

An Empirical Analysis of Street-Level Prostitution

Steven D. Levitt and Sudhir Alladi Venkatesh*

September 2007

Extremely Preliminary and Incomplete

Comments Greatly Appreciated

* Extremely preliminary and incomplete. Please do not cite without prior permission of the authors. We thank William Evans, Lawrence Katz, John List, and Peter Reuter for helpful comments and conversations. Amanda Agan and Marina Niessner provided outstanding research assistance. Dott XXXXX was instrumental in coordinating the collection of the field data. Paul Heaton generously provided the Chicago Police Department data.

Abstract

Combining transaction-level data on street prostitutes with ethnographic observation and official police force data, we analyze the economics of prostitution in Chicago. Prostitution, because it is a market, is much more geographically concentrated than other criminal activity. Street prostitutes earn roughly \$25-\$30 per hour, roughly four times their hourly wage in other activities, but this higher wage represents relatively meager compensation for the significant risk they bear. Prostitution activities are organized very differently across neighborhoods. Where pimps are active, prostitutes appear to do better, with pimps both providing protection and paying efficiency wages. Condoms are used only one-fourth of the time and the price premium for unprotected sex is small. The supply of prostitutes is relatively elastic, as evidenced by the supply response to a 4th of July demand shock. Although technically illegal, punishments are minimal for prostitutes and johns. A prostitute is more likely to have sex with a police officer than to get officially arrested by one. We estimate that there are 4,400 street prostitutes active in Chicago in an average week.

Unlike most other crimes, prostitution is based on markets, and thus potentially of special interest to economists. It is thus surprising that amidst the burgeoning literature on the economics of crime, there is little analysis of prostitution. Rao et al (2003) and Gertler et al. (2005) both find that the prices paid for a prostitute's services are substantially higher when a condom is not used.² Rao et al. (2003) studies Indian prostitutes; Gertler et al. (2005) focuses on Mexican prostitutes. Using an online database of client-based reviews of prostitution services in the United Kingdom, Moffatt and Peters (2004) estimate the determinants of price for a sexual act. Combining their results with survey data on prostitutes from Matthews (1997), they also compute average weekly earnings of a prostitute, finding that prostitutes earn about twice the weekly wage of a typical non-manual female worker and three times that of manual workers. Pickering and Wilkens (1993) also find high wages for prostitutes. Edlund and Korn (2002) argue from a theoretical perspective that one reason for this wage premium is the opportunity cost of foregoing marriage.

The dearth of economic research on the subject of prostitution is driven, at least in part, by the difficulty of obtaining reliable data. Because of the illicit nature of the activity, standard data sources are uninformative. Rao et al. (2003) and Gertler et al. (2005) both overcame this lack of data through carrying out their own surveys. While there is no direct evidence regarding whether sex workers might respond with bias in surveys, it is often found that stigmatizing behavior goes underreported using standard

² These two papers take different approaches to dealing with the problem of unobserved heterogeneity in which prostitutes choose to use condoms. Gertler, Shah and Bertozzi (2005) use prostitute fixed effects, so that they are comparing differences across clients for the same prostitute. Rao et al (2003) uses participation in a safe sex training program that was implemented in 1992 as an instrument for "always uses condoms". The program was administered to a subset of the prostitutes in the region in a plausibly random way, and they find that prostitutes who participated in the program were more likely to use condoms.

survey methods (Evans and Farrelly 1998, Turner et al. 1998, Lochner and Moretti 2004), but sometimes is exaggerated (Thombs 2003).³

In this study, we address the lack of data on prostitution in a number of ways. First, we analyze newly available incident level data from the Chicago Police Department which includes details of every prostitution-related arrest in the city over the period August 19, 2005 to May 1, 2007. Second, we use an online data set that includes mug shots and home addresses of all johns arrested by the Chicago police for soliciting prostitutes. Third, through a partnership with pimps and prostitutes working in two Chicago neighborhoods, we were able to gather detailed, real-time transaction-level data for over 2,200 tricks performed by roughly 160 prostitutes.⁴ The bulk of these data were collected by our trackers who stood on street corners or sat in brothels with prostitutes, recording the information immediately after the customer departed. Finally, we carried out a smaller number of surveys with a subset of these prostitutes asking them about their other sources of income and life histories.

A number of results emerge from our analysis. First, using the Chicago Police Data, we document the high degree of geographic concentration of prostitution arrests. Almost half of these arrests occur in less than one-third of one percent of the city blocks. Prostitution arrests show strong and persistent geographic pattern associated with a small set of major roads. The observed pattern for prostitution is quite different than for all other crimes analyzed and is likely due to the market nature of the prostitution transaction. Prostitutes need customers to be able to find them. Following the logic of

³ These examples of under-reporting and over-reporting generally refer to the quantity of illegal acts. Gertler et al. (2005), in contrast, were examining the nature of the bargaining. i.e. prices and condom use. See Levitt and List (2007) for a discussion of how behavior is affected by outside scrutiny, of which responding to a survey would be an example.

⁴ This research strategy parallels the earlier work on drug markets of MacCoun and Reuter (19XX).

Hotelling (1929), this leads to concentration of suppliers in particular geographic areas. Consistent with this hypothesis, arrests for drug selling (another market-based crime) are also more geographically concentrated than other non-market crimes like robbery, assault, or motor vehicle theft. Proximity to train stations, major roads, and many households on public assistance are all positively related to prostitution arrests; an abundance of female-headed households is negatively related. These results parallel the findings for other crime on some dimensions (train stations and major roads), but differ in other important ways (e.g. a high black population is correlated with other crimes, but not prostitution; female-headed households are positively related to other crimes).

The transaction-level data we collected suggests that street prostitution yields an average wage of \$27 per hour. Given the relatively limited hours that active prostitutes work, this generates less than \$20,000 annually for a woman working year round in prostitution. While the wage of a prostitute is four times greater than the non-prostitution earnings these women report (approximately \$7 per hour), there are tremendous risks associated with life as a prostitute. According to our estimates, a woman working as a prostitute would expect an annual average of a dozen incidents of violence and 300 instances of unprotected sex.

Our data also shed light on questions of pricing and bargaining. Prices differ greatly across sexual acts. There is substantial price variation along observable dimensions of customer characteristics. Black customers pay less on average than whites or Hispanics, all else equal. Repeat clients (especially when they are black) pay less on average than do new customers. There is relatively little systematic variation across women in the prices they charge, controlling for other factors such as the type of act,

location, and customer characteristics. Relative to Rao et al. (2003) and Gertler et al. (2005), we find a small price premium associated with unprotected sex, and condoms are used only 25 percent of the time. In response to a predictable demand shock associated with the 4th of July holiday, the supply of prostitutes proves to be fairly elastic. Total quantity increases by 60 percent that week through a combination of increased work by existing prostitutes, short-term substitution into prostitution by women who do not trade sex for money most of the year, and the temporary inflow of outside prostitutes. The price increase associated with the 4th of July demand shock is 30%

Our analysis also sheds light on issues of organizational form. Perhaps surprisingly, in two of our neighborhoods that are side-by-side, prostitution activities are organized along completely different models. In Roseland, there are no pimps and women solicit customers from the street. Just a few blocks away in Pullman, all women work with pimps who locate customers and set-up tricks, so that the prostitutes rarely solicit on street corners. Under the pimp model, there are fewer transactions, but the prices charged are substantially higher and the clientele is different. Prostitutes who work with pimps appear to earn more, and are less likely to be arrested. It appears that the pimps choose to pay efficiency wages. Consistent with this hypothesis, many of the women who do not work with pimps are eager to work with pimps, and indeed we observe a few switches in that direction over the course of the sample. Pimps are limited by their ability to find customers, however, so they operate on a small scale.

Finally, our study is informative about the interaction between law enforcement and prostitutes. In stark contrast to illicit drugs, the criminal justice system has a relatively minor impact on prostitution activities. Although we observe prostitutes being

taken down to the police station roughly once a month in our sample (which may not be representative because of a police crackdown during part of our data collection), few of these police interactions result in officially recorded arrests. We estimate that prostitutes are officially arrested only once per 450 tricks, with johns arrested even less frequently. Punishment conditional on arrest is limited – roughly 1 in 10 prostitute arrests leads to a prison sentence, with a mean sentence length of 1.2 years among that group.⁵ For many johns, perhaps the greatest risk is the stigma that comes with having a mug shot posted on the Chicago Police Department web page. There is a surprisingly high prevalence of police officers demanding sex from prostitutes in return for avoiding arrest. For prostitutes who do not work with pimps (and thus are working the streets), roughly three percent of all their tricks are freebies given to police.

The remainder of the paper is organized as follows. Section I describes and analyzes the incident-level data from the Chicago Police Department. Section II provides background information on the neighborhoods for which we collected transaction-level data, a description of our data collection methods, and presents the findings from these transaction-level data. Section III analyzes the additional information on non-prostitution wages and life histories that we have gathered from a subset of the prostitutes in our data. Section IV combines our various data sources to generate estimates of the overall scale of street prostitution in Chicago and assess the risk per trick that participants face. Section V concludes.

Section I: Prostitution viewed through the lens of official data on arrests

⁵ In Cook County in 2004 there were 489 cases in which prostitutes were sentenced to prison (Illinois Department of Corrections 2004). Cook County includes Chicago and surrounding suburbs. There are approximately 3,500 prostitute arrests each year in Chicago.

Since August 19, 2005, the CPD has made incident-level crime publicly available through a searchable web site.⁶ Every crime incident (either a victim report of crime to the police or an arrest) that occurs in the city of Chicago is tracked on the web page. Included in each record is the type of crime, date, whether arrests were made, whether the incident was domestic in nature, and the city block on which it occurred. Because the unit of analysis is an incident, multiple arrests can result from a single incident. There is no way in our data to determine how many arrests emanate from a particular incident. Violent crimes (e.g. homicide and robbery) and property crimes (e.g. theft) have both victim reports and arrests included in the sample. For crimes like prostitution and drug selling, however, there is no well-defined victim, so the data are overwhelmingly for arrests.⁷

Our data set covers the period August 19, 2005 to May 1, 2007 and includes the entire city of Chicago. There are a total of 7,573 prostitution-related incidents in the sample. Figure 1 presents the data geographically by block, broken down into five categories according to the number of incidents.⁸ Blocks that are white had no recorded prostitution incidents in our sample. The minimum cutoff to qualify for the highest category is 20 incidents.

Prostitution is highly concentrated. Ninety-four percent of the roughly 25,000 blocks have no incidents. Nearly fifty percent of all incidents are concentrated in the 0.3 percent of blocks in our highest category. There 131 separate incidents recorded for the

⁶ The police department web page that captures these data is <http://gis.chicagopolice.org/>. These data are collected as part of the FBI's National Incident Based Reporting System (NIBRS). The data are also available in a more user-friendly form at <http://www.chicagocrime.org/>, which is the actual site from which our data were scraped. We thank Paul Heaton for generously providing us with these data.

⁷ Although a third-party could report the activities of prostitutes or drug dealers prompting the police to produce a crime report.

⁸ A block corresponds to the common definition of a city block, except in a few cases where land is non-residential. Each park is treated as a block, as are O'Hare and Midway airports.

most active block in the data. The city of Chicago is divided into 78 community areas. Half of all prostitution arrests occur in just eight of these areas; fifteen community areas did not have a single prostitution arrest. High prostitution blocks exhibit a distinctive linear pattern, with high incident rates traced out over distances of miles along major streets. This is especially true on the West side of the city where the level of incidents is highest, but also in other parts of the city.

For purposes of comparison, Figures 2-5 present results for four other crimes: robbery, assault, burglary, and theft. To make the figures comparable, we drew a random sample of 7,573 incidents for each crime (in order to match the number of prostitution incidents in the data).⁹ The cutoffs used for color-coding in Figures 2-5 match those in Figure 1. The pattern of robbery, assault, and theft incidents differs dramatically from that of prostitution. Each of these crimes is much less concentrated than prostitution. The percentage of blocks with no incidents ranges from 63-80 percent across the four crime categories, all well below the 88 percent for prostitution. Far fewer blocks reach the highest levels. The linear patterns that are present in the prostitution data are not evident for these other crimes.

The likely explanation for the distinctive geographic patterns in prostitution is the fact that it, unlike these other crime categories, is market-based. Prostitutes and customers need to find one another. Concentrating prostitution activities in well known, stable areas facilitates search in a similar manner to that observed in other types of retail sales (Hotelling 1929, Wolinsky 1983). Indeed, for street prostitutes, geographic concentration may be even more important than for other types of services because of the

⁹ The total number of incidents in the sample for robbery, assault, burglary, and theft respectively were: XXXXXXXX.

difficulty of reaching customers through traditional marketing channels such as advertising or displaying the store's name and logo on the outside of the building.¹⁰

Organizing prostitution on long stretches of major roads (as opposed to, say, a four block by four block rectangle) makes it possible for customers to easily survey the market without behavior appearing suspicious.

Consistent with the market-based explanation for the patterns in prostitution, Figure 6 presents the distribution of another market-based crime: drug-selling. The construction of this figure parallels that of the earlier figures. Drug selling is more similar to prostitution than are the other crimes, although the observed patterns are not as extreme as for prostitution. 40.5 percent of drug selling arrests occur in the 1 percent of blocks with the greatest number of arrests. One reason that drug selling markets may be less concentrated than prostitution markets is that the overall scale of drug markets is much larger and a greater share of drug transactions are done on a repeat basis between a buyer and seller who are acquainted and thus have mechanisms for finding one another.¹¹

A second feature of the data that matches the market-based explanation for the concentration in prostitution is the high degree of spatial persistence. The block-level correlation between prostitution incidents in the first and second halves of the sample is .73.¹² Drug selling has the third highest correlation (.52). The other crimes range from a high of .58 (for theft) down to only .08 for sex offenses.

In order to further explore the factors that influence the number of prostitution incidents, we run regressions of the form

¹⁰ Of course, prostitutes are able to send other types of signals to potential customers through their clothing, words, and actions.

¹¹ Although not shown in a figure, the distribution of arrests for drug possession, which does not have the market aspects of drug selling, looks similar to the figures for robbery, assault, burglary, and theft.

¹² Measured at the community area level, the correlation is .XX

$$\text{Prostitution}_b = \beta X_b + \gamma Z_g + \varepsilon$$

Where b indexes blocks and g indexes Census block groups. *Prostitution* corresponds to the number of prostitution incidents on a block in our data. Covariates included geographic measures (proximity to train stations and major roads), as well as census data on population, percent black, the age distribution, various proxies for income, and fraction female-headed households. Some of these census variables are available at the block level, others at the block-group level. Standard errors are clustered by census block groups to correct for the fact that some of the right-hand side variables are collected at that higher level of aggregation.

Table 1 presents the results from regressions. The dependent variable is the number of prostitution arrests on the block in the sample period. The mean of the dependent variable is .34. The first column does not include community area fixed effects; the second column does. The third column adds a dummy for being on one of the main streets for prostitution. Proximity to a train station doubles the predicted number of arrests. Being near a major thoroughfare also substantially increases prostitution arrests. The log population on the block is not predictive. A high fraction Hispanic is associated with more prostitution; percent Black is weakly positively related. More renters, fewer 18-39 year olds, and more residents on public assistance increase prostitution. A ten percentage point increase in families on public assistance increases prostitution by more than 50 percent at the sample mean.

Panel B presents parallel results for other crimes. Many of the variables that predict prostitution arrests also predict incidents of other types of crimes: proximity to

train stations and major streets, as well as renter-occupied housing and public assistance. Perhaps more notable are the characteristics that predict other crimes, but not prostitution. These include the block's population, percent black, and female-headed households. Indeed, prostitution is not particularly highly correlated with other crimes at the block level (correlations between .07 and .22). Drug selling, drug possession, assault, and robbery are all much more correlated with one another (.31 to .66).

Section II: Beyond official statistics: an ethnographic exploration of prostitution in two Chicago neighborhoods

Official arrest statistics provide a decidedly incomplete picture of the economic aspects of prostitution. First, arrests are a very poor proxy for the quantity of prostitution activity since arrests are jointly determined by the amount of prostitution and the intensity of police enforcement. The correlation between the number of arrests and the amount of prostitution need not even be positive if police attention to the issue varies across time and space. Further complicating the interpretation of arrest data is that depending on the effectiveness of deterrence, an increase in police effort may lead to a rise or a fall in arrests (Becker 1968, Andreoni 1991).¹³ Second, official data contain no information on prices. Third, there is no way in the publicly available data to follow particular prostitutes over time. Finally, the official data lack any information on the outside opportunities and life histories of the prostitutes.

¹³ As we discuss below, there is also the question of whether a police action gets officially classified as an arrest. In the transaction-level data, the prostitutes we track report far higher frequencies of arrest than appear in the official data. In a number of cases, our trackers are present as prostitutes are taken away by the police, but there is no matching arrest record in the official data because the police do not formally book them. Conversations with police suggest that the combination of extra paperwork associated with an arrest and neighborhoods not wanting to appear to have high rates of prostitution (as evidenced by high arrest rates for the offense) both contribute to the under-recording of prostitution arrests. SUDHIR
DOUBLE CHECK THIS.

To overcome all of these shortcomings, we undertook two years of ethnographic study of prostitution in three Chicago neighborhoods. As a consequence of past research (see, for instance Venkatesh 2002, 2006), one of the co-authors had previously established a strong network of relationships within these communities, including the local prostitutes and pimps, which allowed us to secure their participation in the current study.

We began this project focusing on the Roseland and Pullman neighborhoods on the far South Side of Chicago. Until the late 1990s, these neighborhoods were low income, but relatively stable, Black communities. The demolition of high-rise housing projects in Chicago, however, brought an influx of former housing project residents to this neighborhood. Crime statistics suggest that these neighborhoods have fared worse than Chicago as a whole. The number of homicides fell by 36 percent between 1998 and 2005 in Chicago overall, compared to a 12 percent decline in Roseland and Pullman. Similarly, citywide robbery is down 31% versus only 7 percent in these two neighborhoods. Easy access to interstates and proximity to riverboat casinos helped prostitution to flourish in these neighborhoods.

What originally piqued our interest in these two areas was that prostitution activities were organized very differently in these two areas, despite the fact they were adjacent geographically and shared similar economic and demographic characteristics. In Roseland, street prostitutes worked without pimps. In Pullman, all street prostitutes worked with one of four pimps active in the area.

For prostitutes working in Roseland (and therefore without pimps), data collection was done by trackers who we hired to record information on every trick performed.

Trackers were community members, and typically former prostitutes themselves. In Roseland there were four primary areas of prostitution activity: along a major East-West street, on one major North-South street, on a less heavily trafficked North-South street, and out of a single room occupancy unit in the area). During periods of data collection, trackers would be in each of these locations recording the relevant information as soon as a trick was completed. In some cases, we were forced to rely on retrospective accounts a day or two later if the tracker was not physically present. Prostitutes were paid \$150 per week for participating in the study, with \$75 paid in advance and \$75 paid at the end of the week.¹⁴ All prostitutes initially agreed to participate; roughly 10 percent later were unwilling to provide information to the trackers, or reported data that was otherwise unusable. The tracking form collected a wide range of information about the customer and the specifics of the transaction. Figure 6 presents an example of a completed tracking form.

The majority of tricks done by Pullman prostitutes were pre-arranged by pimps. Pimps would arrange the time, place, and price of a sexual act. Only when the pimp was unable to generate sufficient business through this channel would the women work the streets. In return for the pimp setting up clients, the women paid 25 percent of the revenue to the pimp for all tricks, regardless of whether it was one the pimp had arranged or not. For tricks they initiated themselves, there are strong financial incentives for women to under-report both the number of tricks and the payment received.

¹⁴ Payment could distort prostitute behavior in a number of ways. First, our payment to them is relatively large – equal to about one-third of a typical weekly income for them. The payment could lead them to reduce labor supply as a result of income effects. On the other hand, the presence of our trackers might induce them to work more. The increased scrutiny may make the prostitutes feel what they are doing is important, inducing more effort. Similarly, if they think that we expect them to work in return for our payment, they may work more. On the other hand, if relaying intimate details of their sexual acts is unpleasant, they may elect to work less during the weeks we are tracking.

Data collection in Pullman was done principally through pimps. We spot-checked the accuracy of the pimp reports with the prostitutes themselves.

Approximately 16 months into our data collection efforts, the local police commander initiated a prolonged campaign to reduce prostitution in this neighborhood. As a consequence, prostitution in the Roseland area was reduced to one-third of its former level and two of the pimps in the Pullman area stopped doing business. Twenty-one of the women in our sample moved their prostitution activities to the Washington Park neighborhood, six miles to the North. We then began collecting data in that neighborhood (for all prostitutes in the area, not just the women who we had previously tracked), as well as continuing to gather data from the original neighborhood.

Prostitution activities in Washington Park centered around four locations. Two of these were inside residential apartment buildings. A third area was on a four to five block length of an East-West street. Finally, the park itself was an area of active client recruiting, especially during holidays like Memorial Day and the Fourth of July which brought large numbers of people to the area for cookouts and family reunions. Relative to Roseland and Pullman, the Washington Park area was more economically depressed and less easily accessible for outsiders, particularly whites.

Table 2 presents the timing of our data collection efforts. Data were collected in five rounds spanning nearly two years. We gathered a week's worth of data per woman in each round.¹⁵ The entries in the table are the total number of observations collected, where an observation is either a trick or an arrest. There are 159 different women in our data set, with an average of approximately 15 observations per woman, although that number varies widely. Roughly one third of women are present in one round of data

¹⁵ We gathered two weeks of data on some women in round one.

collection. We observe another third of the women exactly twice. The rest of the women appear in three or more rounds of data collection.

Table 3 shows basic descriptive statistics on the sample. The first column in the table reflects the full sample. The next three columns divide the sample into three groups according to neighborhood (Roseland, Pullman, and Washington Park). The top panel of the table reports prostitute-level data.¹⁶ THIS IS NOT YET FINALIZED SO WE LEFT IT BLANK FOR NOW. Three of the 159 prostitutes in our data set are known to have died over the course of our sample; the number may be higher because we have incomplete information on women after they leave the sample.

The second panel of Table 3 presents data by prostitute-week. On average the prostitutes work roughly thirteen hours per week, performing roughly 10 sex acts total. Average revenues generated per week are about \$340. Most of this comes in cash, with some payments made in drugs. The prostitutes also steal an average of \$20 per week from customers. Prostitutes working with pimps (the Pullman area) generate substantially more weekly revenue than the other prostitutes while working fewer hours and performing fewer tricks. It is important to note, however, that the revenues reported here include the pimp's share. As discussed later, even after correcting for the types of sex acts performed, the actual wages earned by prostitutes working with pimps are slightly higher than that of the other prostitutes. The women report being a victim of violence on the job (either by a client or a pimp) about once per month of working.¹⁷

¹⁶ The same prostitute is included in more than one column of Table 2 if she moves locations or if her pimp status changes. XX women in our sample move from Far South to Englewood and XX switch from no pimp to pimp.

¹⁷ Women who work with pimps are much less likely to be injured by customers; one of the services provided by pimps is protection. Pimps, however, hurt their prostitutes enough to roughly equalize the number of injuries.

Arrests occur with similar frequency, although in many of these cases no formal charges are made. Approximately one in twenty tricks performed by prostitutes are “freebies,” either to police officers or gang members, to avoid arrest or in return for protection from the gang. Women working with pimps have much lower rates of these extortionary sex acts.

The third panel of Table 2 shows transaction-level summary statistics. There are five categories of sex acts: manual stimulation, oral sex, vaginal sex, anal sex, and other.¹⁸ Oral sex is most common (46 percent of all tricks), followed by vaginal sex (17 percent), manual stimulation (15 percent), and anal sex (9 percent). Over half the customers are black, although the exception is for the prostitutes who work with pimps. Condoms are used in only about 20 percent of the overall sex acts. As noted later, even for vaginal and anal sex condom use is only 25 percent. Roughly half of the tricks are done for repeat customers. Customers span a wide age range. Friday is the busiest days of the week.

Table 3 presents raw data on prices charged. The rows in the table correspond to the type of sex act. Columns are broken down by the race of the client and whether the client has previously used this prostitute. Black customers, regardless of whether they are new or repeats, pay substantially less than whites and Hispanics. The average Black customer spends less than \$40, compared to repeat white and Hispanic customers who spend nearly twice as much. Part of this price difference is attributable to differing distributions of sex acts – repeat white and Hispanic customers are much more likely to engage in vaginal or anal sex rather than manual or oral. Even for a given sex act,

¹⁸ Included in the “other category” are nude dancing, sex with women, just talk, urinating on the customer, etc.

however, the prices paid by black customers are systematically lower than for other customers. These differences appear to be attributable to price discrimination on the part of the prostitutes. INSERT QUOTE ON HOW THEY PERCEIVE CUSTOMERS OF DIFFERENT RACES. Prostitutes describe how they change the structure of the bargaining when the customer is not black. INSERT QUOTE ON HOW THEY MAKE THE WHITE GUYS THROW OUT A NUMBER FIRST.

Charging lower prices to repeat customers is another form of price discrimination. Repeat customers who are black consistently pay less than first-timers – 10-30 percent less – depending on the act. That pattern is not apparent in the data for customers who are white or Hispanic. INSERT ANOTHER QUOTE HERE.

To more systematically explore pricing, we estimate specifications of the form

$$P_{iw} = \alpha + \Gamma' X_i + \lambda_w + \varepsilon_{iw}$$

where i indexes a particular trick and w corresponds to a particular prostitute. The variable P is the price in dollars paid for the trick. A wide range of trick-level covariates X are included in the regressions reflecting aspects of the trick (e.g. type of sex act, where the act was performed, day of the week, whether a condom is used, etc.) and characteristics of the client (e.g. race, whether it is a repeat customer, how the prostitute ranks the client's physical attractiveness, etc.). In some specifications, we also include prostitute-fixed effects, so that the estimates are identified only using variation in prices received by the same prostitute across different tricks. We exclude from the regression

all tricks which were performed for free. In all cases, estimation is done using ordinary least squares, clustering by prostitute.

Table 5 presents the regression results using price as the dependent variable. Column 1 includes an array of controls related to the nature of the trick, characteristics of the client, location of the trick, and day of the week. Column 2 adds prostitute fixed effects. The results are generally similar across the two columns, and the R-squared in the regression increases only slightly from .69 to .74. This suggests that after controlling for other factors, there is relatively little heterogeneity across women in the prices they charge.

There are, however, substantial differences in the prices paid by customers of different types and characteristics of the trick. Whites pay \$8-9 more per trick than black customers, with Hispanics (the omitted category) in between. These racial differences in price across customers are highly statistically significant. The type of sex act is the single most important determinant of price with oral sex costing \$9 more than manual stimulation, vaginal sex \$45 more, and anal sex nearly \$60 more. Repeat customers pay slightly less on average than new customers, with the difference only marginally statistically significant. When the act is performed inside, prices are six and one half dollars higher than the omitted category of outside/unknown location. There is little evidence that prices vary substantially by the age of the customer or by their physical appearance. When payment is made in drugs, the total price is lower by nearly \$7. This lower payment cannot be attributed to drug addicted prostitutes being willing to work for less, however, because the difference persists even after prostitute fixed effects are

included.¹⁹ Clients pay \$16 more per trick for women working with pimps than for those without pimps. Note, however, that not all of that extra revenue accrues to the prostitute; some of it is kept by the pimp.²⁰ Because we have women in the sample who switch from not having a pimp to having one during the sample, we are able to estimate the price impact of a pimp for the same woman, although it is identified only off the experiences of these few women. We find that the price increase associated with having a pimp is even slightly larger when prostitute fixed effects are included. Prices do not differ much over the course of the week, although Monday (the omitted category) has statistically significantly lower prices than most other days of the week.

Prices in Washington Park when it is not the Fourth of July were lower than in the other neighborhoods. The Fourth of July causes a large shock to demand in the Washington Park area – the only area for which we were collecting data on that date – due to the presence of a large number of outsiders attending local festivities in the park. Prices are approximately \$11 (30 percent) higher that week than the other period when we sampled this area. Quantities are also much higher: we observe a 43 percent increase in the number of tricks done by the regular neighborhood prostitutes. An additional 20 percent (THIS NUMBER IS OUR BEST GUESS THUS FAR; STILL CONFIRMING) increase in tricks is done by a combination of prostitutes who come from outside the neighborhood for the holiday and women who typically are not prostitutes, but are willing to do sex acts for money at the higher prices that accompany the holiday spike in demand. INSERT QUOTE FROM ONE OF THESE WOMEN. The data from the

¹⁹ It is possible that women become addicted to drugs over the course of the sample, which a prostitute fixed effect would not control for. Our information on addiction status for each woman was gathered at a single point in time. We do not observe changes in addiction.

²⁰ Based on the number of tricks, the average price, and the number of pimps operating, we estimate a weekly income of \$960 per pimp.

Fourth of July holiday demonstrate the relatively elastic supply of prostitutes on both the intensive and extensive margins. If one views the Fourth of July changes as being purely driven by shifts in demand, then the 30% price increase associated with a 60% quantity increase implies an arc elasticity of supply of .50 for this predictable, temporary demand shock.

The price premium associated with not using a condom is small in our sample relative to Gertler et al. (2005), who report a 24 percent price increase when a condom is not used in a survey of Mexican prostitutes. In our data, the overall premium for condom use is only \$2. One important difference between their sample and ours is that their prostitutes almost exclusively engaged in vaginal sex. Table 6 presents estimates of equation 2 separately by type of sex act. Most of the patterns observed in Table 5 for other variables like race of customer and Fourth of July holiday hold across the different types of sex acts, although for some variables the estimates become quite imprecise.

As would be expected, the price premium for not using a condom increases with the risk posed by the absence of a condom. For manual stimulation there is no statistically significant price difference. For oral sex a condom reduces the price by \$2.. For vaginal sex that number rises to \$5.53 (a 7.5 percent increase over the average price using a condom) and for anal sex the gap is \$12.61 (or 13.6 percent of the average price with a condom).

A much more striking difference between our results and those of Gertler et al. (2005) is in the use of condoms. Prostitutes in their sample report using condoms 90 percent of the time, compared to only 25 percent in our sample for vaginal sex, and 21 percent for anal sex. Among their Mexican prostitutes, condom use is the default from

which customers must bargain away, potentially inducing large increases in prices. In contrast, in our sample no condom appears to be the default choice, perhaps making it harder for the prostitute to credibly argue for a higher price if no condom is used. Moreover, in an equilibrium in which condom use is infrequent, infection rates among prostitutes are likely to be extremely high, so that the primary value of condoms to women may be protecting the women from becoming pregnant and hygiene, rather than the spread of disease. Indeed, one would expect that the johns would likely gain more in disease reduction from condoms than the prostitutes.

SOME DISCUSSION OF HOW CONDOM USE VARIES ACROSS PROSTITUTES IN OUR SAMPLE. SOME QUOTES ABOUT WHY THEY DON'T USE THEM. SOME FACTS ABOUT AIDS RATES AMONG JOHNS AND PROSTITUTES FROM MEDICAL LITERATURE.

Table 7 presents estimates from a probit model in which the dependent variable equal to one if a condom is used.²¹ The coefficients reported in the table are marginal effects, evaluated at the mean of the data. Included on the right-hand side are the same set of covariates used in the pricing regressions in Tables 5 and 6. Condom use is most common with vaginal sex and least likely with manual stimulation. Consistent with the quotes above, condom use is much lower among black customers. Condom use is higher with new customers. The Roseland area has the highest condom use. The women who work with pimps in Pullman and the prostitutes in Washington Park both report condom usage roughly half as high, controlling for other factors. Whether the customer is physically attractive has no influence on whether a condom is used.

²¹ Probit models evaluated at the sample means yield similar estimates.

Section III: Outside opportunities, compensating differentials, and the path to becoming a prostitute

Being a street prostitute is a dangerous, unpleasant, and stigmatizing job. Economic theory predicts that women who do this job must be compensated accordingly. Table 8 presents our best estimate of the hourly earnings associated with prostitution. These calculations are based on the roughly one-fifth of our sample for which we have reliable information on hours worked as a prostitute.²² The women included in this sample are all drawn from the Roseland and Pullman neighborhoods and, on average, are performing more tricks per week than the sample as a whole. In order to compute an hourly wage, we need to subtract off the portion of the total revenue generated by clients which does not go directly to the women. For women who work with pimps, 25 percent of the fees are taken by the pimp. For women who work without pimps, a much smaller share of revenue is diverted. Based on conversations with the women, we estimate they spend an average of \$5 per night worked on lookouts and protection, except for the women who use the single-room occupancy building in Roseland, who pay between 20 and 25 percent of their revenue in return. Given these assumptions, we estimate an overall hourly wage of \$26.73, with the women working without pimps earning roughly \$25 an hour and those with pimps earning about 50 percent more.²³ The higher wage for women working with pimps is consistent with the fact that the women who did not have pimps were

²² On our tracking forms, we did not explicitly ask trackers to record total hours worked, but in some cases we are able to back out this information from the tracker field notes.

²³ We should discuss how much this varies across women.

For a subset of 99 women-week observations in our sample, we collected information about non-prostitution work that they had performed in the preceding week.²⁴ These results are shown in Table 9. We divided non-prostitution work into four broad categories: formal sector jobs (e.g. retail jobs, school aide, janitor), daycare/babysitting, informal sector work (gypsy cab, lawn care, hair styling), and crime (e.g. selling drugs or stolen goods, scams). For each of these categories, column 1 presents the number of times a job in this category was mentioned. Women sometimes performed multiple jobs outside of prostitution, so the total number of jobs across the 99 women is 111. Formal sector, informal, and child care jobs all occur with roughly similar frequencies. Criminal activities are less common. Column 2 reports the mean weekly earnings per women who reports doing an outside job. These weekly earnings vary from a high of \$145 in the formal sector down to \$67 for child care. Column (3) shows the total earnings across all women in each of these categories (column 3 is the product of columns 1 and 2). Over 40 percent of all earnings are from the formal sector. Total weekly earnings from these outside jobs across the 99 women total to \$10, 876, or about \$110 per woman. Note that these outside earnings are small relative to prostitution earnings of between \$300 and \$400 per week. The final column in Table 9 reports hourly earnings for those cases (one third of the total) where we have reliable information on hours worked. The average hourly wage from child care services is \$4.60. Formal sector work (excluding child care) yields a wage of just under \$10. Work in the informal sector (again excluding child care) pays less well: \$6.25 per hour. None of the women reporting crime income provided hours worked, so we are unable to calculate an hourly wage for that category. Overall,

²⁴ The way the data were collected, when there is no information on outside jobs, we cannot tell whether the questions simply went unanswered or whether the woman actually had no outside income. Thus, the proper way to interpret our results is conditional on a woman reporting some outside income.

we estimate that these women earn an average of \$7.24 per hour in their outside jobs, or about one-fourth what they earn as prostitutes.

To further explore the relationship between prostitution and other forms of work, we asked a subset of the women in our sample a series of questions about hypothetical tradeoffs they would make.

ADD RESULTS FROM LIFE HISTORY SURVEYS. SOME QUOTES AS WELL.

Section IV: Estimating the overall level of street prostitution in Chicago and the criminal justice risks involved

By combining the information from our transaction-level data with Chicago Police Department arrest records, we are able to develop crude estimates of the overall scale of street prostitution activity in the city of Chicago.

Our data from the Roseland neighborhood show an average of 380 tricks per week performed by 23.75 women. In Pullman and Washington Park (excluding the 4th of July) the corresponding numbers are 226 tricks by 19 women and 232 tricks by 16 women respectively. We estimate that our sample in Roseland and Pullman captures 90 percent of all prostitution activity there. For Washington Park, our data are a less complete accounting of prostitution activity in the area; we believe the locations we cover reflect approximately 80 percent of the total street prostitution in the neighborhood.

Using the Chicago Police data on arrests, we are able to calculate an implied number of tricks per official arrest in these three neighborhoods. Over the 88 weeks covered by the Chicago Police data, we observe a total of 104, 1, and 82 arrests of

prostitutes in Roseland, Pullman, and Washington Park respectively.²⁵ Assuming that the particular weeks we sample are representative of the overall period, the number of tricks per official prostitute arrest in Roseland and Washington Park are 357 and 311 respectively. In Pullman there are more than 22,000 tricks over the course of the Chicago Police data sample, and only a single official arrest. The infrequency of arrests in Pullman is due to the fact that most tricks in this area are pre-arranged by pimps so that the women are rarely soliciting on the streets. Averaged over all three neighborhoods, there are 453 tricks per prostitute arrest. If one is willing to assume that this average of our three neighborhoods is representative of the city as a whole, then the city's annual prostitution arrest tally of 3,500 implies nearly 1.6 million acts of prostitution a year. If tricks per prostitute-week in our sample are representative, that implies 4,400 women active as prostitutes citywide in any given week.²⁶

Estimating the size of the population of johns is a closely related question. Combining the estimates above with some additional assumptions, we are able to make some even more speculative conjectures as to the number of johns. There are a total of 2,985 arrests of johns over the 26 month period for which we have data. Using the estimates above of 1.6 million acts of prostitution per year, this implies a mean estimate of almost 1,200 tricks per one john's arrest. Because we can have names and pictures of the johns who are arrested, we are able to compute the probability of a john being

²⁵ As noted earlier, the official police records show far fewer arrests than appear in our data. For the purposes of this exercise, it is the official records that are relevant because that is the information we observe for all neighborhoods, not just the three for which we have detailed transaction data.

²⁶ These numbers ignore prostitution that operates through separate channels. There is an active online prostitution market that caters to a more upscale clientele. A recent search at one site – eros-chicago.com -- yielded 268 separate individuals advertising escort services. High-end escorts who we spoke with estimated that at least 75 percent of all of the independent upscale prostitutes advertise on this site at any given point in time. In addition, there are prostitutes who work through escort agencies. In 1911, the Chicago Vice Commission estimated that there were 5,000 full time prostitutes in Chicago (Abbott 2007).

arrested for a second time, conditional on already having been arrested once. Let p equal the probability a john gets arrested per trick. Under the assumption that this probability is the same for johns who do or do not have prior arrests,²⁷ then the number of post-arrest tricks per john who has been arrested is simply equal to s/p , where s is the probability of a second arrest conditional on a first arrest having occurred. In our data, we observe 25 johns arrested twice and 2,969 johns who are arrested once. This implies that s is .0084. Using a value of p of 1/1,200 this implies approximately 10 prostitute visits per john after a first arrest. On average, we observe 13 months of time post first arrest, implying 9 visits per john per year amongst this group. One piece of evidence consistent with a relatively small pool of frequent johns is that in our data roughly half of all tricks involve repeat customers. It is not obvious how to generalize the experiences of this group to the john population as a whole. On the one hand, it is likely that an arrest decreases the future rate of frequenting prostitutes. On the other hand, those who were heavy users of prostitutes ex ante are likely to be overrepresented in the pool of arrested johns. These two sources of bias counteract one another. If it were the case that these biases exactly offset, then one could extend the estimate of 9 visits per john per year to the sample as a whole. Dividing the number of tricks by the mean number of visits per john would yield a lower bound estimate of roughly 175,000 different johns using prostitutes in Chicago in a year. To the extent that the distribution of visits per john is skewed, with many men making a few visits and a small number of men making very frequent visits, basing our calculation off the mean number of visits will understate the total number of johns.

²⁷ There are a number of reasons why the probability of arrest differs across johns who have or have not been arrested. Having been arrested once may be a signal of a high innate propensity to get arrested, perhaps due to the particular neighborhood one goes to for prostitutes, inability to distinguish between real prostitutes and police officer stings, etc. On the other hand, having been arrested once might make an individual more cautious when seeking prostitutes, lowering the probability of arrest.

Section V: Conclusion

Little is known about the economics of prostitution. Through a combination of transaction-level data, ethnographic research, and official police data, we paint a picture of street prostitution in the city of Chicago. The geographic distribution of prostitution is quite distinct from other crimes, presumably due to its market-based nature. Prostitutes earn an average of \$25-30 per hour – far more than they are paid in other jobs, but not a high wage given the risks they bear. Markets are organized differently across neighborhoods. In some places, pimps perform an important marketing and protection function; prostitutes appear to fare better in these areas. Condom use is shockingly low and there is only a small price premium associated with unprotected sex. Compared to illegal drug markets, risks of incarceration are low and prostitutes ply their trade with relative impunity.

The particulars of this study of the prostitution industry is likely to be of limited generalizability to other industries because of the many unique features of prostitution: social stigma, weakly enforced illegality, etc. There are, however, two dimensions along which this study may prove to be of broader applicability. First, the methodological approach is one that is rarely employed: a combination of ethnography, original data collection, and administrative data. Embedding data trackers into the daily activities of the subjects studied and gathering data in real time has the potential for generating more accurate data reporting than standard survey methods. Second, this study provides a rare window into the lives of those who are most marginalized in society. Surprising to an outsider are the fluidity with which these women move in and out of prostitution and

other work, their willingness to absorb enormous risk for a small pecuniary reward, and the blurred lines between good and evil, where police extort sex and pimps pay efficiency wages.

References

- Abbott, Karen. 2007. Sin in the Second City. New York: Random House.
- Ahlburg, D. and E. Jensen 1998. "The Economics of the Commercial Sex Industry." In *Confronting Aids: Evidence from the Developing World*, edited by Martha Ainsworth, Lieve Franssen, and Mead Over. Brussels: European Commission.
- Andreoni, James. 1991. "Reasonable Doubt and the Optimal Magnitude of Fines: Should the Penalty Fit the Crime?" *RAND Journal of Economics* 22(3):85-95.
- Becker, Gary. 1968. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76 (2): 169-217.
- Edlund, L. and E. Korn 2002. A Theory of Prostitution. *The Journal of Political Economy* 110(1): 181-214.
- Evans, William and Matthew Farrelly, 1989, "The Compensating Behavior of Smokers Taxes, Tar, and Nicotine." *RAND Journal of Economics* 29(3): 578-595.
- Gertler, P., M. Shah and S. Bertozzi. 2005. Risky Business: The Market for Unprotected Commercial Sex. *The Journal of Political Economy* 113(3): 518-550.
- Hotelling, Harold. 1929. "Stability in Competition." *Economic Journal* 39:41-57.
- Illinois Department of Corrections. 2005. 2004 Statistical Presentation. Viewed at http://www.idoc.state.il.us/subsections/reports/statistical_presentation_2004.
- Levitt, Steven, and John List. 2007. "On the Generalizability of Lab Behavior to the Field." *Canadian Journal of Economics* 40(2): 347-370.
- Levitt, Steven, and Sudhir Venkatesh. 2000. "An Economic Analysis of a Drug-Selling Gang's Finances." *Quarterly Journal of Economics*, 2000, 115(3), pp. 755-89.
- Lochner, Lance and Enrico Moretti. 2004. "The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports," *American Economic Review*, 94(1): 155-189.
- MacCoun, Robert and Peter Reuter. 1992. "Are the Wages of Sin \$30 an Hour? Economic Aspects of Street-level Drug Dealing." *Crime and Delinquency* 38: 477-491.
- Matthews, R. 1997. *Prostitution in London: An Audit*. Middlesex University.

- Moffatt, P and S. Peters. 2004. Pricing Personal Services: An Empirical Study of earnings in the UK Prostitution Industry. *Scottish Journal of Political Economy* 51(5): 675-690.
- Pickering, H. and Wilkins, H. 1993. "Do Unmarried Women in African Towns Have to Sell Sex, or is it a Matter of Choice?" *Health Transitions Review* 3: 17-27.
- Rao, V., I. Gupta, M. Lokshin, and S. Jana. 2003. "Sex Workers and the Cost of Safe Sex: The Compensating Differential for Condom Use Among Calcutta Prostitutes." *Journal of Development Economics* 71(2003): 585-603.
- Thombs, Dennis, R. Scott Olds, and Barbara Snyder. 2003. "Field Assessment of BAC Data to Study Late-Night College Drinking." *Journal of Studies on Alcohol* 64: 322-330.
- Turner, C.F., L. Ku, S. M. Rogers, L. D. Lindberg, J. H. Pleck, F. L. Sonenstein. 1998. "Adolescent Sexual Behavior, Drug Use, and Violence: Increased Reporting with Computer Survey Technology." *Science* 280 (May 8): 867-873.
- Venkatesh, Sudhir A. 2002. American Project: The Rise and Fall of a Modern Ghetto. Cambridge, MA: Harvard University Press.
- Venkatesh, Sudhir A. 2006. Off the Books: The Underground Economy of the Urban Poor. Cambridge, MA: Harvard University Press.
- Wolinsky, Asher. 1983. "Retail Trade Concentration Due to Consumers' Imperfect Information." *Bell Journal of Economics* 14(1): 275-282.

Table 1: Predictors of Block-level Officially Recorded Criminal Incidents

Panel A: Prostitution				
	(1)	(2)	(3)	Mean
	prostitution			Standard Deviation
Near Train Station	0.414*** (0.141)	0.330** (0.148)	0.308** (0.149)	0.06 0.24
On major street	0.364*** (0.042)	0.377*** (0.045)	0.116*** (0.028)	0.68 0.47
ln (population)	-0.015 (0.023)	-0.021 (0.026)	0.000 (0.025)	117.35 153.88
% black	0.146* (0.080)	0.113 (0.152)	0.052 (0.147)	0.31 0.43
% hispanic	0.460*** (0.124)	0.809*** (0.194)	0.515*** (0.182)	0.16 0.27
% female	-0.096 (0.258)	0.014 (0.259)	-0.074 (0.262)	0.39 0.23
% aged 18 to 39	-0.410*** (0.151)	-0.484*** (0.176)	-0.468*** (0.174)	0.26 0.19
% Renter Occupied	0.386*** (0.094)	0.270*** (0.100)	0.213** (0.098)	0.31 0.31
% female headed household	-0.274 (0.281)	-0.489* (0.288)	-0.447 (0.276)	0.08 0.12
% households on public assistant	2.587*** (0.755)	2.070*** (0.798)	1.943*** (0.749)	0.08 0.1
On Prominent prostitution street			2.267*** (0.274)	0.08 0.27
Constant	-0.266 (0.170)	-0.227 (0.320)	0.051 (0.316)	
Community Fixed Effects	No	Yes	Yes	
Observations	18845	18845	18845	
R-squared	0.01	0.03	0.06	
Notes: Dependent variable is the number of officially recorded prostitution incidents on a block over the period August 19, 2005 to May 1, 2007. Almost all prostitution incidents are arrests; for other crime categories this is not the case. Most of the variables are available at the block level; some are available only down to the level of the Census block group. Standard errors, in parentheses, are clustered by Census block group. * significant at 10%; ** significant at 5%; *** significant at 1%				

(note <- not in logs)

Panel B: Predictors of Block-level Incidents for Other Crimes

	robbery	assault	drugselling	drugpossession	sexoffense	murder	theft	motortheft	johnarrests
Near Train Station	1.083*** (0.165)	2.722*** (0.663)	0.121* (0.069)	0.949*** (0.359)	0.067*** (0.018)	0.004 (0.010)	6.743*** (1.142)	0.609*** (0.153)	0.084 (0.137)
On major street	0.421*** (0.030)	1.176*** (0.166)	0.049* (0.025)	0.761*** (0.118)	0.028*** (0.005)	0.008* (0.005)	3.330*** (0.259)	0.454*** (0.050)	0.100*** (0.031)
ln (population)	0.201*** (0.021)	1.841*** (0.108)	0.141*** (0.013)	0.778*** (0.074)	0.026*** (0.003)	0.018*** (0.002)	0.659*** (0.222)	0.512*** (0.028)	0.015 (0.016)
% black	0.418*** (0.101)	5.408*** (0.601)	0.529*** (0.076)	2.648*** (0.392)	0.036** (0.015)	0.041*** (0.010)	-0.014 (1.020)	1.169*** (0.162)	0.172 (0.127)
% hispanic	-0.027 (0.095)	1.344** (0.533)	-0.077 (0.058)	0.090 (0.310)	0.045*** (0.016)	0.007 (0.011)	-0.918 (1.407)	0.304** (0.154)	0.683*** (0.195)
% female	0.080 (0.167)	-1.137 (0.934)	-0.165* (0.087)	-0.329 (0.453)	-0.009 (0.027)	-0.036** (0.015)	-0.768 (2.184)	-0.477* (0.278)	-0.361** (0.159)
% aged 18 to 39	0.001** (0.000)	0.009*** (0.001)	-0.000 (0.000)	-0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.021*** (0.003)	0.003*** (0.000)	-0.000* (0.000)
% Renter Occupied	0.691*** (0.084)	4.788*** (0.415)	0.226*** (0.044)	1.331*** (0.205)	0.071*** (0.013)	0.031*** (0.008)	6.027*** (0.992)	1.444*** (0.134)	-0.006 (0.082)
% female headed household	0.038 (0.201)	7.765*** (1.301)	0.783*** (0.144)	6.207*** (1.310)	0.046* (0.027)	0.074*** (0.021)	-3.065* (1.612)	-0.086 (0.261)	-0.070 (0.218)
% households on public assistant	1.515*** (0.345)	11.978*** (1.915)	1.472*** (0.384)	8.332*** (2.075)	0.083** (0.041)	0.156*** (0.043)	5.289 (5.885)	0.562 (0.501)	1.241* (0.679)
On Prominent prostitution street	1.008*** (0.119)	2.062*** (0.473)	0.158** (0.072)	1.493*** (0.319)	0.042** (0.017)	-0.008 (0.010)	7.479*** (1.056)	0.973*** (0.140)	1.528*** (0.292)
Constant	-1.097*** (0.184)	-8.686*** (0.955)	-0.819*** (0.099)	-5.154*** (0.548)	-0.106*** (0.034)	-0.091*** (0.017)	-1.520 (1.623)	-1.303*** (0.259)	0.209 (0.396)
Community Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18845	18845	18845	18845	18845	18845	18845	18845	18845
R-squared	0.17	0.26	0.17	0.16	0.04	0.07	0.18	0.31	0.03

Note: The dependent variable is number of official recorded incidents for a particular crime category on a block over the period August 19, 2005-May 1, 2007. Each column corresponds to

Table 2: Description of Data Collection Timing and Scope						
	Round					
	1	2	3	4	5	Total
Dates:	Oct/Nov-05	Mar-06	Jan-07	Jun-07	Jul-07	
Roseland (non-pimp)	640	317	168	0	0	1125
Pullman (pimp)	255	230	114	0	0	599
Washington Park	0	0	0	241	345	586
Total	895	547	282	241	345	2310

Notes: Values in the table are the number of prostitute-events recorded during data collection. Prostitution events are primarily tricks, but also include arrests and other incidents. The first round of data was conducted over a 4 week period. Rounds 2-5 were conducted in a single week. In all cases, an individual prostitute's activities were tracked for one week at a time.

Summary Statistics

Table 3: Summary Statistics					
Panel A: Prostitute Level Data					
		Whole Sample	Roseland No Pimp	Pullman Pimp	Wash. Park No Pimp
Race	White				
	Black				
	Hispanic				
Age	Under 21				
	21-25				
	25-30				
	30-40				
	40-50				
	Over 50				
Drug Addicted					
Has children					
Attractiveness					

Panel B: Prostitute-Week Data					
		Whole Sample	Roseland No Pimp	Pullman Pimp	Wash. Park No Pimp
Average:					
Number of tricks		7.15	7.83	6.21	7.09
Money Earned by:	Overall	\$336.62	\$323.22	\$408.98	\$273.21
	Cash	\$281.13	\$251.71	\$381.85	\$210.16
	Drugs	\$34.02	\$44.92	\$15.41	\$37.50
	Stolen	\$20.21	\$19.48	\$17.40	\$24.81
Days Worked		3.94	3.66	2.95	3.07
Times injured		0.23	0.26	0.22	0.21
Number of arrests		0.21	0.25	0.13	0.23
Freebies to police		0.18	0.21	0.07	0.24
Freebies to gang member		0.16	0.21	0.12	0.16

Summary Statistics

Panel C: Trick Level Data					
Note: Freebies not included			Roseland	Pullman	Wash. Park
		Whole Sample	No Pimp	Pimp	No Pimp
Avg price per trick		\$49.45	\$43.71	\$67.91	\$39.70
Percent of tricks:	Manual	14.51%	11.97%	6.31%	28.11%
	Oral	45.81%	57.25%	52.66%	52.49%
	Vaginal	17.24%	15.62%	26.08%	10.85%
	Anal	9.40%	10.38%	11.13%	5.69%
	Other	4.03%	4.77%	3.82%	2.85%
	No condom	79.37%	66.80%	85.32%	96.52%
	condom	20.63%	33.20%	14.68%	3.48%
	Black	56.07%	53.65%	37.21%	82.16%
	White	29.64%	30.62%	42.26%	13.47%
	Hispanic	14.29%	15.73%	20.54%	4.36%
	New customer	52.57%	49.85%	55.59%	54.78%
	Repeat	47.43%	50.15%	44.41%	45.22%
	Customer rated attractive (>5)	27.22%	29.26%	24.88%	25.71%
	Client Under 25	25.24%	20.36%	23.79%	36.39%
	Client 25 to 40	31.49%	31.13%	38.97%	24.21%
	Client 41 to 60	18.20%	20.10%	23.94%	8.35%
	Client over 60	11.05%	14.67%	5.16%	10.18%
Customer paid in drugs	6.04%	8.40%	2.19%	5.51%	
Day of the week	Sunday	9.52%	7.10%	6.54%	17.34%
	Monday	8.29%	9.80%	9.80%	4.71%
	Tuesday	12.13%	15.57%	11.76%	5.72%
	Wednesday	16.08%	14.97%	13.07%	21.38%
	Thursday	15.49%	16.25%	17.32%	12.12%
	Friday	21.73%	21.73%	25.65%	17.68%
	Saturday	16.76%	15.06%	15.85%	21.04%

Notes: Panel A is prostitute-level data for the 169 prostitutes observed in our sample. Panel B presents data at the level of prostitute-week. Panel C shows data at the level of a single transaction.

Table 4: Average Price by Customer Race, Type of Sexual Act, and whether the Customer is a Repeat

	Customer race					
	Black		White		Hispanic	
	New	Repeat	New	Repeat	New	Repeat
Overall	\$39.74	\$37.58	\$55.38	\$76.31	\$62.01	\$77.95
	N=430	N=379	N=183	N=310	N=102	N=168
By type of sex:						
Manual	\$28.64	\$21.64	\$28.57	\$23.33	\$26.12	\$33.57
	N=133	N=60	N=30	N=12	N=41	N=8
Oral	\$35.94	\$31.82	\$43.14	\$43.39	\$42.79	\$49.76
	N=378	N=324	N=216	N=60	N=66	N=21
Vaginal	\$69.86	\$62.80	\$87.20	\$94.12	\$94.61	\$83.64
	N=67	N=85	N=93	N=76	N=23	N=22
Anal	\$94.06	\$72.37	\$86.67	\$103.95	\$98.20	\$92.09
	N=17	N=20	N=12	N=42	N=56	N=56

Notes: Values in table are average prices paid by customers for a trick in the named category. The number of observations in a cell are also presented.

Table 5: Determinants of Price for Prostitute Transactions

	(1)	(2)
Customer black	-5.714*** (1.332)	-4.150*** (1.356)
Customer white	3.597*** (1.319)	3.887*** (1.323)
Oral sex	9.449*** (1.114)	9.601*** (1.117)
Vaginal sex	45.274*** (1.370)	44.349*** (1.384)
Anal Sex	58.662*** (1.637)	58.405*** (1.647)
Repeat Customer	-1.464* (0.874)	-2.150** (0.897)
Done in car	0.557 (1.094)	-0.069 (1.130)
Done indoors	6.540*** (1.176)	6.643*** (1.273)
Customer age under 25	0.521 (1.445)	-0.380 (1.460)
Customer age 25-40	-0.350 (1.403)	-0.480 (1.421)
Customer age 40-60	1.379 (1.471)	2.721* (1.472)
Customer attractiveness (Scale of 1-10)	-0.028 (0.893)	-0.466 (0.895)
Customer paid in drugs	-6.953*** (1.601)	-5.836*** (1.657)
Prostitute works with pimp	16.439*** (0.979)	24.458*** (3.729)
Washington Park - not 4th of July	-4.192*** (1.381)	-6.867*** (1.981)
Washington Park - 4th of July	6.432*** (1.354)	4.395** (1.991)
No condom used	2.129** (0.939)	2.031** (0.988)
Tuesday	1.765 (1.788)	1.051 (1.839)
Wednesday	4.613*** (1.702)	4.117** (1.782)
Thursday	3.779** (1.698)	3.831** (1.772)
Friday	5.462*** (1.619)	4.760*** (1.717)
Saturday	6.765*** (1.676)	5.582*** (1.783)
Sunday	3.623* (1.903)	4.156** (2.006)
Constant	19.176*** (2.500)	5.314 (5.257)
Prostitute fixed effects?	no	yes
Observations	2003	2003
R-squared	0.69	0.74

Notes: The dependent variable is the price paid for a trick by the customer. Cases where prostitutes provided services to gang members or police at no cost are excluded. Customer characteristics are based on prostitutes description. The omitted variable for sex act is manual stimulation, for location is done outdoors, for customer age is over 60, and for day of the week is Monday. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Determinants of Price by Category of Sex Act

	(1)	(2)	(3)	(4)
	Manual	Oral	Vaginal	Anal
black	-7.056***	-5.612***	-9.228*	-20.524**
	(2.485)	(1.493)	(4.718)	(9.066)
white	-1.166	1.320	2.940	-5.068
	(2.625)	(1.548)	(4.003)	(6.145)
repeatcust	-2.608	-1.159	-1.792	-2.248
	(1.589)	(0.852)	(2.708)	(6.439)
car	3.263*	2.588**	-4.712	11.286
	(1.844)	(1.061)	(4.023)	(10.068)
inside	4.248*	8.228***	1.923	1.606
	(2.246)	(1.402)	(3.778)	(8.584)
AgeUnder25	0.794	1.068	-2.050	2.077
	(2.212)	(1.616)	(5.091)	(10.198)
Age25to40	-1.813	1.049	3.095	-10.056
	(2.369)	(1.564)	(4.633)	(9.472)
Age41to60	0.875	0.398	9.909**	-3.722
	(2.451)	(1.653)	(4.763)	(8.598)
agemissing	-0.616	0.659	7.514	-14.529
	(3.258)	(2.281)	(7.781)	(19.161)
looksgood	2.718**	-1.427*	-0.193	8.417
	(1.245)	(0.858)	(3.116)	(5.977)
paidDrugs	-5.670**	-6.040***	-20.290*	-18.952
	(2.288)	(1.422)	(10.903)	(40.542)
pimp	-1.827	1.638	53.952***	56.620
	(6.658)	(3.705)	(10.294)	(34.825)
englewoodnon	-5.014	-6.979***	-3.035	-7.456
	(3.091)	(1.838)	(6.750)	(16.835)
englewood4th	3.944	1.310	12.454*	14.391
	(2.563)	(1.996)	(7.409)	(21.120)
nocondom	2.643	3.521***	5.527*	12.607*
	(1.949)	(0.933)	(3.223)	(6.720)
Tuesday	-3.485	2.360	-5.335	4.792
	(3.050)	(1.737)	(5.587)	(16.256)
Wednesday	-2.713	5.708***	-5.698	7.441
	(2.920)	(1.692)	(5.750)	(15.407)
Thursday	4.387	4.492***	-5.893	-8.407
	(3.169)	(1.683)	(6.003)	(15.280)
Friday	0.967	7.452***	-4.327	-8.296
	(2.875)	(1.665)	(5.536)	(15.034)
Saturday	1.893	5.354***	2.241	9.346
	(2.931)	(1.717)	(5.615)	(14.513)
Sunday	-1.296	3.057	-1.144	10.228
	(2.986)	(2.014)	(6.061)	(15.481)
Constant	23.386**	35.656***	27.503**	39.101
	(10.086)	(5.138)	(13.392)	(41.231)
Prostitute fixed effects	Yes	Yes	Yes	Yes
Observations	292	1062	365	203
R-squared	0.69	0.47	0.73	0.84

Notes: The dependent variable is the price paid for a transaction. Each column corresponds to a different category of sexual act. The specifications are identical to those presented in column 2 of Table 5. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: The Determinants of Condom Use

	(1)	(2)
Manual	-0.212*** (0.023)	-0.284*** (0.031)
Oral	0.051 (0.036)	0.050 (0.051)
Vaginal	0.094** (0.047)	0.123* (0.064)
Customer paid in drugs	0.006 (0.043)	0.043 (0.068)
Customer black	-0.082*** (0.032)	-0.110** (0.044)
Customer white	-0.047 (0.029)	-0.061 (0.041)
New customer	0.036* (0.021)	0.042 (0.030)
Prostitute uses pimp	-0.188*** (0.017)	-0.013 (0.254)
Customer attractiveness (scale of 1-10)	-0.018 (0.022)	-0.016 (0.032)
Washington Park - not 4th of July	-0.175*** (0.018)	-0.184*** (0.055)
Washington Park - 4th of July	-0.193*** (0.019)	-0.250*** (0.045)
Prostitute fixed effects?	No	Yes
Observations	2,003	2,003

Notes: Dependent variable is equal to one if a condom was used during a trick and zero otherwise. Estimation done using probit. The coefficients in the table are marginal effects calculated at the sample mean. Column 2 includes prostitute fixed effects. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Estimated Prostitute Wages

		Overall	Roseland (No Pimp)	Pullman (Pimp)
Average:				
Hours worked per day		4.52	4.58	4.1
Revenue per prostitute-hour		\$31.12	\$28.29	\$52.25
Estimated prostitute hourly wage		\$26.73	\$25.10	\$37.41
Tricks per Hour		0.72	0.7	0.82
Estimated prostitute wage per trick			38.11	48.53
Hours worked per week		13.18	13.38	11.71

Note: Data only available for 21% of the day-place-woman combinations.

Note: The estimated wages are done very crudely at this point. We are still trying to determine precisely what we need to subtract from revenues to get to something like a wage.

Table 9: Non-prostitution Income for Prostitutes in our Sample

Outside income earned per week

	Woman-week-job Obs	Average	Total \$	Hourly Wage (when reported)
Daycare/Babysit (26)	26	\$56.73	\$1,474.98	\$4.60
Formal Sector (34)	34	\$144.85	\$4,924.90	\$9.75
Informal Sector (42)	42	\$86.76	\$3,643.92	\$6.25
Crime (9)	9	\$92.50	\$832.50	N/A
Total	111	\$95.21	\$10,876.30	\$7.24

Note: Data in panel A comes from the 111 woman-week combinations for which we have information on outside income. Data in panel B comes from the 33 woman-week combinations for which we have both outside income and outside hours. Outside hourly wages per hour are calculated by the authors.

Appendix Table 1: Block-level Correlations across Crimes in Officially Recorded Incidents

	prostitution	johnarrests	posession	drugsell	theft	robbery	damage	assault	sexoff
prostitution	1								
johnarrests	0.398	1							
posession	0.131	0.025	1						
drugsell	0.123	0.014	0.658	1					
theft	0.099	0.031	0.158	0.118	1				
robbery	0.215	0.052	0.437	0.333	0.398	1			
damage	0.116	0.036	0.362	0.309	0.371	0.546	1		
assault	0.145	0.033	0.551	0.441	0.355	0.633	0.698	1	
sexoffense	0.071	0.028	0.166	0.121	0.163	0.242	0.256	0.296	1

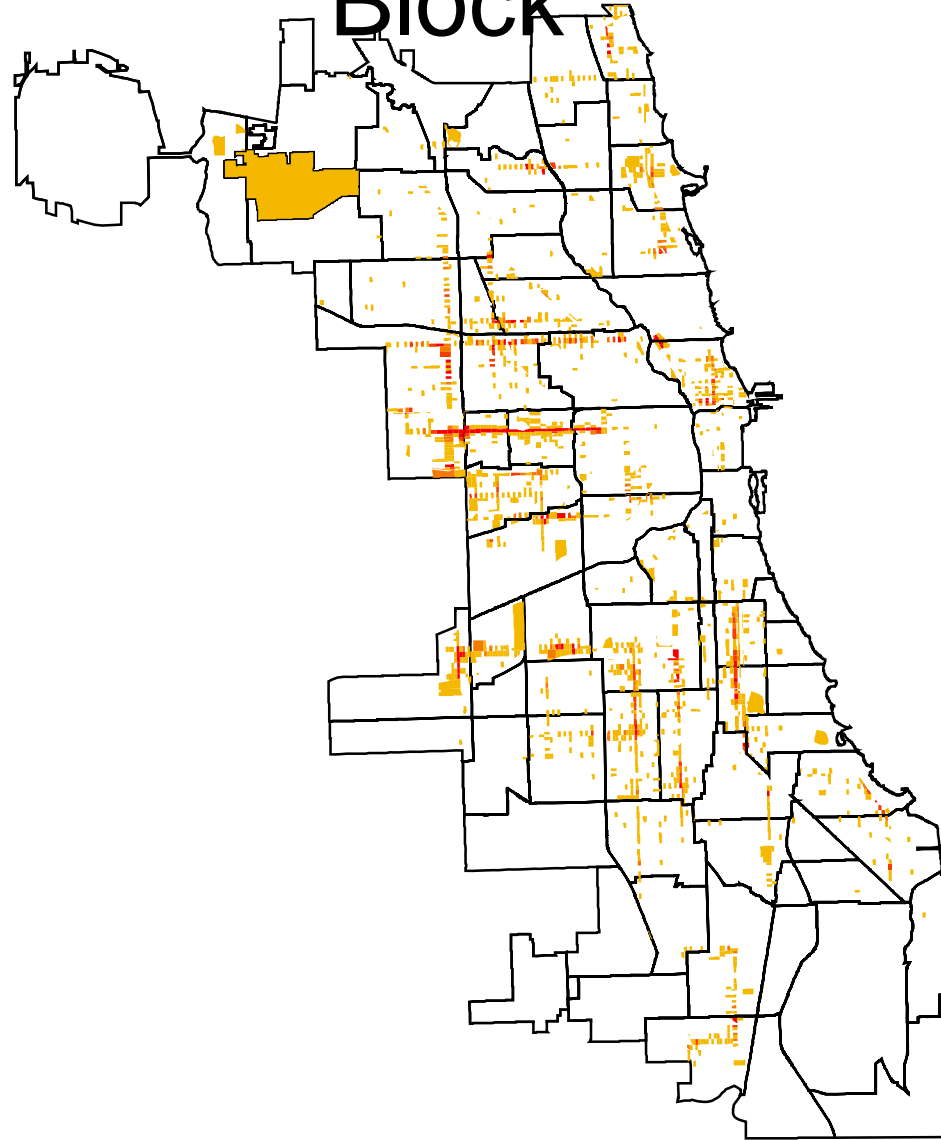
Notes: Values in the table are pairwise correlations between the number of officially recorded crime incidents at the block level. Data include all officially recorded crime incidents in the city of Chicago between August 17, 2005 and May 1, 2007.

Appendix Table 2: Block-level Correlations over Time in Officially Recorded Crime Incidents

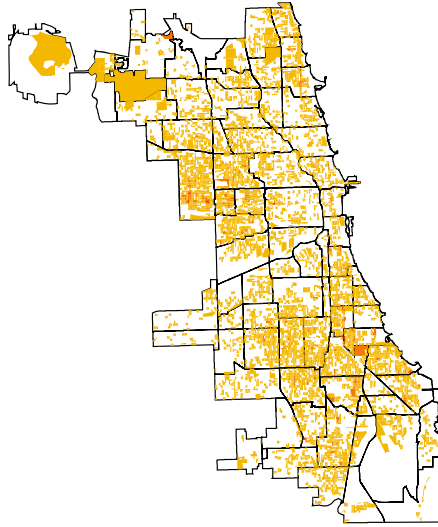
Crime:	Correlation between First and Second Half
Prostitution	0.73
Theft	0.58
Drug Possession	0.52
Robbery	0.45
Drug Selling	0.37
Motor Vehicle Theft	0.26
Damage	0.24
Murder	0.09
Sex Offense	0.08

Notes: Values in table are correlations in block-level number of officially recorded crime incidents between the first and second halves of our data sample which runs from August 19, 2005 to May 1, 2007

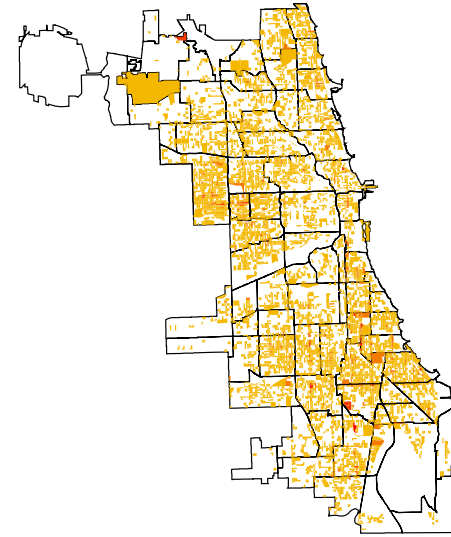
Figure 1: Prostitution Incidences By Block



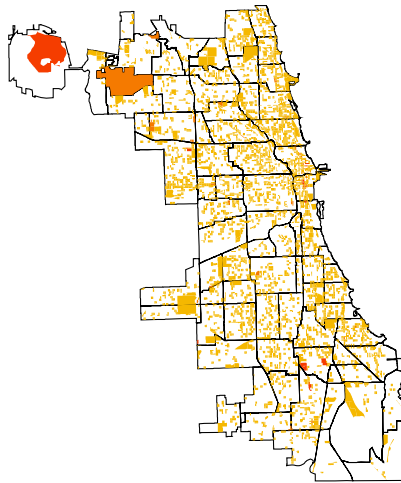
Assault and Battery



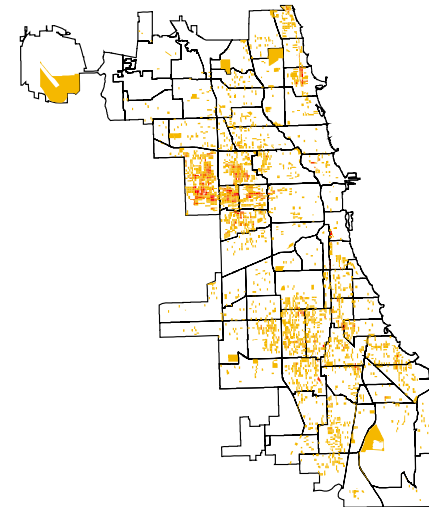
Robbery



Theft



Drug Selling



LATRICE Data: _____ Location: _____ Recorder: _____

Woman's Name	Trick/Event: (circle all that apply)	Used a condom	Amount paid in cash (\$)	Amount paid in drugs	Where done	Race of customer	Approx. age of customer	Was customer new or repeat?	How attractive is the customer (10 = sexy, 1 = disgusting)	Information on client (if known)	Was it a freebie?	Any trouble?	Did you steal from John?
TUES	Blow Job	yes			Car	Black	under 25	new	1 2	married unmarried unknown	yes	yes	yes
	Vaginal Sex	no			Outside	White	25 - 40	repeat	3 4	employed unemployed unknown	no	no	no
	Anal Sex				Inside	Hispanic	41 - 60		5 6	gang-leader gang-member	If yes, who to:	If yes: explain below	if yes: cash (\$):
	Other Sex act				Other	Other	over 60	7 8	drug-dealer unknown				
	Hand Job								9 10	neighborhood:			drugs:

Notes: → ARRESTED ON FIRST MTG. W/ JOHN

	Blow Job	yes			Car	Black	under 25	new	1 2	married unmarried unknown	yes	yes	yes
	Vaginal Sex	no			Outside	White	25 - 40	repeat	3 4	employed unemployed unknown	no	no	no
	Anal Sex				Inside	Hispanic	41 - 60		5 6	gang-leader gang-member	If yes, who to:	If yes: explain below	if yes: cash (\$):
	Other Sex act				Other	Other	over 60	7 8	drug-dealer unknown				
	Hand Job								9 10	neighborhood:			drugs:

Notes: CHANNING

SATURDAY 1-	Blow Job	yes			Car	Black	under 25	new	1 (2)	married unmarried unknown	yes	yes	yes
	Vaginal Sex	no	25		Outside	White	25 - 40	repeat	3 4	employed unemployed unknown	no	no	no
	Anal Sex				Inside	Hispanic	41 - 60		5 6	gang-leader gang-member	If yes, who to:	If yes: explain below	if yes: cash (\$):
	Other Sex act				Other	Other	over 60	7 8	drug-dealer unknown				
	Hand Job								9 10	neighborhood: Local			drugs: 20

Notes: 2 beat me, had to go to hospital overnight

	Blow Job	yes			Car	Black	under 25	new	1 2	married unmarried unknown	yes	yes	yes
	Vaginal Sex	no			Outside	White	25 - 40	repeat	3 4	employed unemployed unknown	no	no	no
	Anal Sex				Inside	Hispanic	41 - 60		5 6	gang-leader gang-member	If yes, who to:	If yes: explain below	if yes: cash (\$):
	Other Sex act				Other	Other	over 60	7 8	drug-dealer unknown				
	Hand Job								9 10	neighborhood:			drugs:

Notes: Other relevant observations by recorder:

12

Ornella (Friday)

EVENT TRACKING SHEET

7

Date: _____ Location: _____ Recorder: _____

Woman's Name	Time trick		Trick/Event: (circle all that apply)	Used a condom	Amount paid in cash (\$)	Amount paid in drugs	Where done	Race of customer	Approx. age of customer	Was customer new or repeat?	How attractive is the customer (10 = sexy, 1 = disgusting)		Was it a freebie?	Any trouble?	Did you steal from John?
	starts:	ends:									1	2			
1			Blow Job	yes	60	20	Car	Black	under 25	new	1	2	yes	yes	yes
			Vaginal Sex	no			Outside	White	25-40	repeat	3	4	no	no	no
			Anal Sex				Inside	Hispanic	41-60		5	6	If yes: who to:		if yes:
			Other Sex act				Other	Other	over 60		7	8	If yes: explain below		cash (\$):
			Arrest								9	10			drugs:

Notes:

2			Blow Job	yes	75		Car	Black	under 25	new	1	2	yes	yes	yes
			Vaginal Sex	no			Outside	White	25-40	repeat	3	4	no	no	no
			Anal Sex				Inside	Hispanic	41-60		5	6	If yes: who to:		if yes:
			Other Sex act				Other	Other	over 60		7	8	If yes: explain below		cash (\$):
			Arrest								9	10			drugs:

Notes:

2 gang members; inside client's house

3			Blow Job	yes	-	-	Car	Black	under 25	new	1	2	yes	yes	yes
			Vaginal Sex	no			Outside	White	25-40	repeat	3	4	no	no	no
			Anal Sex				Inside	Hispanic	41-60		5	6	If yes: who to:		if yes:
			Other Sex act				Other	Other	over 60		7	8	If yes: explain below		cash (\$):
			Arrest								9	10			drugs:

Notes:

*COP; agreed not to arrest her for B.S.O.s

4			Blow Job	yes	100		Car	Black	under 25	new	1	2	yes	yes	yes
			Vaginal Sex	no			Outside	White	25-40	repeat	3	4	no	no	no
			Anal Sex				Inside	Hispanic	41-60		5	6	If yes: who to:		if yes:
			Other Sex act				Other	Other	over 60		7	8	If yes: explain below		cash (\$):
			Arrest								9	10			drugs:

Notes:

5			Blow Job	yes	100		Car	Black	under 25	new	1	2	yes	yes	yes
			Vaginal Sex	no			Outside	White	25-40	repeat	3	4	no	no	no
			Anal Sex				Inside	Hispanic	41-60		5	6	If yes: who to:		if yes:
			Other Sex act				Other	Other	over 60		7	8	If yes: explain below		cash (\$):
			Arrest								9	10			drugs:

Notes:

father & son; inside client's house while

Other relevant observations by recorder:

mother watched and masturbated