex intensifies the severity of committed sex crimes. However, there is a tentative finding that paying for sex with an under-aged prostitute has a positive correlation with the exacerbation of sex crimes, likely due to their shared nature targeting more vulnerable counterparts.

6. Conclusion

In this paper, I tried to find micro-evidence on the effect of prostitution on sex crimes. My results suggest that the experience of buying sex increases the probability of one committing a sex crime, probably by intensifying one's propensities towards more violent, riskier sexual behaviors. These findings signal to policy-makers that the provisions of prostitution may not be a solution to reduce sex crimes but it may result in exacerbating the problems.

My paper does not necessarily claim for the prohibition of prostitution as a policy choice against sex crimes. Such prohibition may not always be effective and the criminalization of prostitution may exacerbate the violent aspects of commercial sex. However, my findings call for a cautious approach in dealing with prostitution, by providing counter-evidence to presumed positive externalities of the legalization of prostitution that its advocates propose.

As mentioned above, the scope of my study is limited to an analysis of sex offenders, thus should be extended with population-represented samples, when data is available. By doing so, future studies can enrich the currently thin literature in the fields of prostitution and sex crime research with more empirical evidence.

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Table 1. Sex Crimes and Prostitution, probit analysis, marginal effects (2007, Korea)

DV	Sexual Assaults			Forced Sex (stranger)			Forced Sex (partner)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Prostitution	0.02 (0.01)**			0.06 (0.01)***			0.03 (0.006)***		
Prostitution (adults)		0.03 (0.01)**			0.06 (0.01)***			0.03 (0.007)***	
Prostitution (minors)			0.06 (0.04)			0.10 (0.04)***			0.07 (0.02)***
Prostitution Myths	0.02 (0.02)	0.02 (0.02)	0.03 (0.02)	-0.0004 (0.01)	0.002 (0.01)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Rape Myths	-0.002 (0.02)	0.01 (0.02)	-0.01 (0.02)	-0.007 (0.01)	0.003 (0.01)	-0.01 (0.02)	0.01 (0.01)	0.023 (0.012)*	0.01 (0.01)
Risk-taking	0.01 (0.02)	-0.002 (0.02)	0.01 (0.02)	0.01 (0.01)	0.01 (0.01)	0.025 (0.014)*	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)*
Fragile-self	0.03 (0.02)*	0.04 (0.02)**	0.03 (0.02)*	0.003 (0.01)	0.006 (0.01)	-0.007 (0.014)	0.001 (0.01)	0.003 (0.01)	-0.002 (0.01)
Age	0.02 (0.01)**	0.02 (0.01)**	0.02 (0.01)***	0.007 (0.008)	0.008 (0.009)	0.025 (0.009)***	0.003 (0.005)	0.006 (0.005)	0.01 (0.005)*
Age ²	-0.0002 (0.0001)*	-0.0002 (0.0001)**	-0.0003 (0.0001)**	-0.0001 (0.0001)	-0.0002 (0.0001)	-0.0004 (0.0001)***	-0.00004 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.00008)*
Singlehood	0.07 (0.04)*	0.05 (0.04)	0.06 (0.04)	-0.05 (0.04)	-0.05 (0.05)	-0.06 (0.05)	-0.02 (0.03)	-0.02 (0.03)	-0.03 (0.03)
Middle School or Below	0.08 (0.08)	0.09 (0.09)	0.10 (0.08)	0.05 (0.07)	0.04 (0.07)	0.12 (0.08)	0.06 (0.06)	0.06 (0.06)	0.09 (0.07)
Some High School	0.03 (0.07)	0.05 (0.08)	0.05 (0.08)	0.07 (0.07)	0.07 (0.07)	0.12 (0.08)	0.08 (0.06)	0.09 (0.07)	0.12 (0.08)
High School Graduate	0.08 (0.08)	0.09 (0.08)	0.11 (0.08)	0.01 (0.06)	-0.01 (0.06)	0.06 (0.07)	0.05 (0.05)	0.05 (0.06)	0.09 (0.07)
Some College	0.19 (0.11)*	0.21 (0.12)*	0.05 (0.08)*	0.04 (0.08)	0.04 (0.08)	0.05 (0.09)	0.05 (0.08)	0.06 (0.08)	0.05 (0.09)
Unemployed	0.02 (0.06)	0.03 (0.06)	0.01 (0.06)	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.04)	0.02 (0.04)	0.04 (0.05)	0.02 (0.04)
Abused by Parents	-0.004 (0.02)	0.002 (0.02)	0.005 (0.02)	0.01 (0.02)	0.02 (0.02)	0.03 (0.02)	0.02 (0.014)	0.02 (0.02)	0.025 (0.015)*
Observations	469	478	472	470	474	474	467	473	471
(pseudo)R ²	0.09	0.09	0.08	0.21	0.20	0.09	0.16	0.16	0.12
Log likelihood	-185.56	-196.77	-188.57	-145.67	-152.31	-167.93	-112.95	-123.01	-118.47

Note: Robust standard errors are in parenthesis. * $p < .10$, ** $p < .05$, *** $p < .01$. *College graduate* is omitted as a reference category of the education variables.

Table 2. Sex Crimes and Prostitution, instrumental variable approach, marginal effects (2007, Korea)

DV	Second Stage, Probit Analysis								
	Sexual Assaults			Forced Sex (stranger)			Forced Sex (partner)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Prostitution	0.11 (0.03)***			0.08 (0.04)**			0.10 (0.03)***		
Prostitution (adults)		0.13 (0.03)***			0.11 (0.03)***			0.12 (0.03)***	
Prostitution (minors)			0.72 (0.27)***			0.67 (0.30)***			0.75 (0.25)***
Prostitution Myths	-0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)	-0.02 (0.02)	0.01 (0.02)
Rape Myths	-0.01 (0.02)	0.004 (0.02)	-0.04 (0.024)*	-0.01 (0.02)	0.002 (0.01)	-0.04 (0.02)*	0.01 (0.01)	0.02 (0.01)	-0.03 (0.02)
Risk-taking	0.00004 (0.02)	-0.01 (0.02)	0.02 (0.02)	0.01 (0.02)	0.003 (0.01)	0.03 (0.015)**	0.01 (0.01)	0.001 (0.01)	0.03 (0.016)**
Fragile-self	0.03 (0.015)**	0.04 (0.01)***	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	-0.004 (0.02)	0.01 (0.01)	0.01 (0.01)	-0.002 (0.02)
Age	-0.004 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.002 (0.01)	-0.002 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.001 (0.01)
Age ²	0.0001 (0.0002)	0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.00002 (0.0002)	-0.0003 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	-0.00002 (0.0002)
Singlehood	0.08 (0.04)*	0.06 (0.04)	0.01 (0.05)	-0.04 (0.04)	-0.03 (0.04)	-0.077 (0.04)*	-0.01 (0.03)	0.001 (0.03)	-0.06 (0.04)
Middle School or Below	0.02 (0.07)	0.01 (0.07)	0.12 (0.07)*	0.03 (0.07)	0.01 (0.06)	0.13 (0.07)**	0.02 (0.06)	0.001 (0.06)	0.13 (0.07)*
Some High School	-0.01 (0.07)	-0.02 (0.07)	0.10 (0.07)	0.05 (0.06)	0.03 (0.06)	0.15 (0.07)**	0.04 (0.06)	0.02 (0.06)	0.16 (0.07)**
High School Graduate	0.03 (0.07)	0.02 (0.07)	0.17 (0.07)**	0.0004 (0.06)	-0.03 (0.06)	0.13 (0.07)*	0.02 (0.06)	-0.003 (0.06)	0.17 (0.07)**
Some College	0.12 (0.07)*	0.12 (0.07)*	0.16 (0.08)**	0.04 (0.07)	0.03 (0.06)	0.07 (0.08)	0.05 (0.07)	0.04 (0.06)	0.11 (0.08)
Unemployed	0.02 (0.05)	0.03 (0.05)	0.01 (0.05)	-0.03 (0.05)	-0.03 (0.05)	-0.03 (0.06)	0.03 (0.04)	0.04 (0.04)	0.02 (0.05)
Abused by Parents	-0.02 (0.02)	-0.02 (0.02)	-0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.002 (0.02)	-0.003 (0.02)	0.01 (0.02)
Observation	469	478	472	470	474	474	467	473	471
Log likelihood	-1001.21	-1003.97	-352.65	-964.01	-955.58	-331.60	-922.88	-921.78	-277.83
Wald Test (p-value)	0.06	0.04	0.04	0.59	0.37	0.07	0.03	0.02	0.01

Note: Robust standard errors are in parenthesis. * $p < .10$, ** $p < .05$, *** $p < .01$. College graduate is omitted as a reference category of the education variables. The endogenous variables that are instrumented are *prostitution*, *prostitution (adults)*, and *prostitution (minors)*. The excluded instrument is *brothel* (the location of brothel concentrations).

Table 3. Sex Crimes and Prostitution, reduced form regression, marginal effects (2007, Korea)

First Stage, Non-negative Binomial Regression						
DV	Prostitution		Prostitution (adults)		Prostitution (minors)	
Brothel (IV)	-0.65 (0.15)***		-0.59 (0.15)***		-2.08 (0.59)***	
Control variables	Yes		Yes		Yes	
F-statistics	14.25 (14, 456)		14.20 (14, 465)		7.73 (14, 460)	

Second Stage including the Instrument, Probit Analysis						
DV	Sexual Assaults		Forced Sex (stranger)		Forced Sex (partner)	
	(1)	(2)	(3)	(4)	(5)	(6)
Prostitution	0.02 (0.01)**		0.06 (0.01)***		0.023 (0.006)***	
Brothel (IV)	-0.06 (0.04)	-0.09 (0.04)**	-0.02 (0.03)	-0.07 (0.03)**	-0.046 (0.26)*	-0.074 (0.028)***
Prostitution Myths	0.02 (0.02)	0.02 (0.02)	-0.001 (0.01)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)
Rape Myths	-0.002 (0.02)	0.01 (0.02)	-0.01 (0.01)	0.003 (0.02)	0.01 (0.01)	0.024 (0.013)*
Risk-taking	0.01 (0.02)	0.002 (0.02)	0.01 (0.01)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)
Fragile-self	0.02 (0.02)	0.027 (0.016)*	0.002 (0.01)	-0.01 (0.01)	-0.002 (0.01)	-0.01 (0.01)
Age	0.02 (0.01)*	0.01 (0.01)	0.01 (0.01)	0.03 (0.01)***	0.002 (0.01)	0.013 (0.006)**
Age ²	-0.0002 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0004 (0.0002)***	-0.00003 (0.0001)	-0.0002 (0.0001)**
Singlehood	0.064 (0.035)*	0.04 (0.04)	-0.05 (0.04)	-0.06 (0.05)	-0.02 (0.03)	-0.02 (0.03)
Middle school below	0.08 (0.08)	0.08 (0.09)	0.05 (0.07)	0.09 (0.08)	0.06 (0.06)	0.07 (0.07)
Some high school	0.03 (0.07)	0.05 (0.08)	0.07 (0.07)	0.10 (0.08)	0.07 (0.06)	0.10 (0.07)
High school graduate	0.07 (0.08)	0.11 (0.09)	0.01 (0.06)	0.02 (0.07)	0.04 (0.05)	0.04 (0.06)
Some college	0.17 (0.11)	0.19 (0.12)	0.04 (0.08)	0.04 (0.08)	0.05 (0.07)	0.04 (0.08)
Unemployed	0.02 (0.06)	0.01 (0.06)	-0.03 (0.04)	-0.04 (0.04)	0.02 (0.04)	0.03 (0.04)
Abused by parents	-0.001 (0.02)	0.02 (0.02)	0.01 (0.02)	0.04 (0.02)*	0.02 (0.01)	0.026 (0.015)*
Observation	469	486	470	478	467	477
(Pseudo) R ²	0.09	0.08	0.21	0.08	0.17	0.12

Note: Robust standard errors are in parenthesis. * $p < .10$, ** $p < .05$, *** $p < .01$. *College graduate* is omitted as a reference category of the education variables.

Table 4. Determinants of Prostitution, Non-negative Binomial Regression (2007, Korea)

	Prostitution				Prostitution of Adults				Prostitution of Minors			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Sexual Assaults		0.31 (0.17)*				0.36 (0.16)**				0.56 (0.51)		
Force Sex (stranger)			1.02 (0.14)***				1.01 (0.14)***				1.63 (0.59)***	
Forced Sex (partner)				0.84 (0.19)***				0.80 (0.17)***				1.83 (0.60)***
Prostitution Myths	0.30 (0.08)***	0.30 (0.08)***	0.28 (0.08)***	0.27 (0.08)***	0.31 (0.08)***	0.31 (0.08)***	0.28 (0.08)***	0.27 (0.08)***	0.19 (0.21)	0.14 (0.20)	0.09 (0.19)	0.08 (0.19)
Rape Myths	0.10 (0.09)	0.09 (0.09)	0.10 (0.08)	0.06 (0.08)	0.06 (0.08)	0.05 (0.08)	0.06 (0.08)	0.02 (0.08)	0.84 (0.25)***	0.80 (0.25)***	0.64 (0.19)***	0.61 (0.19)***
Risk-taking	0.19 (0.07)***	0.19 (0.07)***	0.17 (0.07)**	0.18 (0.07)**	0.21 (0.07)***	0.21 (0.07)***	0.19 (0.07)***	0.20 (0.07)***	-0.12 (0.24)	-0.07 (0.24)	-0.24 (0.29)	-0.22 (0.28)
Fragile-self	-0.15 (0.07)**	-0.15 (0.07)**	-0.15 (0.07)**	-0.15 (0.07)**	-0.14 (0.07)**	-0.15 (0.07)**	-0.15 (0.07)**	-0.15 (0.07)**	0.18 (0.19)	0.16 (0.18)	0.09 (0.21)	0.15 (0.20)
Age (rapist)	0.38 (0.06)***	0.37 (0.06)***	0.35 (0.06)***	0.37 (0.06)***	0.38 (0.06)***	0.37 (0.07)***	0.35 (0.06)***	0.37 (0.07)***	0.44 (0.11)***	0.42 (0.11)***	0.38 (0.14)***	0.39 (0.15)***
Age ² (rapist)	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.005 (0.001)***	-0.006 (0.002)***	-0.006 (0.002)***	-0.005 (0.002)***	-0.006 (0.002)***
Singlehood	-0.23 (0.21)	-0.26 (0.21)	-0.16 (0.20)	-0.18 (0.20)	-0.20 (0.18)	-0.22 (0.18)	-0.14 (0.19)	-0.16 (0.19)	-0.10 (0.95)	-0.12 (0.94)	-0.26 (0.79)	-0.22 (0.75)
Middle School	0.56 (0.29)*	0.55 (0.28)**	0.48 (0.28)*	0.60 (0.27)**	0.63 (0.29)**	0.61 (0.28)**	0.53 (0.30)*	0.65 (0.29)**	-0.23 (0.63)	-0.31 (0.63)	-0.26 (0.76)	-0.20 (0.71)
Some High School	0.49 (0.30)	0.49 (0.30)*	0.40 (0.30)	0.44 (0.29)	0.59 (0.30)**	0.58 (0.30)*	0.47 (0.32)	0.51 (0.30)*	0.08 (0.94)	0.04 (0.93)	-0.26 (0.94)	-0.24 (0.91)
High School Graduate	0.36 (0.28)	0.36 (0.27)	0.32 (0.27)	0.38 (0.27)	0.47 (0.28)*	0.46 (0.27)*	0.42 (0.29)	0.48 (0.28)*	-1.52 (0.87)*	-1.50 (0.90)*	-1.59 (0.98)*	-1.63 (0.93)*
Some College	-0.12 (0.36)	-0.18 (0.36)	-0.16 (0.35)	-0.08 (0.36)	-0.06 (0.35)	-0.17 (0.35)	-0.15 (0.36)	-0.06 (0.37)	0.71 (1.05)	0.78 (1.10)	0.56 (1.07)	0.52 (1.19)
Unemployed	-0.16 (0.27)	-0.14 (0.27)	-0.11 (0.26)	-0.16 (0.24)	-0.25 (0.23)	-0.23 (0.23)	-0.16 (0.25)	-0.23 (0.23)	0.69 (0.88)	0.70 (0.88)	0.74 (0.88)	0.63 (0.83)
Abused by Parents	0.28 (0.10)***	0.26 (0.10)**	0.24 (0.10)**	0.24 (0.10)**	0.24 (0.10)**	0.22 (0.10)**	0.20 (0.10)*	0.21 (0.10)**	0.50 (0.32)	0.53 (0.33)	0.29 (0.27)	0.28 (0.28)
Observations	471	462	470	467	480	478	474	473	475	472	474	471
Wald chi2	173.56***	170.73***	239.72***	178.96***	178.05***	175.18***	242.24***	183.48***	129.70***	166.57***	198.46***	232.81***
Log likel.	-573.73	-570.82	-557.87	-561.50	-578.71	-575.19	-553.33	-561.63	-80.02	-79.45	-76.81	-73.76

Note: Robust standard errors are in parenthesis. * $p < .10$, ** $p < .05$, *** $p < .01$. *College graduate* is omitted as a reference category of the education variables.

Table 5. Effects of Unobserved Characteristics, Residual Analysis (2007, Korea)

DV	Sexual Assaults	Forced Sex (stranger)	Forced Sex (partner)	Prostitution	Prostitution of Adults	Prostitution of minors
Residuals	1.08	1.43	1.27	-0.07	-0.05	-0.006
Observations	469	470	467	462	471	465

Note: residuals were estimated through the regressions presented in columns 1, 4, and 7 in table 2, and columns 2, 4, and 6 in table 4, respectively.

Table 6. Prostitution and the Severity of Sex Crimes, probit analysis, marginal effects (2007, Korea)

DV	Acquaintance Rape			Rape of Minors			Sadistic Means		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Prostitution	0.03 (0.02)			-0.04 (0.02)**			0.009 (0.005)		
Prostitution (adults)		0.01 (0.02)			-0.06 (0.02)***			0.008 (0.006)	
Prostitution (minors)			0.17 (0.07)**			0.15 (0.06)**			0.04 (0.02)*
Prostitution Myths	-0.001 (0.027)	-0.01 (0.02)	0.002 (0.02)	-0.05 (0.03)*	-0.05 (0.03)*	-0.06 (0.03)**	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Rape Myths	0.01 (0.028)	0.02 (0.03)	0.003 (0.03)	0.05 (0.03)	0.04 (0.03)	0.03 (0.03)	-0.01 (0.01)	-0.004 (0.01)	-0.01 (0.01)
Risk-taking	-0.01 (0.03)	-0.004 (0.03)	-0.005 (0.03)	-0.04 (0.03)	-0.03 (0.03)	-0.04 (0.03)	0.004 (0.01)	0.002 (0.01)	0.004 (0.008)
Fragile-self	0.01 (0.03)	-0.001 (0.03)	0.005 (0.03)	0.05 (0.03)	0.04 (0.03)	0.06 (0.03)*	-0.01 (0.01)	-0.01 (0.01)	-0.016 (0.01)
Reason: power	0.50 (0.09)***	0.47 (0.09)***	0.51 (0.08)***	-0.16 (0.12)	-0.11 (0.12)	-0.18 (0.12)	-0.02 (0.03)	-0.03 (0.02)	-0.02 (0.02)
Reason: anger	0.38 (0.13)***	0.39 (0.13)***	0.34 (0.13)***	-0.07 (0.13)	-0.08 (0.13)	-0.07 (0.13)	0.07 (0.07)	0.07 (0.07)	0.05 (0.06)
Reason: desire	0.01 (0.06)	0.04 (0.06)	0.01 (0.06)	0.21 (0.07)***	0.20 (0.07)***	0.21 (0.07)***	0.03 (0.02)	0.03 (0.02)	0.02 (0.02)
Alcohol (rapist)	0.06 (0.04)*	0.07 (0.04)*	0.065 (0.037)*	0.05 (0.04)	0.04 (0.04)	0.06 (0.04)	0.002 (0.01)	0.002 (0.01)	-5.44e-06 (0.01)
Alcohol (victim)	0.003 (0.003)	0.01 (0.03)	0.004 (0.03)	-0.10 (0.04)***	-0.11 (0.04)***	-0.10 (0.04)***	-0.01 (0.01)	-0.004 (0.01)	-0.01 (0.01)
Resistance: verbal	0.07 (0.06)	0.06 (0.06)	0.07 (0.06)	-0.13 (0.06)**	-0.14 (0.06)**	-0.13 (0.06)**	0.05 (0.03)**	0.054 (0.026)**	0.05 (0.03)**
Resistance: physical	0.12 (0.07)	0.10 (0.07)	0.12 (0.07)*	-0.13 (0.08)*	-0.13 (0.08)*	-0.13 (0.08)*	0.01 (0.03)	0.01 (0.03)	0.01 (0.03)
Victim's Age: 12 or younger	-0.07 (0.24)	-0.08 (0.24)	-0.10 (0.24)				0.98 (0.01)***	0.98 (0.01)***	0.97 (0.02)***
Victim's Age: 13-19	0.05 (0.25)	0.02 (0.25)	0.02 (0.25)				0.86 (0.08)***	0.87 (0.08)***	0.83 (0.09)***
Victim' Age: 20-29	-0.20 (0.22)	-0.21 (0.22)	-0.21 (0.23)				0.95 (0.04)***	0.95 (0.04)***	0.94 (0.04)***
Victim' Age: 30-39	-0.28 (0.13)**	-0.29 (0.13)**	-0.29 (0.14)**				0.99 (0.004)***	0.99 (0.005)***	0.99 (0.01)***

Victim's Age: 40-49	-0.17 (0.19)	-0.17 (0.19)	-0.18 (0.19)				0.98 (0.01)***	0.98 (0.01)***	0.98 (0.01)***
Age (rapist)	-0.034 (0.018)*	-0.03 (0.02)	-0.034 (0.018)*	-0.14 (0.02)***	-0.14 (0.02)***	-0.15 (0.02)***	0.012 (0.007)*	0.013 (0.007)*	0.012 (0.007)*
Age ² (rapist)	0.001 (0.0003)**	0.0006 (0.0003)*	0.0007 (0.0003)**	0.002 (0.0003)***	0.002 (0.0003)***	0.002 (0.0003)***	-0.0002 (0.0001)*	-0.0002 (0.0001)*	-0.0002 (0.0001)*
Singlehood	0.02 (0.07)	0.01 (0.07)	0.004 (0.07)	0.05 (0.08)	0.06 (0.08)	0.06 (0.08)	0.01 (0.02)	0.01 (0.02)	-0.001 (0.03)
Middle School or Below	-0.18 (0.09)**	-0.16 (0.09)*	-0.17 (0.10)*	-0.05 (0.10)	-0.04 (0.10)	-0.07 (0.10)	0.04 (0.05)	0.03 (0.05)	0.05 (0.05)
Some High School	-0.17 (0.09)*	-0.15 (0.09)*	-0.16 (0.09)*	-0.02 (0.10)	0.01 (0.10)	-0.04 (0.10)	0.01 (0.04)	0.01 (0.04)	0.03 (0.04)
High School Graduate	-0.23 (0.08)***	-0.21 (0.08)**	-0.21 (0.08)**	-0.14 (0.10)	-0.12 (0.10)	-0.14 (0.10)	-0.04 (0.02)*	-0.04 (0.02)*	-0.03 (0.02)
Some College	-0.20 (0.09)**	-0.18 (0.09)**	-0.20 (0.09)**	-0.22 (0.10)**	-0.22 (0.10)**	-0.22 (0.10)**	0.02 (0.05)	0.03 (0.05)	0.02 (0.04)
Unemployed	-0.18 (0.07)**	-0.14 (0.07)*	-0.19 (0.07)***	-0.24 (0.08)***	-0.24 (0.07)***	-0.23 (0.08)***	0.03 (0.04)	0.02 (0.04)	0.02 (0.03)
Abused by Parents	0.01 (0.04)	0.01 (0.04)	0.02 (0.04)	0.01 (0.04)	-0.0001 (0.04)	-0.01 (0.04)	0.024 (0.01)**	0.024 (0.01)**	0.03 (0.01)***
Observations	430	439	433	443	452	446	405	410	407
(pseudo)R ²	0.15	0.14	0.16	0.31	0.32	0.31	0.20	0.20	0.22
Wald chi2	80.99***	76.12***	82.78***	131.64***	135.91***	138.66***	265.06***	265.86***	282.79***
Log likelihood	-240.41	-248.10	-239.97	-208.90	-210.38	-210.37	-97.04	-99.73	-97.14

Note: Robust standard errors are in parenthesis. * $p < .10$, ** $p < .05$, *** $p < .01$. *50 or older* is omitted as a reference category of the victim's age variables; and *college graduate* is omitted as a reference category of the education variables.

Appendix 1. Sex Buyers and Non-buyers among Sex Offenders,
by education, marital status and age, percent (2007, Korea)

	Prostitution of Adults		Prostitution of Minors	
	Buyers	Non-buyers	Buyers	Non-buyers
Total	38.29 (242/632)	61.71 (390/632)	5.80 (36/621)	94.20 (585/621)
Education: college	32.30 (36/115)	68.70 (79/115)	5.36 (6/112)	94.64 (106/112)
Education: high school	36.84 (119/323)	63.16 (204/323)	3.13 (10/319)	96.87 (309/319)
Education: lower	44.76 (85/190)	55.26 (105/190)	10.70 (20/187)	89.30 (167/187)
Unemployed	32.69 (17/52)	67.31 (35/52)	5.88 (3/51)	94.12 (48/51)
Employed	37.12 (170/458)	62.88 (288/458)	3.55 (16/451)	96.45 (435/451)
Single	35.70 (176/493)	64.30 (317/493)	5.93 (29/489)	94.07 (460/489)
Married/Partnered	50.00 (63/126)	50.00 (63/126)	5.83 (7/120)	94.17 (113/120)
Age: 10s	12.64 (23/182)	87.36 (159/182)	1.10 (2/182)	98.90 (180/182)
Age: 20s	45.45 (75/165)	54.55 (90/165)	3.68 (6/163)	96.32 (157)
Age: 30s	58.18 (96/165)	41.82 (69/165)	10.69 (17/159)	89.31 (142/159)
Age: 40s	41.67 (35/84)	58.33 (49/84)	6.17 (5/81)	93.83 (76/81)
Age: 50s or older	36.11 (13/36)	63.89 (23/36)	16.67 (6/36)	83.33 (30/36)

* Parenthesis: the number of respondents of the respective demographic group who are sex buyers or non-buyers
/ the total number of respondents of the respective demographic group.

Appendix 2. Sex Offenders, by education, marital status and age, percent
(2007, Korea)

	Sexual Assaults	Forced Sex (stranger)	Forced Sex (partner)	Rape of Minors	Acquaintance Rape	Sadistic Means
Education: college	18.26 (21/115)	9.82 (11/112)	7.21 (8/111)	31.82 (35/110)	32.38 (34/105)	9.62 (15/153)
Education: high school	16.82 (55/327)	14.81 (48/324)	10.63 (34/320)	43.87 (143/326)	35.33 (112/317)	8.81 (26/295)
Education: lower	19.60 (39/199)	14.52 (27/186)	13.16 (25/190)	45.79 (87/190)	40.11 (75/187)	9.13 (41/449)
Unemployed	16.98 (9/53)	9.80 (5/51)	11.76 (6/51)	39.22 (20/51)	26.00 (13/50)	12.50 (6/48)
Employed	16.67 (78/468)	13.82 (63/456)	8.99 (41/456)	44.84 (204/455)	38.34 (171/446)	8.57 (36/420)
Single	17.86 (90/504)	12.83 (63/491)	9.84 (48/488)	45.44 (224/493)	35.95 (174/484)	9.13 (41/449)
Married/Partnered	19.53 (25/128)	19.67 (24/122)	16.13 (20/124)	29.27 (36/123)	38.46 (45/117)	10.71 (12/112)
Age: 10s	7.73 (14/181)	7.14 (13/182)	3.85 (7/182)	82.42 (150/182)	43.50 (77/177)	6.47 (11/170)
Age: 20s	20.00 (34/170)	17.47 (29/166)	12.88 (21/163)	18.07 (30/166)	17.90 (29/162)	12.50 (19/152)
Age: 30s	22.81 (39/171)	18.52 (30/162)	14.20 (23/162)	23.53 (30/170)	31.74 (53/167)	10.49 (15/143)
Age: 40s	25.53 (20/85)	13.75 (11/80)	12.35 (10/81)	42.17 (35/83)	62.16 (46/74)	9.21 (7/76)
Age: 50s or older	22.22 (8/36)	11.11 (4/36)	18.92 (7/37)	42.86 (12/28)	56.25 (18/32)	3.03 (1/33)

* Parenthesis: the number of respondents of the respective demographic group who committed the respective sexual offence / the total number of respondents of the respective demographic group.

Appendix 3. Reasons for Committing Rape
(2007, Korea)

	Number	Percent
To satisfy sexual desires (<i>desire</i>)	126	19.1
To possess the victim (<i>power</i>)	13	2.0
Love (<i>power</i>)	21	3.2
Anger, retaliation (<i>anger</i>)	24	3.6
Curiosity (<i>desire</i>)	96	14.6
To prevent the reporting of another crime	29	4.4
Alcohol consumption (being drunk)	249	37.8
Drug use	2	0.3
Spur of moment (<i>anger</i>)	18	2.7
Because of the accomplice	10	1.5
Victim consented	7	1.1
Did not commit rape	6	0.9
Other reasons	39	5.9
No answer	18	2.7
Total	658	100

Appendix 4. Crime Rates of Police-recorded Sexual Offences, national level
(per 100,000 persons, OECD countries, 2012)

Ranking	Country	Crime Rates of Rape and Sexual Assaults
1	Sweden	182.5
2	United Kingdom (England and Wales)	81.6
3	Switzerland	81.1
4	Australia	80.2
5	New Zealand	76
6	Canada	75.6
7	Finland	64.9
8	Belgium	61.7
9	Germany	55.3
10	Luxembourg*	55
11	Netherlands	54.7
12	Norway	52.6
13	Ireland	46.3
14	France	41.9
15	Republic of Korea	40
16	Austria	37.6
17	Mexico	30.1
18	Portugal	20.1
19	Spain	19.3
20	Czech Republic	18.6
21	Hungary	13.3
22	Slovenia	12.8
23	Croatia	11.9
24	Italy	7.7
25	Turkey	7.5
26	Greece	7.4
27	Poland	7.3
28	Japan	6.7
29	Slovakia	2.6

* Note: the data of Luxembourg comes from 2011 – the most recent available year.

Appendix 5. Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
Sexual Assaults	469	0.16	0.36	0	1
Forced Sex (stranger)	468	0.13	0.34	0	1
Forced Sex (partner)	465	0.08	0.28	0	1
Acquaintance Rape	448	0.38	0.48	0	1
Rape of Minors	460	0.45	0.48	0	1
Sadistic Means	428	0.09	0.28	0	1
Prostitution	469	1.00	1.56	0	8
Prostitution (adults)	469	0.94	1.47	0	4
Prostitution (minors)	469	0.06	0.36	0	4
Prostitution Myths	469	3.79	1.05	1	5
Rape Myths	469	2.43	0.89	1	5
Risk-taking	469	2.31	1.00	1	5
Fragile-self	469	2.29	1.03	1	5
Rapist's Age	469	27.99	10.70	12	68
Singlehood	469	0.83	0.38	0	1
Unemployed	469	0.10	0.30	0	1
Abused by Parents	469	1.56	0.71	1	4
Reason: power	469	0.05	0.22	0	1
Reason: anger	469	0.04	0.19	0	1
Reason: desires	469	0.35	0.48	0	1
Alcohol (rapist)	466	1.16	0.87	0	2
Alcohol (victim)	460	0.72	0.83	0	2
Resistance: verbal	450	0.31	0.46	0	1
Resistance: physical	450	0.18	0.38	0	1
Variables	Observation	Frequency	Percent	Cum	
Middle school or below	469	122	26.01	26.01	
High School	469	250	53.30	79.31	
College	469	98	20.89	100	
Victims' age: 1-19	460	206	44.78	44.78	
Victims' age: 20-29	460	171	37.17	81.96	
Victims' age: 30-39	460	43	9.35	91.30	
Victims' age: 40-49	460	35	7.61	98.91	
Victims' age: 50-older	460	5	1.09	100	