

*Prostitution 2.0: The Changing Face of Sex Work**

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October, 2009

Abstract. Technological change in the prostitution industry has provided a wealth of data that supply a clearer picture of this poorly-understood activity. The use of Internet technology for solicitation by sex workers has also raised important legal and regulatory questions. We provide a description of the new institutions that facilitate prostitution online, and supply some of the first evidence on several key parameters of interest to policymakers. First, we find that workers who solicit online largely represent growth in the overall prostitution market, as opposed to simple displacement of the off-line, street-focused market, although we find important displacement effects among sex workers in their 30s and 40s. Using a newly-implemented survey, we also find that most sex workers who solicit online engage in lower risk behaviors than traditional street-based workers; however, workers close to the margin for migration from outdoor work bring riskier business and sexual practices with them as they enter the off-street sector.

* Cunningham: Department of Economics, Baylor University. Kendall: Compass Lexecon. The authors thank Benjamin Edelman for sharing broadband data, Kris Hiew for his helpful research assistance, Amanda Brooks for help on the survey, the Nevada chapter of the Sex Workers Outreach Project for endorsing the SASP survey and seminar participants at Georgia State University for useful comments and suggestions. All errors are the responsibility of the authors.

I. Introduction

The rise of e-commerce over the last 15 years has facilitated the development and growth of markets in all manner of goods and services, including used books, musical recordings, software, and collectibles. Markets for illegal goods and services have not been immune to this retailing revolution – if anything, they have been at the forefront, since Internet commerce is frequently associated with substantial reductions in search costs, which constitute a large share of the total price for goods such as pornographic images, Nazi memorabilia, and black market pharmaceuticals.¹

Recently, tremendous growth in the online market for prostitution has drawn the attention of law enforcement agencies and regulators, including a lawsuit brought by the Sheriff of Cook County, Illinois, and additional legal action by a consortium of 40 state attorneys general, against craigslist.org, an online classified ads site frequently used by sex workers. In its complaint, the Cook County Sheriff referred to craigslist (which is just one of many similar sites) as “the single largest source of prostitution in the nation”.²

Very little is known about markets for prostitution services generally, and most of the extant economic literature has focused on either outdoor, street-focused markets (e.g., Levitt and Venkatesh, 2007), or prostitution in developing countries (e.g., Rao, et. al., 2002, Gertler, Shah

¹ See Goldsmith and Wu (2006) for other examples of attempts to circumvent prohibitions through the use of the Internet.

² Craigslist has been the focus of considerable legal and media attention throughout 2009 due in part to the discovery of a man who assaulted several prostitutes and murdered one who he met through the site. In June of 2009, Craigslist shut down its infamous “erotic services” section and replaced it with a more regulated “adult services” section. Tom Dart, sheriff of Cook County, nonetheless sued the company for damages claiming his office had spent over \$100,000 in resources policing the site.

and Bertozzi, 2005, Arunachalam and Shah, 2008, Gertler and Shah, 2009).³ Our study is one of the first to analyze in detail the characteristics of a large and growing sector of the prostitution market in the developed world, in which solicitation takes place online.

We provide preliminary evidence on two key policy questions: (1) Are modern technologies augmenting the market for prostitution, or rather merely displacing older and riskier modes of solicitation, such as streetwalking? (2) Are risk behaviors among sex workers who solicit online similar to those associated with older modes of solicitation?

If technology-facilitated solicitation primarily displaces streetwalking, then it is possible the optimal degree of enforcement against prostitution could decrease, as off-street solicitation involves lower levels of neighborhood nuisance, fewer opportunities for third-party exploitation of workers by pimps and others (Weitzer, 2005), and potentially lower STI risk (Gertler and Shah, 2009). However, if the new forms of solicitation are substantially augmenting the market, then strong responses by law enforcement and public health agents may be appropriate.

Similarly, if sex workers who solicit for customers online engage in less risky sexual behaviors than those associated with streetwalking, then the appropriate policy response is likely to differ from a case where the high-volume, high-risk behaviors observed among street prostitutes are also common among online workers.

We address both of these questions empirically. First, we find evidence that growth in online solicitation has had a substantial displacement effect among sex workers in their 30s and 40s, but

³ The literature has also focused almost entirely on the supply of prostitute labor, with very little research on the demand for prostitution services. To our knowledge, the only economic study of the determinants of demand for heterosexual prostitution services is Cameron and Collins (2003).

for other age groups, and overall, the rise of online solicitation appears to have led to market augmentation. One theory that can explain these differential effects by age is that prime-aged workers have sufficient human capital and experience to employ the Internet and other new technologies in order to move into indoor work. Those remaining on the street include very young and inexperienced sex workers, and older workers who lack the human and social capital necessary to convert to indoor work.

Second, we find that most workers who solicit online engage in safer sex practices, and on average, see substantially fewer clients than found in the literature on streetwalking prostitutes. However, to the extent there is some degree of displacement between online and offline workers, we estimate that those who are on the margin of migration between sectors are substantially more likely to engage in risky business and sexual practices. This raises the question of whether displacement may create new vectors for STI transmission in the off-street sector.⁴

As many researchers have noted, serious empirical work on prostitution markets has been stymied by a lack of systematic data. In this paper, we marshal the best evidence available on modern prostitution markets, and examine it through various empirical approaches, while admitting that no dataset on this poorly understood industry can be truly definitive. For our analyses, we combine law enforcement data on prostitution with a proxy for the rise in Internet-facilitated prostitution – counts of customer reviews from a nationwide “mall” for sex workers, TheEroticReview.com (“TER”), which as of August, 2008, included detailed data on over

⁴ Disease externalities have historically been the primary impulse for regulation of prostitution (Decker, 1979). Gertler and Shah (2009), however, in their study of Ecuadorian prostitutes, find lower STI incidence rates due to displacement of street workers into the indoor licensed brothel system, where safety and public health is carefully regulated.

90,000 workers. These data have previously been analyzed by Edlund, et al. (2009) and Cunningham and Kendall (2009a, 2009b).

To better understand the risk behaviors of sex workers who solicit online, we also implemented a new survey of nearly 700 sex workers, asking questions about their history in the profession, and about their last five client transactions. We believe ours is the largest survey of sex workers in modern economies to date, and is unique for its extensive sampling of indoor workers.

Section II briefly describes the online market for prostitution, while Section III describes the law enforcement and TER website data. Section IV presents our results regarding displacement effects, while section V describes and examines the risk behaviors of workers who solicit online. Section VI concludes.

II. Recent Changes in Prostitution Markets

In most large cities, prostitution services have long been available through street “strolls”, call operations, and as secondary products of some legal businesses, such as massage parlors.

Nevertheless, the Internet has exponentially increased the ability of sex workers to: (a) reach large numbers of potential clients with informative advertising, (b) build reputations for high-quality service, and (c) arrange discreet assignments in which screening methods can be used to reduce the risk of discovery by police and others. In this section, we describe briefly how sex workers employ the Internet for these purposes, and suggest means by which these improvements in the market may have led to displacement of street transactions.

As in other industries, online commerce has revolutionized advertising among sex workers. A number of websites offer advertisement services specifically for sex workers at low (and sometimes zero) cost. The most well-known of these is the classified ads site, craigslist.org, which has local posting boards in most U.S. cities. Until May, 2009, each local posting board included a section entitled “Erotic Services”, where for a nominal fee, users could post advertisements with essentially an unlimited amount of text and up to four images. Typical postings gave a worker’s telephone number or email, and indicated services offered and prices (often using thinly-veiled euphemisms for money, such as “roses”). The number of daily postings on many local boards is extremely high; there were an average of 1,690 ads posted each day on the New York City board in May, 2009 (Cunningham and Kendall, 2009a).⁵

In November, 2008, a consortium of 40 state attorneys general negotiated with Craigslist to charge advertisers \$5 per posting (previously, advertisement was free) and to require the use of a credit card for payment. These actions caused a substantial drop in advertisement rates (Cunningham and Kendall, 2009b).⁶ A number of other sites offer similar advertisement services, including Backpage.com, CityVibe.com, and Eros.com. All of these sites allow customers to browse and directly compare the characteristics, photographs, and prices of a large number of sex workers in ways that were not possible through older methods of solicitation.

⁵ Similarly calculated figures for San Francisco, Los Angeles, and Chicago during the same month were 770, 670, and 315. Some postings are repeat ads for the same worker, and there is a small amount of “spam,” though the latter is limited by the fact that, after November 2008, craigslist was charging advertisers \$5 per posting.

⁶ Later, in May, 2009, actual and threatened legal action by the attorneys general of Connecticut and South Carolina, and the sheriff of Cook County, Illinois, led Craigslist to abolish the erotic services boards entirely, and replace them with more closely-monitored “adult services” sites. A perusal of these sites indicates that they continue to be used for advertisement by sex workers, although ads are generally not as explicit as before.

Also as in markets for other goods and services, the rise of online commerce has created greater opportunities for seller reputation-building among sex workers. Among other market institutions, this is evidenced in the popularity of various reviewing sites, where clients share information about sex workers with each other. These sites allow workers to build and maintain public reputations for quality service, as well as increasing the willingness-to-pay among risk-averse clients, for whom reviews serve as an indication that the worker is unlikely to be dangerous or fraudulent. In their advertisements, sex workers frequently refer potential clients to their reviews on such sites, and our ethnographic interviews with sex workers consistently reveal the importance workers place on having many positive reviews. We describe the largest reviewing site, TheEroticReview.com, in greater detail in the following section.

Internet technology also appears to facilitate the screening of customers by sex workers, through published “black lists” and “white lists”, and also through a fascinating system of worker-to-worker references, by which many sex workers will refuse to see a client unless he can provide evidence that he has seen another worker.⁷ This system functions because a worker who is contacted by a potential client with a reference can quickly find information about the referring worker online and contact him or her for verification. At the same time, many sex workers indicate that e-mail and the Internet also facilitate more informal screening procedures, including entering the potential client’s name or telephone number into search engines, or simply communicating via email for a brief period before arranging an assignment (Brooks, 2009).

⁷ This is quite common among workers, with 58% in our survey (described in Section V) indicating that they refuse to see new clients without at least one reference from another worker (Cunningham and Kendall, 2009b). TheEroticReview.com offers a “Whitelist” service, which serves a similar purpose. See this FAQ for more on the service:
http://www.theeroticreview.com/info_policies/whiteListFAQ.asp

Law enforcement agencies have not ignored these developments in prostitution markets, though they have faced difficulties in responding effectively.⁸ For the most part, declines in the price of advertising and better methods of screening out law enforcement agents have allowed online solicitation to flourish with very low probabilities of arrest or punishment.⁹ Reductions in arrest probabilities both directly lower the (expected) cost of offering prostitution services due to fewer fines and jail terms, but also lower the likelihood of a sex worker's discovery by friends and family. As Della Giusta, et al (2009) argue that stigma is a key cost to prostitutes, this may be an important effect.

All of these factors have served to lower the costs and increase the relative rewards of off-street work, potentially causing displacement from the street-work sector. Insofar as there exist sex workers at the margin between these two sectors, such reductions in costs could lead to a transition indoors from the streets.¹⁰ However, a significant literature indicates that, to a large degree, the types of women who offer street prostitution services are quite different than the types who offer off-street services. Church, et al (2001) find that outdoor workers are typically

⁸ There is also some evidence that, to the extent police have responded to the increased availability of online solicitation, they have done so by concentrating their resources on streetwalking prostitutes, in a purposeful attempt at displacement to online solicitation (Weidner, 2001; Murphy and Venkatesh, 2006; Bernstein, 2007).

⁹ A 2008 analysis by the Cook County sheriff's office estimated that the cost of arresting a worker who advertises and communicates with clients online is \$674, not including the opportunity costs of potential increases in other crimes while police officers are occupied in arresting sex workers – a figure presumably higher than the cost of arresting street-based workers, since they claimed damages based on this calculation.

¹⁰ Gertler and Shah (2009), similarly, find evidence of displacement in Ecuador when police devote resources to regulating street markets. This displacement led to an 8% reduction in STIs. Because the indoor markets have institutions and clients that facilitate safer sex practices, the authors believe that displacement from streets via increased regulation can increase social welfare by improving public health.

younger, began prostitution at an earlier age, and are more likely to use prostitution wages to pay for drugs, as opposed to household expenses and children. They are also far more likely to use heroin, opiates, and crack, to have injected drugs in the past month, and to have been assaulted by a client. Based on such studies, Weitzer (2005) concludes there is vast heterogeneity in risk behaviors and experiences between indoor and outdoor workers.¹¹

Nevertheless, despite evidence that the indoor and outdoor markets are segmented, substantial displacement effects caused by increased online solicitation cannot be rejected *ex ante*. Moreover, in Section V below, we document a non-trivial population of workers who have solicited both online and offline. It may be that women who enter the street sector face difficulty moving to the indoor market, but new entrants to the prostitution market, who might have otherwise selected street work, may not be so constrained. Moreover, even if there are few prostitutes who can effectively convert from street to indoor markets, there may be many potential clients that can do so. To the extent that the Internet allows indoor workers to attract clients who otherwise would have patronized street workers, a sizeable displacement effect for transactions may exist. Our primary focus in this paper is on displacement of transactions, whether due to seller-side or buyer-side substitution.

III. Measuring Offline and Online Prostitution Activity

Our chief proxy for offline, street-level prostitution is the number of arrests for prostitution, while for online activity, we focus on counts of reviews at a popular online reviewing site for sex

¹¹ Clients of street workers also differ from those of indoor workers. Lever and Dolnick (2010) find that the clients of indoor sex workers are typically more affluent males and expect more emotional services for their money than from street prostitutes.

workers. In this section, we first show that the vast majority of women who come into contact with police are street workers, and we describe the advantages and limitations of law enforcement data. We then describe the reviewing data and present summary statistics.

A. Measuring Offline Prostitution Activity

To examine the locational choices of arrested prostitutes, we first examined data collected by the FBI for the National Incident-Based Reporting System (NIBRS). NIBRS is unique among law enforcement data in that it includes information on the location at which each recorded criminal incident takes place.

Table 1 displays the distribution of arrests across locations in 2005, and shows that the bulk of arrests took place at what are clearly “street” locations, including “highway/road/alley”, and “parking lot/garage”. Only 10.72% of arrests took place in locations that would normally be associated with off-street workers – “hotel/motel/etc.” and “residence/home,” though this likely overstates the share of arrests of off-street workers, since it is not uncommon for solicitation to take place on a street, while the actual assignment takes place in a motel or residence. Thus, NIBRS data suggest that outdoor workers remain the majority of prostitutes who come into contact with law enforcement, despite the apparent growth in the off-street sector associated with online solicitation. Cunningham and Kendall (2009a) show that the share of prostitutes arrested at “street”-like locations has not changed materially between 1999 and 2005.

While NIBRS data supplies information on location of arrest, it is limited in coverage;¹² hence, in our analyses we will proxy for the level of street activity with counts of prostitution arrests from a more comprehensive law enforcement dataset, the FBI's Uniform Crime Reports (UCR).¹³ Unlike NIBRS, the vast majority of law enforcement agencies in the U.S. participate in UCR.¹⁴ The primary data construction concern associated with UCR arrest data is the "hierarchy rule" employed by the FBI in these data, by which only the most serious crime is recorded in cases where an individual is arrested for multiple crimes. Since street prostitution is frequently concomitant with drug use, theft, and other crimes,¹⁵ the hierarchy rule may suppress the actual level of arrests. In our analyses, we will control for all unmeasured factors associated with a given location and with a given period, but to the extent that the association between prostitution and more serious crimes may vary over time within a given location in non-random ways, this could bias our findings.

In addition, as with other crimes, prostitution arrests may not always vary directly with prostitution activity, since arrests are also affected by the level of law enforcement resources applied to combating prostitution (Becker 1968, Levitt and Miles 2006). Again, if police vigor in enforcing statutes against prostitution varies over time within a given location in ways that are correlated with off-street prostitution activity, this could potentially bias our findings.

¹² Currently there are only 32 states in which law enforcement agencies record their data for the program, and most of the largest U.S. cities are not included in the data.

¹³ UCR defines prostitution as "the unlawful promotion of or participation in sexual activities for profit," and includes in its counts not only those arrested for prostituting themselves, but also keepers of houses of prostitution, panders, and pimps (FBI, 2004).

¹⁴ The major exceptions include spotty recording by some agencies in Florida and the District of Columbia.

¹⁵ See Ratner (1992) and Miller (1995).

Since our measure of online activity (described in the following section) focuses on female sex workers, we will focus our offline measures exclusively on female prostitution arrests. While UCR data also provides information on arrests of males, but these counts include, in an unknown composition, male prostitutes, pimp managers, and clients of female prostitutes.¹⁶

B. Measuring Online Prostitution Activity

To measure online activity by prostitutes, we examined what we believe is the largest dataset currently available on sex workers who use the Internet to solicit and communicate with customers. The data are drawn from a website known as TheEroticReview.com (“TER”), where clients share reports and reviews of sex workers they have met.¹⁷ TER was established in 1998, and the number of individuals reviewed, as well as the number of reviews, has grown substantially over the last decade as the use of the Internet for advertisement by sex workers has grown. Figure 1 illustrates, in logarithmic scale, growth in the site’s popularity.

A recent estimate indicated that TER receives between 500,000 and 1,000,000 unique visitors each month (Richtel, 2008). Both published sources (Brooks 2009), and our own ethnographic interviews with sex workers indicate that TER reviews are widely recognized as a key to business success among independently-operating workers, although they may be somewhat less important among brothel and agency-based workers, and among a small contingent of extremely high-priced workers, who operate exclusively through word-of-mouth among clients.

¹⁶ See Logan and Shah (2009) and Logan (2009) for a description of the highly-developed online market for male sex workers.

¹⁷ Data from TER and other sex worker review sites are analyzed by Moffatt and Peters (2004), Logan and Shah (2009), and Edlund, et al (2009).

While there exist other websites offering customer reviews on sex workers, TER is by far the largest. As of August, 2008, when we retrieved the data using a web-crawling PERL script, there were over 500,000 reviews of more than 94,000 sex workers reviewed on the site. Moreover, unlike some other similar sites, TER is national in scope, with reviews categorized by geographic location.

After an assignment, a customer may fill out an online review form at TER which demands very detailed information on physical characteristics, prices, and services offered, as well as ratings (on a ten-point scale) of the worker's overall appearance and "performance". All workers reviewed on TER must solicit for customers online – for instance, through an advertisement on a public classified ads site like craigslist.org, or a personal website. We will take as our measure of online prostitution activity the number of individuals receiving at least one new review in a given location in a given time period.

While TER data are incomparable as a measure of online sex worker activity, like all data on prostitution, there are key limitations to their use. Specifically, there are two major ways TER review data could potentially be corrupted as a proxy for activity in the off-street market. First, while most information from previous reviews are available free to all who access the site, prices and some parts of the reviewer-submitted narratives are available only by either submitting two validated reviews, or by paying a fee (as we did to collect the data).¹⁸ Thus, it is plausible that some users could submit inauthentic reviews in order to gain access to the site's restricted details. Such activity is likely to be rare since all other information, including contact and

¹⁸ The site has very recently (summer, 2009) changed its practice to restrict more information to "members", those who pay or submit reviews.

website information is available for free to all users, and price information can usually be determined independently through these means. Moreover, the review form is extremely detailed and takes several minutes to fill out, even with falsified information. Finally, users do not gain access to the price and narrative information until their reviews have been checked by TER staff, which takes several days, so impatient users attempting to gain access to restricted information would likely be dissuaded.

Second, sex workers may attempt to “review” themselves in order to appear to have more or better reviews. In order to combat this type of fraud, the site allows users to “click through” a reviewer’s screen name to see all other reviews supplied by that client. Thus, reviews from persons who have not reviewed many other workers (as would likely be the case with this type of fraud) can be discounted by users. However, if the prevalence of such fraudulent reviews varied systematically with street prostitution activity in a given location, our results could be biased.¹⁹

Another limitation of TER data is that all sex workers reviewed on the site are either women or transgendered men; hence, we will be unable to examine the effects of Internet technology on the male prostitution market (see Logan, 2009 and Logan and Shah, 2009, for an analysis of a reviewing site which focuses on male workers).

¹⁹ Another possible limitation is the potential for the same worker to be reviewed multiple times under different names. In general, TER appears to match new incoming reviews with individuals already reviewed on the site by telephone number, website URL, and email address, and the fact that many workers have scores, if not hundreds, of reviews, indicates that the matching process appears to work reasonably well. However, we have come across isolated cases of individuals who appear, from a comparison of photographs, to be the same person, but who are listed as two different people, perhaps because they changed their contact information. To the extent that such match failures were a random sample of all individuals reviewed, our analyses should be unaffected.

IV. Displacement Analyses

A. National Trends

Before proceeding to our formal regression analyses, we first examine the evidence regarding displacement at the national level. Figure 2 shows the age distribution of all female prostitution arrests recorded in UCR in 1995, just before widespread home adoption of the Internet, and in 2006. The data illustrate a striking trend towards bimodalism, in which arrests of women ages 25-40 appear to have declined substantially relative to older and younger workers. No similar trend is evident for female prostitution arrests in other crime categories, such as property or violent crimes, nor is there any similar trend among male prostitution arrests.

Figure 3 illustrates a similar phenomenon in per capita arrest levels. Between 1999 and 2006, arrest rates among women aged 25-39 fell substantially, while other age groups saw either stagnant or even increasing arrest rates. Figures 2 and 3 are consistent with a hypothesis which will find further support in our formal regression analyses below, that the Internet and other modern technologies are drawing outdoor transactions associated with prime-aged sex workers into the Internet-facilitated sector, where they rarely encounter law enforcement. Those transactions remaining on the street are associated with very young and inexperienced sex workers, and older workers who lack the human and social capital necessary to convert to indoor work.

B. Correlational Analyses

In this section, we report simple least squares analyses of the relationship between street and online prostitution, proxying for street prostitution activity with female prostitution arrests, and proxying for online activity with the number of sex workers reviewed on TER.

We aggregate our data to the level of the year and state in order to allow controls for other factors that might covary with prostitution activity. In doing so, we are forced to drop some geographic locations, since TER data, while national in scope, do not always classify the location of a reviewed worker to a single state.²⁰ After these culls, we are left with 152 state-year observations.²¹ Since UCR data allows us to categorize arrests into age groups, we will be able to analyze not only the overall effect of online activity on arrests, but also the effects on arrests within various age groups, which the national trends presented above suggest may differ.²²

Most of our analyses in this section will focus on estimating the following regression specification:

$$[1] \quad \text{Arrests}_{it}^a = \alpha + \beta \text{-Workers reviewed per capita}_{it}^a + \gamma X_{it} + \mu_i + \delta_t + \varepsilon_{it},$$

²⁰ For instance, one of the geographic categories available to TER reviewers is “Carolinas,” which presumably includes both North and South Carolina, and there is no obvious way to distinguish which workers operated in which of the two states.

²¹ The states used in our analyses are Arizona, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Louisiana, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New Mexico, New York, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah and Washington. All states have observations for all eight years, except Hawaii (2006), Georgia, (1999-2002), New Mexico (2000-2006), and New York (1999-2002).

²² UCR data can also be disaggregated by race (but not by race and age simultaneously). In unreported analyses, we found no significant differences in our estimated relationships between Whites and Blacks, but we did generally find significantly stronger evidence of displacement among Asian prostitutes; however, some evidence suggests arrests are a relatively poor measure of street sector activity among Asians, who nevertheless constitute a very small share of all arrests.

where $Arrests_{it}^a$ represents the number of arrests in age group a in state i and year t , X_{it} is a matrix of state-year covariates, and μ_i and δ_t are state- and year-fixed effects, respectively.

Table 2 presents summary statistics on the relevant variables for our analyses. The set of state-year covariates includes common law enforcement controls, such as police presence and imprisonment rates (lagged one year to avoid simultaneity issues); income measures such as per capita real income and the unemployment rate,²³ and local average prices and purity levels for key illegal drugs.²⁴

Despite the inclusion of these covariates, there are a number of remaining factors which could bias our estimates of equation [1]. First, if consumers perceive street prostitution and online prostitution as near substitutes, then a temporal and location-specific increase in overall demand for prostitution could lead to a spurious positive correlation between street and off-street activity. For instance, a large convention attracting many potential customers from out of town could raise the demand for both street and off-street prostitutes simultaneously (Cunningham and Kendall, 2008). Similarly, temporal increases in levels of police enforcement against all forms of prostitution or changes in economic conditions that drive women to offer prostitution services both online and offline could imply a spurious positive correlation in the estimation of equation [1]. We will attempt to control for these factors using an instrumental variables approach in the

²³ A sizeable literature suggests economic considerations are key in the decision to offer prostitution services (see, e.g., Rosen and Venkatesh, 2008).

²⁴ Since a substantial criminological literature suggests a connection between street prostitution and drug use (see, e.g., Inciardi, et al., 1991), the inclusion of these drug variables allows us to control for a possibly important omitted variable relating street and off-street solicitation. See Appendix A on the methodology used to construct drug price and purity measures.

following subsection; however, it seems likely our correlational results will be biased against finding a displacement effect.

Table 3 presents the results from estimating equation [1] using least squares. Heteroskedasticity-robust standard errors, clustered at the state level, are presented in parentheses below each coefficient.²⁵ In the first column, both the dependent and independent variables include all ages, while the other columns estimate equation [1] using data on each age group separately. In panel A of Table 3, no covariates except year and state-fixed effects are included in the regressions, while panel B includes time-varying covariates.

The results in Table 3 suggest a robust displacement effect among sex workers aged 30-39, while apparent displacement effects for other age groups are either not present or are not robust to the inclusion of covariates. The coefficient on the 35-39 age group in panel B of Table 3 can be interpreted to mean a unit increase in the number of TER workers reviewed per 100,000 females aged 35-39 is associated with a 0.8 reduction in arrests among that age group. Thus, we estimate that a one standard deviation increase (16.40 reviewed women per 100,000 residents) in online prostitution activity is associated with a 23.7% reduction in arrests at the mean, around 1/5 of a standard deviation decrease in arrests among 35-39 year old women. Other coefficients in the table can be interpreted similarly.

For the aggregate of all ages in column 1, we find no statistically significant displacement of arrests from online prostitution activity (at least, once we include covariates). This suggests that

²⁵ By clustering at the state level, we assume the disturbance term to be a stochastic value correlated within state-age cells over time.

overall, the rise in online solicitation represents an expansion of the market. However, consistent with the evidence presented in the national trends above, these simple correlations do suggest a focused displacement effect among women in the middle of the age distribution. Since TER may not be an ideal proxy for all online activity, we are disinclined to interpret our findings structurally (and even less inclined to assume a globally linear effect); however, the estimated 23.7% decline in arrests among 35-39 year old women associated with a standard deviation increase in TER activity is quite large, given that over the 1999 – 2006 period, arrest rates in this age group declined by 27%.

C. Causational Analyses

The previous subsection estimated correlations between proxies for online and offline prostitution activity. However, as discussed above, there are many temporal location-specific shocks that might bias these correlations, such as the temporary presence of a convention bringing many out-of-town visitors, a short-term police crack-down, or simply omitted variables that we cannot observe and account for, such as changing consumer preferences or community norms. In this section, we examine the relationship between online and offline prostitution activity, using only variation in online activity that is correlated with a plausibly exogenous factor, the growth in residential high-speed internet access.

The period from 1999 to 2006 was one of tremendous growth in residential broadband. Figure 4 plots the share of U.S. households with broadband access, by year, using data from the FCC (e.g., FCC 2002). Broadband subscription in the United States grew from fewer than three million lines in 1999 to over 60 million lines in 2006 with most residential subscribers choosing

cable models or DSL lines (Prieger and Hu 2008). The increased availability of broadband internet connections facilitates online prostitution activity by connecting buyers with sellers, and by widening the population who can access, at high speeds, the institutions that facilitate online solicitation described in Section II. Since much of the value in these new forms of advertisement and communications is visual, the availability of broadband, which vastly increases download speeds for images, has special importance beyond mere internet access.

A valid instrument must have two characteristics: it must be excludable from equation [1] and it must be relevant for explaining variation in our endogenous repressor, growth in online solicitation activity.²⁶

One prominent way that broadband may directly affect street prostitution, and thus, not be excludable from equation [1], is if it facilitates access to online pornography, which might be either a substitute or a complement for prostitution services, including street prostitution. While we cannot fully exclude this possibility, there are both theoretical and empirical indications that substitution towards pornography does not seriously invalidate our identification strategy. From the standpoint of theory, as noted in the previous sub-sections (and confirmed below), our findings indicate a strong displacement effect only among prime-aged workers. However, the rise of the internet has primarily increased access to pornography among younger consumers,

²⁶ Recent studies on broadband diffusion find that in addition to income, factors related to market structure explain the growth in broadband in states. Prieger and Hu (2008) show that, in states with more competition from suppliers, broadband grew faster. Prieger and Hu (2008) also find that service quality, affected by population density and residential sorting, can reduce demand for broadband, particularly among Black households which more commonly live far from broadband provider central offices, causing decay in signal quality. All of our models control for two moments in the income distribution: real state income per capita and the state poverty rate. State fixed effects capture all other time-invariant state and state-age level heterogeneity.

who faced legal and social restrictions in accessing pre-internet sources of pornography, such as magazines or adult theaters. Similarly, in our survey (described in the following section), we find that the average age among clients who purchase services from sex workers who advertise on the internet is 43.

A second possible means by which broadband access could directly affect street prostitution would be if access to the internet allowed clients of street prostitutes to better avoid arrest. Holt and Blevins (2009) show that there is, in fact, considerable sharing of information among street prostitute clients regarding which streets are frequent targets of police sting operations, tips to avoid getting caught in stings, and so on.

As an empirical check on the potential excludability of broadband penetration from equation [1], we considered adding it directly to our correlational regression model, as described in the previous subsection. If broadband penetration was independently correlated with arrests, controlling for our proxy of online activity, this would suggest that it may not be excludable from equation [1]. As the results in Table 4 show, however, it appears that broadband penetration is not separately correlated with arrests for all age groups together, or for any age group separately, except for the 45-54 age group, when time-varying controls are included. These results do not prove with certainty the validity of broadband as an instrument, but they are an empirical indication consistent with a valid identification strategy.

A second criterion for a valid instrument, besides excludability from equation [1], is that it is relevant for explaining changes in the endogenous variable. As in all instrumental variables-

based research, “weak” instruments can result in large standard errors with poor asymptotic approximation of confidence intervals. The bias in the two-stage least squares (2SLS) estimator has been shown to converge towards the OLS bias when the correlation between the instrument and the endogenous variable is weak (see Stock, Wright and Yogo 2002 for a survey of the weak instrument literature). To illustrate the problem, write equation [2] below as the first-stage equation associated with the estimation of equation [1]:

$$[2] \quad \textit{Workers reviewed per capita}_{st} = \gamma \textit{Broadband}_{st} + \psi X_{st} + u_{st}.$$

OLS estimates of equation [1] are biased if the disturbance term in that equation is correlated with the growth in online solicitation activity. A weak but exogenous instrument is not sufficient to solve this problem because of the inherent bias of the IV estimator, which in expectation is equal to

$$[3] \quad E[\hat{\beta}_{2SLS} - \beta] = \frac{\sigma_{\epsilon u}}{\sigma_u^2} \left[\frac{1}{F+1} \right].$$

Equation 3 shows that as the first stage F-statistic gets smaller (i.e., as the instrument becomes weak), the bias of the 2SLS estimator converges to the biased OLS estimator. Stock and Yogo (2001) therefore recommend as a diagnostic test an F statistic larger than 10. But while this is a widely used standard for 2SLS estimators, this threshold is only appropriate in situations when the disturbance term is homoskedastic and i.i.d. Less is known of situations when the disturbance term is heteroskedastic and/or serially correlated within state/age cells, for instance. Nevertheless, we report robust F-statistics for all our 2SLS estimates.

Weak instruments also result in size distortions such that the estimator has a null distribution poorly approximated by a standard normal (Nelson and Startz 1990). As a result, conventional IV tests will have spuriously high null rejection rates, even in large samples. There are, however, several tests available for linear instrumental variable models that have the correct size even when instruments are weak (Finlay and Magnusson 2009). For just-identified models such as ours, the Anderson-Rubin test is optimal (Moreira 2009). Because of concerns regarding serial correlation, as well as the apparent presence of weak instruments (as defined by the F-statistic threshold of ten) for some of our results, we display both traditional t-statistics, as well as p-values from a chi-squared Anderson-Rubin (AR) test with all our 2SLS results.

In Table 5, we replicate the analyses we performed in the previous subsection, but instead of estimating equation [1] through correlation, we implement a two-stage least squares procedure, using broadband penetration as an instrument for per capita TER workers reviewed.

The results in Table 5 are qualitatively similar for all ages to our correlational findings in Table 3; however, in Table 5, we find a larger effect for ages 35-39 and 40-44, but a smaller effect for ages 30-34. For the 35-44 year olds, when we control for time-varying state covariates in panel B, the strength of the first stage increases by two to three fold over the fixed effects model, but the instruments are still weak according to traditional F tests. Both AR tests, however, indicate that the statistical significance of these results is robust to weak instruments.

The qualitative differences between the coefficients in Tables 3 and 5 may indicate that the omitted variables biases discussed earlier primarily act to lower the estimated relationship between online and offline activity among 35-44 year olds. Alternatively, it may be that the set of street transactions displaced by online prostitution, which is driven by the growth of broadband, are different in important ways from street transactions displaced by other exogenous variation in TER activity. For instance, it may be the case that the substitution between street and off-street prostitution caused by broadband penetration is focused among white sex workers and clients, since the increases in broadband penetration in the population have been focused among whites (Preiger and Hu, 2008).²⁷

Panel C in Table 5 displays results for a similar analysis, including all time-varying state controls, but excluding two high-density states with large urban street markets, New York and California. When New York and California are excluded, we find a sizeable overall displacement effect, and for each age group between 25-54 separately. This is our strongest evidence of large displacement effects.

We speculate that the stronger apparent displacement effects outside New York and California may be attributable to the fact that New York City, Los Angeles, and San Francisco have long had very active off-street prostitution markets, before the widespread adoption of Internet technology, such as through advertisements in newspapers and specialized publications.

Therefore, the rise in online solicitation may have had relatively little impact in these cities. In

²⁷ In unreported analysis, we estimated a multinomial logit model on the relative risk that a TER-reviewed worker was White. We found that a one standard deviation increase in the share of all households with broadband access was associated with a 46% increase in the probability that a worker was White relative to Black. These results are available from the authors upon request.

other locations, search costs for off-street prostitution were much higher absent the Internet, and markets were thin; the rise of sites that reduce these costs, such as TER, therefore may have had a much larger impact outside New York and California. However, in the absence of better evidence to substantiate this speculation, our best estimate is that displacement effects are only substantial among sex workers in their 30s and 40s, and that the rise in online solicitation has likely augmented the market in other age groups.

V. Risk Behaviors of Sex Workers who Solicit Online

In this section, we examine the business and sexual practices of workers who currently solicit online. Given the results in the previous section, showing important displacement effects for some age groups of sex workers, we are also able to specifically examine those who have previously worked in the outdoor sector, and thus may be close to the margin for displacement, and possibly most responsive to policies targeting the sector.

A. Survey methodology

Our analyses are derived from a survey of sex workers implemented by the authors between August, 2008 and June, 2009, known as the Survey of Adult Service Providers (SASP). Previous surveys have largely focused on street-based prostitutes, in part due to the lower cost of contacting workers who operate in public places. Sampling methods in such studies, therefore, frequently suffer from selection biases by focusing disproportionately on a high-risk group and extrapolating to the broader prostitution population. SASP represents the most comprehensive

sampling of indoor workers to date, and by correcting for the inverse probability of appearing in the survey, it is unique in the literature in its efforts to address selection bias.

Cunningham and Kendall (2009a) describe the survey procedure in more detail, but to summarize briefly, SASP was implemented by sending requests to all valid email addresses among TER-reviewed workers, supplemented with a sample of sex workers who advertise on a popular national site for escort ads, Eros.com. In the email, respondents were asked to click on a link that led them to the survey, hosted on Baylor University servers. Each email sent was associated with a randomly-generated string of characters, which allowed us to prevent multiple responses from the same email, while at the same time maintaining the anonymity of the survey, which we found to be a key factor driving participation.²⁸

In total, we attempted to contact 26,189 individuals to participate in SASP. 13,333 of these emails were successfully delivered to an address and did not “bounce back”. Some share of the accounts receiving these emails, although nominally open for incoming mail, are likely unused or rarely checked, especially since our population of TER-reviewed workers stretches back to 1998. Thus, 13,333 is likely an upper bound on the pool of potential respondents, and the “true” response rate is likely much higher as a result. Nevertheless, 685 respondents answered our request to take the survey, giving a lower bound response rate of 5.14%.

While this figure is low by traditional survey standards, we believe the survey results are of value, given the general difficulty previous research has faced in reaching this population, and

²⁸ Respondents were also allowed to answer survey questions by telephone with the authors or their research assistants.

the typical hesitancy among sex workers to answer questions related to work in illicit activity. In an attempt to make the survey as representative as possible, we adjust the responses for the most serious potential selection biases on the part of respondents, as described below. Nevertheless, the results must be interpreted with some care.

In order to facilitate extrapolations to the population of sex workers who solicit online, we adjusted SASP responses using probability weights constructed from the distribution of age and race characteristics of all TER-reviewed workers and SASP respondents. Specifically, we calculated the share of individuals reviewed on TER in each age-race category, and divided that share by the similarly-calculated share of SASP respondents in that same category. Thus for instance, there are 1,155 White workers between ages 31 and 35 reviewed on TER, which is 11% of all TER-reviewed workers. Likewise, there were 99 White SASP respondents aged 31-35, which is 15% of all SASP respondents. The inverse probability of appearing in our sample is therefore 0.72 ($= 0.11/0.15$) for Whites aged 31-35. This process allows us to present estimates of population means and linearized standard errors using these probability weights.

In order to gauge the reasonableness of our results using this methodology, we compared population-weighted means in SASP against those in a smaller survey by Church, et al. (2001). The latter survey involved interviews of 240 female prostitutes in the United Kingdom, including 125 indoor workers. In Table 6, we provide sample means for SASP and Church et al.'s indoor sample on four questions which roughly overlap between the surveys. For current age, age at first entry into prostitution, and experience, mean answers between the surveys are similar. Notably, however, SASP respondents report considerably lower risk levels for client violence.

Given the demographic similarities, this difference may suggest that SASP respondents are drawn from a pool of workers who take more care to screen out violent clients.²⁹

B. Business and sexual practices of online sex workers

The SASP data has two files – a worker-level file based on responses to questions about personal characteristics and general practices, and a transaction-level file with observations that vary across clients for a given worker. The latter is based on a sequence of questions asked in the survey regarding each respondent’s five most recent client-session transactions. Table 7 shows estimates of population means for key variables from each file, with linearized standard errors.

Based on the information in Table 7, we estimate that the typical sex worker who solicits for clients online sees 5.4 clients per week, and of these, 54.2% ($= 2.94/5.42$) are “regulars” – that is, repeat customers. By contrast, Levitt and Venkatesh’s (2007) analysis of streetwalking prostitutes in Chicago found a mean of 7.2 clients per week, with 47.4% of these being regulars.

We estimate that the typical technology-facilitated sex worker has been involved in the industry for around 5.5 years, and nearly 93% are “independents”, who do not operate under third-party management, such as by a pimp or agency. The latter result may partially reflect the greater difficulty we faced in receiving responses from those without their own advertised email address, including some workers in brothels or under pimp management; nevertheless, it appears that a very sizeable share of those who solicit online are independents. By contrast, studies of

²⁹ It is also the case that Church et al.’s study was performed before most of the rise in Internet solicitation; thus, new technologies may have vastly reduced the degree of violence perpetrated against indoor workers.

streetwalking prostitutes generally find between 40% - 80% work under pimp management (Giobbe, 1993, Norton-Hawk, 2004).

The mean body mass index (BMI) is 23.1 which falls into the range generally considered normal and healthy. 45% of those surveyed have private health insurance. However, 11% of online sex workers reported BMI values below 18.5, indicating underweight (by comparison, 2.6% of U.S. males and females aged 20-39 were underweight in the 2003-2006 National Health and Nutrition Examination Survey). Insofar as low BMI measurements are indicative of malnutrition associated with drug use and eating disorders, this suggests a relatively low frequency of such behaviors among online prostitutes, though the share is considerably higher than the national average.

Our survey results suggest that 13% of workers are married or cohabitating with a partner, 38% have children, and 41% are college graduates. We are unaware of any previous studies examining such questions among streetwalking prostitutes; however, these findings suggest that online workers are drawn from those with relatively traditional backgrounds and family situations, relative to the common perceptions of prostitutes in the street sector, and relative to the low quality-of-life suggested by the ethnographic literature on streetwalking (e.g., Rosen and Venkatesh, 2009).

We can also compare the age and race characteristics estimated for sex workers who solicit online, with those of arrested prostitutes, which we have shown above appear to be largely constituted of street-sector workers. Among online workers, the average age is 28.3, and 61%

are white, 11.1% are black, and 8.6% are Asian. Based on the FBI's NIBRS (2005), the average age of female prostitute offenders is 33.5 and 59.8% are white, 37.5% are black, and 2.1% are Asian. Online sex workers appear to be younger, and to include a smaller share of Black workers.

Turning to the transaction-level file, panel B in table 7 presents the population frequency of various risky sexual acts among transactions associated with sex workers who solicit online. Fellatio appears to be the most common sexual practice, with 50.4% of all transactions involving unprotected fellatio, and another 31.2% involving fellatio with a condom. Vaginal sex is common as well, and anal sex less frequent, but only 6.1% of all transactions involved unprotected vaginal or anal sex. By comparison, in Levitt and Venkatesh's (2007) survey of streetwalking prostitutes, oral and vaginal sex were much less common (45.8% and 17.2% of all transactions, respectively), while anal sex was more common (9.4%); however, they report 79.4% of all transactions were unprotected, with that share rising to nearly 97% in some subsamples. The results in Table 7 suggest a substantially lower degree of risk-taking among online sex workers.

Overall, we conclude from the means provided in Table 7 that sex workers who use the Internet to solicit for customers represent a population behaviorally and demographically different from street-based workers. They see lower volume of clients, more repeat clients, and engage in high-risk sexual activities less frequently. However, they do see multiple clients per week, and occasionally engage in unprotected penetrative sex; therefore, if as suggested above, the rise in

online solicitation represents augmentation of the market for prostitution, such behaviors are of concern.

C. Behaviors of Sex Workers on the Margin of Displacement

Given our earlier focus on displacement between outdoor and Internet-facilitated solicitation, we can also ask how these risk behaviors differ among those on the margin of displacement, and who might plausibly be most affected by policies focused on prostitution.³⁰ In particular, a series of questions in the survey listed under the heading of “Historical Experience Questions” asked about respondents’ employment history in sex work. Relevant for our analyses, we asked, “Have you ever solicited your customers from a public place, like a street, alley, highway, or parking lot?” We coded those who responded affirmatively to have had “street experience”. As indicated in Table 7, we estimate that 13% of the population of workers who currently solicit online have street experience.³¹

Table 8 correlates this street experience variable with several worker-level characteristics, including whether the worker saw any clients during the past week, the number of clients (broken out among “new” clients and “regulars”), total weekly earnings, whether the worker held a second (non-prostitution) job, and the worker’s insurance and Medicaid status. In addition to our usual set of controls, we include fixed effects for all unmeasured observables associated with

³⁰ Since our survey focuses on sex workers, we have little to say about the equally-important question regarding the behaviors of customers of prostitutes who are on the margin between buying street-based and online-based services.

³¹ Note that street experience only refers to workers who have ever solicited from a public location, like a street. There may be other workers who would have entered prostitution as a street worker, but due to technological change, entered indoors instead; thus, those with street experience in our survey are a subsample of those on the margin of displacement.

the worker's primary state of residence, and with the month in which the worker was surveyed; and all regressions are population-weighted using the procedure described above.

The results in the first column of Table 8 indicate that workers with street experience are not significantly different from others who solicit online in terms of the likelihood of working at all in a given week. However, columns 2 – 4, which are expressed as marginal effects derived from negative binomial count models, imply that former street workers see more clients in a week, including both more “new” clients and more “regulars”. It is largely this higher volume that accounts for the fact that these workers see 73.6% higher weekly earnings (conditional on working at all), as noted in column 5. Workers with street experience are also 42.2% less likely to hold a second job outside of sex work, and are 22.6% less likely to have private medical insurance, but no more or less likely to be enrolled in Medicaid.

Table 9 presents additional evidence on the behaviors of workers with street experience, using the transaction-level file to examine typical length of sessions and calculated hourly wages. The results in Table 9 suggest that sex workers near the margin of displacement provide shorter sessions (20.6% shorter in length, and 14.7% more likely to be less than the mode, 60 minutes). These findings are consistent with other studies (Lever and Dolnick, 2010) that find streetwalkers specializing in more transitory sexual encounters with strangers, when compared to indoor workers. The last column of Table 9 shows that, on average, sex workers with street experience see 3.8% lower hourly wages.³²

³² For women with sessions shorter than the modal 60-minute session, there is a 27.1% penalty (p -value of 0.038). We find no statistically significant penalty for sessions lasting 60 minutes or longer. One interpretation of these results is that street experience sorts into shorter sessions, involving less companionship and other non-sexual activity, and that these shorter sessions involve a sizeable wage

The findings in Tables 8 and 9 suggest that workers with street experience, who are potentially on the margin for displacement, tend to be associated with high volume activity, tend to be full-time sex workers, as opposed to “moonlighters”, and to face limitations in their ability to access medical resources.

Finally, in Table 10 we use transaction-level data to examine how the sexual practices of workers with street experience differ from other sex workers who solicit online. Each column presents the results of a regression in which the dependent variable is an indicator for whether a particular sex act occurred during a transaction. The first three columns indicate that those with street experience differ little with other sex workers who solicit online regarding the provision of, and condom usage during, fellatio. Columns 4 and 5, however, indicate that those with former street experience are 13.6% more likely to provide vaginal sex, and 4.7% more likely to provide anal sex in any given transaction. The last column in Table 10 indicates that these former street workers are 2.8% more likely to engage in some form of receptive vaginal or anal sex without a condom.³³ According to Varghese, et al (2001), for a heterosexual woman who has receptive vaginal sex without a condom with a partner of unknown HIV serostatus and an HIV prevalence of 1%, the risk of HIV transmission in a single sex act would be ten times higher than is associated with receptive fellatio without a condom.

penalty. It may be that these workers have high subjective time discount rates, leading them to specialize in low-cost high-volume service.

³³There are a small number of cases of unprotected anal sex, but not enough to estimate the effects of street experience on these separately from unprotected vaginal sex.

Overall, the results from the survey suggest that most sex workers who solicit online engage less frequently in high-risk sexual practices than has been found among street-level prostitutes. However, the segment of workers who are close to the margin of displacement between street and off-street activity engage in higher volume and higher risk behaviors, which more closely match those of street workers.

VI. Conclusion

We consider the main contribution of this paper to shed light on the poorly-understood industry of prostitution, and particularly on the modern, technology-facilitated segment, which has received very little empirical attention by researchers, but which has fomented significant concern and calls for changes in policing and public health measures. We have provided preliminary evidence on key parameters for policymakers, estimating the degree of displacement between new and old technologies for solicitation, and the frequency of risky behaviors among those who use new technologies.

A sunny perspective on the rise of online solicitation among prostitutes is that such activity largely displaces streetwalking, with its associated nuisance externalities and worker exploitation, and that the new market institutions associated with online activity incentivize reputation-building and screening, which reduce the risks and social externalities of prostitution. Our results suggest that, while there is some evidence for such effects, this perspective is likely too optimistic. In fact, it appears that, overall, online solicitation represents an augmentation of the prostitution market, with large displacement effects only among some age groups of sex workers. Moreover, while it is true that those who solicit online generally engage in less high-

risk behavior than those involved in street markets, they still offer a large quantity of transactional sex, and moreover, those sex workers who appear to have been displaced from the street sector mostly carry their risky behaviors with them into the off-street sector, potentially creating new disease vectors where few existed before. This potentially differentiates our findings from those of Gerler and Shah (2009), who find that displacement of sex workers from the outdoor to the indoor sector in Ecuador led to declines in STI incidence, although more research is needed to fully understand whether the growth in online sex work has had any effect on STI incidence and prevalence.

While we believe our evidence is based on the best available data, we recognize serious limitations in the scope of these data, and so we conclude with a call for more substantial data collection on business and sexual practices in this industry.

Appendix A:

To generate standardized drug prices and purity levels, we used similar method to those of Grossman and Chaloupka (1998), DeSimone (2001) and Dave (2008), who employ a two-stage least squares methodology which treats purity as endogenous. Purity may be endogenous because drug purchases may depend on expected purity instead of actual purity. First, we regressed the natural log of predicted purity of cocaine (heroin, methamphetamine) from a specific transaction (i) in a specific state (s) and in a specific year (t) onto all of the following factors: the natural log of the weight, state fixed effects, year fixed effects, and interactions between state and year fixed effects. We then regressed the natural log of cocaine (heroin, methamphetamine) prices onto the log predicted purity of cocaine (heroin, methamphetamine) obtained from the first stage, including as second-stage covariates the natural log of weight, state fixed effects, year fixed effects, and interactions between state and year fixed effects. This model explicitly treats purity as endogenous. Furthermore, we constrained the coefficients on log predicted purity and log weight be equal in order to identify the model. The price of one pure gram of cocaine (heroin, methamphetamine) is then given by $\exp(\beta_0 + \beta_{2s} + \beta_{3t} + \beta_{4st})$, where the coefficients are estimates obtained from the second stage regression and refer to the constant, the sum of all state fixed effects estimates, the sum of all year fixed effects, and the sum of all state-year interaction fixed effects. To impute methamphetamine prices, we used STRIDE data from years 1999 through 2006.

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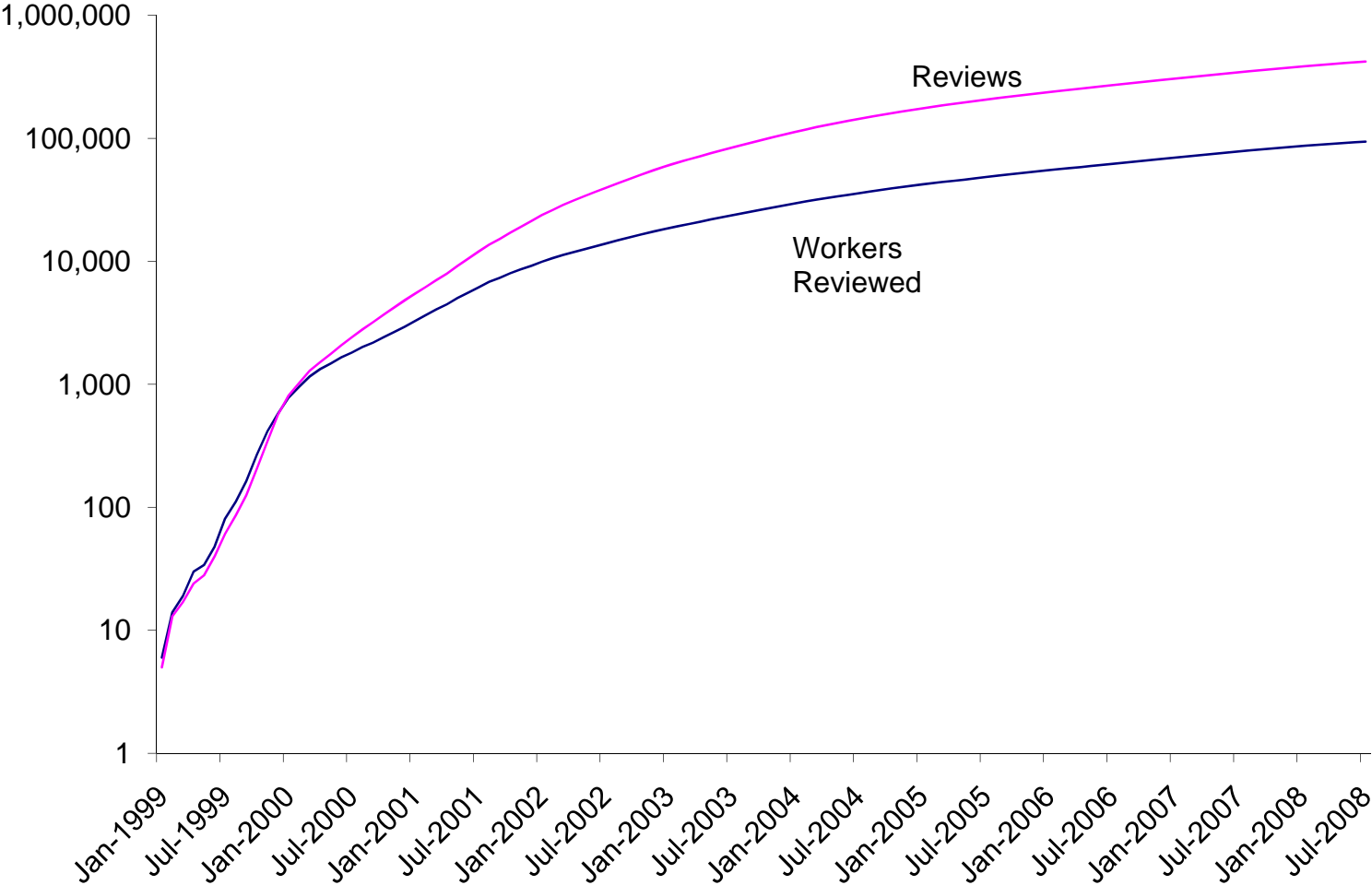
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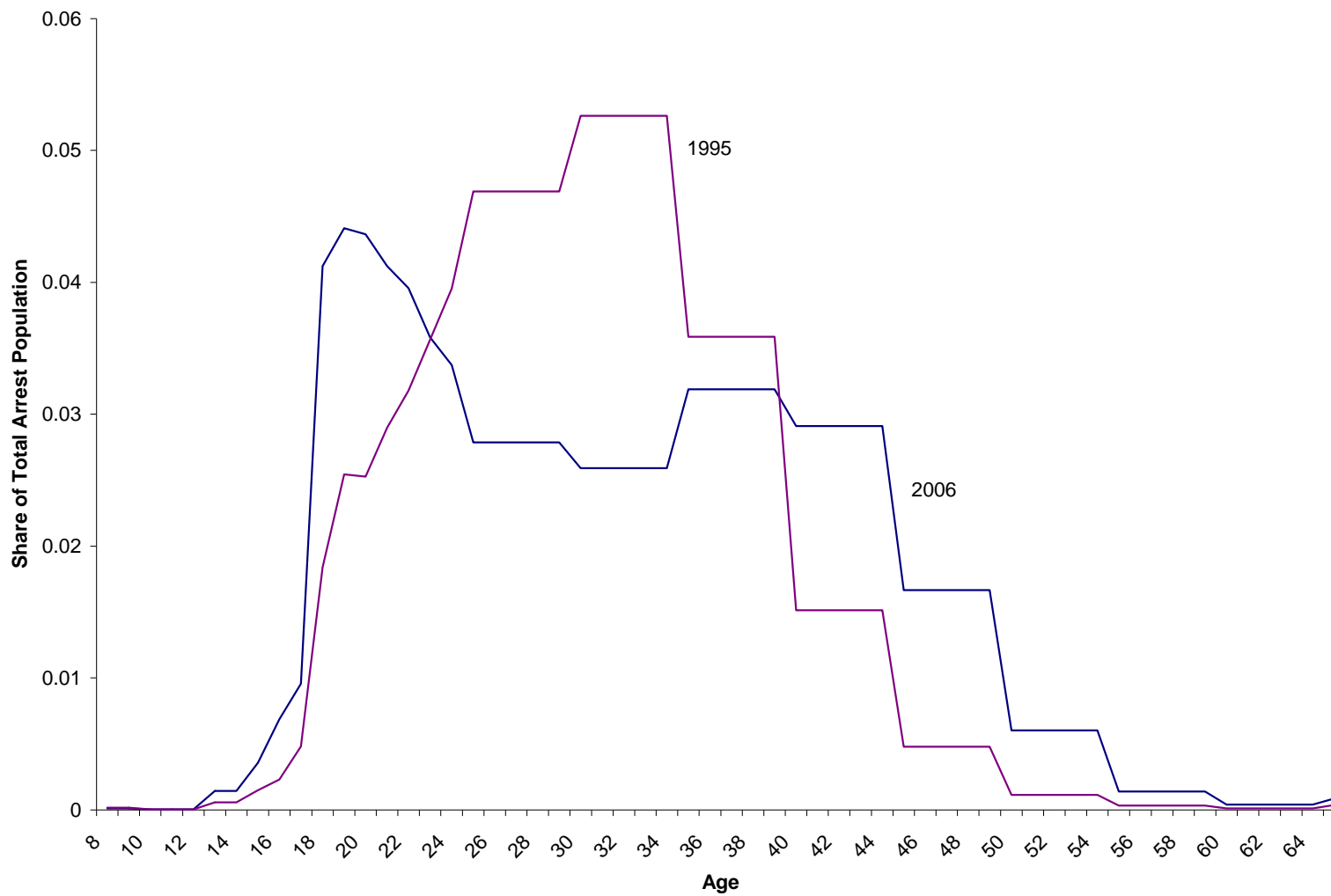
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Figure 1: Cumulative Number of New Sex Workers and Reviews Posted at TheEroticReview.com, 1999-2009



Notes: Vertical axis employs logarithmic scale.

Figure 2: Age Distribution of Female Prostitution Arrests, 1995 and 2006



Source: FBI *Crime in the United States*, various years.

Figure 3: Trends in Female Prostitution Arrests by Age Category, 1999-2006

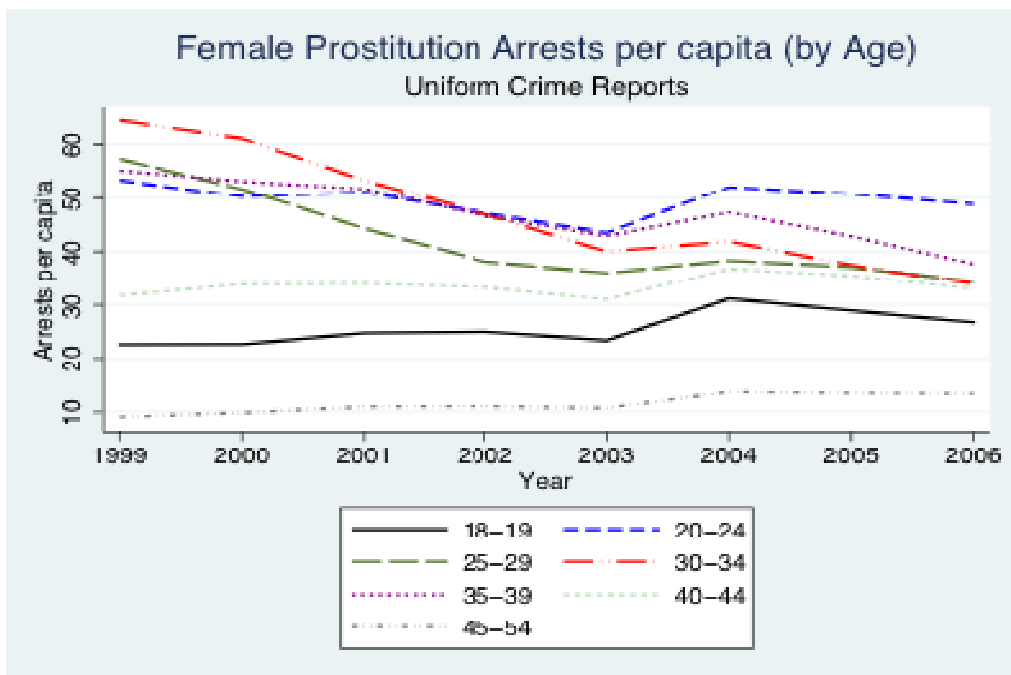


Figure 4: Trends in Share of US Households with Residential High-Speed Internet Access, 1999-2007

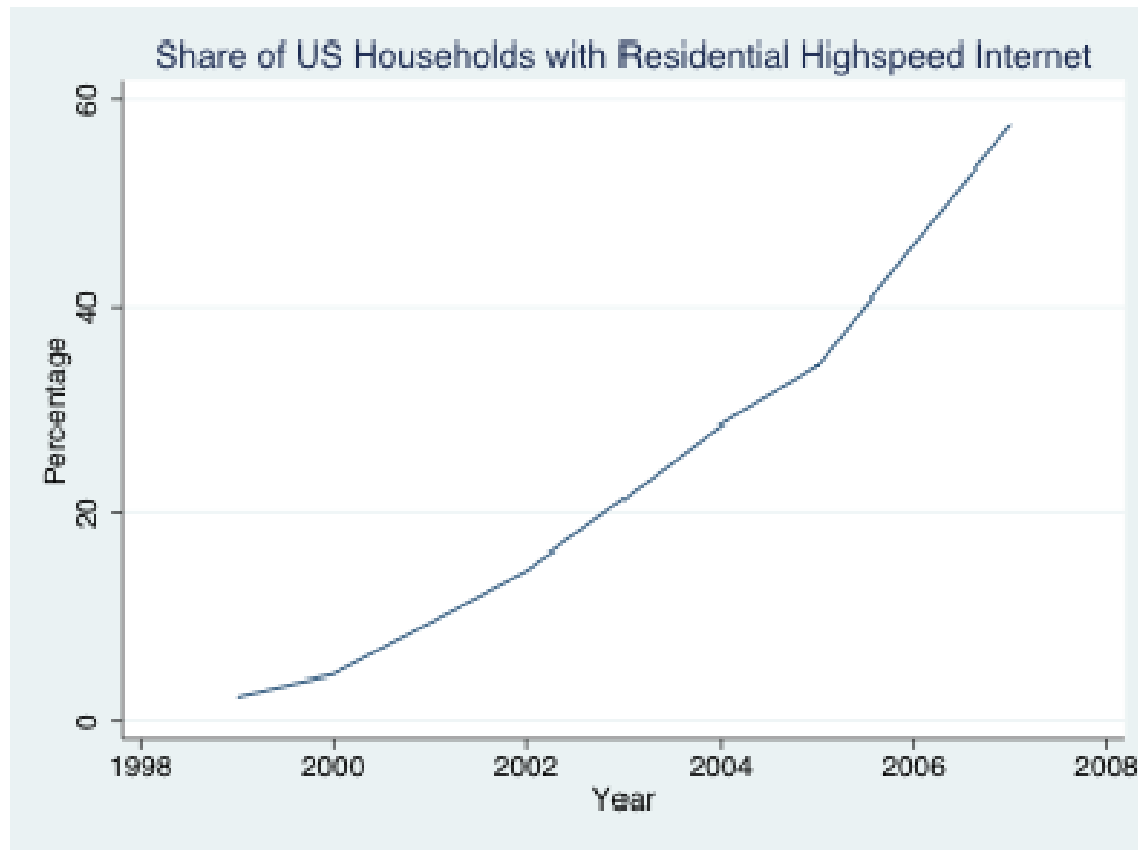


Table 1: Location of Law Enforcement-Recorded Prostitution Incidents, 2005

| Location Type | Share of Incidents |
|----------------------------|---------------------------|
| Highway/Road/Alley | 73.43% |
| Other/Unknown | 7.33% |
| Hotel/Motel/Etc. | 6.44% |
| Parking Lot/Garage | 4.69% |
| Residence/Home | 4.29% |
| Field/Woods | 0.67% |
| Commercial/Office Building | 0.56% |
| Bar/Nightclub | 0.45% |
| Convenience Store | 0.41% |
| Service/Gas Station | 0.33% |
| Specialty Store | 0.31% |
| Government/Public Building | 0.20% |
| Church/Synagogue/Temple | 0.17% |
| Jail/Prison | 0.14% |
| Grocery/Supermarket | 0.10% |
| Bank/Savings and Loan | 0.09% |
| School/College | 0.09% |
| Drug Store/Doctor's | |
| Office/Hostpital | 0.07% |
| Lake/Waterway | 0.06% |
| Air/Bus/Train Terminal | 0.05% |
| Department/Discount Store | 0.04% |
| Construction Site | 0.03% |
| Rental Storage Facility | 0.03% |
| Liquor Store | 0.02% |

Source: 2005 FBI National Incident-Based Reporting System (NIBRS).

Table 2: Summary Statistics for State-Level Displacement Analyses

| Variable | N | Mean | SD | Min | Max |
|--|----------|-------------|-----------|------------|------------|
| Female Prostitution Arrests per 100,000 (All Ages) | 152 | 42.039 | 61.529 | 1.222 | 351.940 |
| Female Prostitution Arrests per 100,000 (18-19) | 152 | 31.584 | 66.179 | 0.408 | 431.934 |
| Female Prostitution Arrests per 100,000 (20-24) | 152 | 73.187 | 161.947 | 2.001 | 979.677 |
| Female Prostitution Arrests per 100,000 (25-29) | 152 | 53.774 | 80.189 | 0.634 | 457.597 |
| Female Prostitution Arrests per 100,000 (30-34) | 152 | 56.487 | 64.715 | 0.840 | 427.225 |
| Female Prostitution Arrests per 100,000 (35-39) | 152 | 55.598 | 63.576 | 0.530 | 440.125 |
| Female Prostitution Arrests per 100,000 (40-44) | 152 | 39.351 | 46.529 | 0.236 | 286.138 |
| Female Prostitution Arrests per 100,000 (45-54) | 152 | 13.259 | 17.017 | 0.142 | 99.050 |
| Workers Reviewed per 100,000 (All Ages) | 152 | 12.126 | 16.445 | 0.000 | 102.139 |
| Workers Reviewed per 100,000 (18-19) | 152 | 7.219 | 10.086 | 0.000 | 69.403 |
| Workers Reviewed per 100,000 (20-24) | 152 | 34.574 | 45.473 | 0.000 | 275.664 |
| Workers Reviewed per 100,000 (25-29) | 152 | 26.240 | 33.979 | 0.000 | 196.841 |
| Workers Reviewed per 100,000 (30-34) | 152 | 15.198 | 21.533 | 0.000 | 127.190 |
| Workers Reviewed per 100,000 (35-39) | 152 | 8.491 | 16.403 | 0.000 | 107.824 |
| Workers Reviewed per 100,000 (40-44) | 152 | 3.766 | 5.555 | 0.000 | 27.459 |
| Workers Reviewed per 100,000 (45-54) | 152 | 1.250 | 1.914 | 0.000 | 9.034 |
| Percent of Homes with Residential Broadband Lines | 152 | 19.585 | 15.321 | 0.789 | 60.734 |
| Meth price (per pure gram) | 152 | \$673.19 | 447.66 | \$186.86 | \$2,979.30 |
| Meth Purity | 152 | 41.77 | 16.89 | 10.62 | 98.18 |
| Cocaine price (per pure gram) | 152 | 62.35 | 7.22 | 47.11 | 82.41 |
| Cocaine Purity | 152 | 62.35 | 7.22 | 47.11 | 82.41 |
| Heroin price (per pure gram) | 152 | \$484.61 | 200.74 | \$103.90 | \$1,677.29 |
| Heroin Purity | 152 | 42.20 | 11.72 | 18.74 | 73.06 |
| Police per 100,000 residents [t-1] | 152 | 352.87 | 339.635 | 20.50 | 4,376.51 |
| Prisoners per 100,000 residents [t-1] | 152 | 411.98 | 164.65 | 117.89 | 823.07 |
| Population Density (Land area / population) x 100 | 152 | 1.543 | 1.682 | 0.086 | 6.665 |
| Unemployment Rate | 152 | 5.026 | 1.075 | 2.5 | 8.2 |
| Poverty Rate | 152 | 11.981 | 3.051 | 5.7 | 20.3 |
| Personal Income per Capita | 152 | \$29,834.55 | 4,186.45 | \$22,143 | \$40,779 |

Notes: Data are based on 152 state-year observations. Methodology for calculating drug prices and purity described in Appendix A.

Table 3: OLS Estimates of Effect of Online Prostitution on Prostitution Arrests

Dependent Variable: Female prostitution arrests in specified age category

| Panel A: Fixed Effects Only | | | | | | | | |
|---|--------------------|-------------------|-------------------|---------------------|---------------------|---------------------|--------------------|-------------------|
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | -0.309* (0.128) | 1.523 (1.094) | 0.794 (0.533) | -0.253** (0.072) | -1.477** (0.473) | -1.784** (0.265) | -1.702* (0.654) | 0.172 (0.491) |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | 0.977 | 0.891 | 0.963 | 0.965 | 0.928 | 0.938 | 0.944 | 0.957 |
| Panel B: Fixed Effects and Time-Varying Covariates | | | | | | | | |
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | -0.218 (0.221) | 0.021 (0.54) | 0.421 (0.43) | -0.184 (0.13) | -0.712** (0.19) | -0.803** (0.23) | -0.382 (0.27) | 0.348 (0.62) |
| Meth purity | -0.139 (0.188) | -0.383 (0.407) | -0.586 (0.593) | -0.067 (0.276) | 0.117 (0.325) | -0.082 (0.350) | -0.137 (0.177) | -0.063 (0.048) |
| Meth price | -0.000 (0.002) | -0.009 (0.008) | -0.011 (0.011) | 0.003 (0.002) | 0.005 (0.004) | 0.005 (0.005) | 0.003 (0.003) | 0.001 (0.001) |
| Cocaine purity | -1.441 (2.819) | 3.147 (6.544) | 2.281 (9.440) | -2.732 (3.260) | -3.020 (3.762) | -2.980 (3.211) | -2.112 (1.746) | -0.722 (0.864) |
| Cocaine price | -0.071 (0.165) | 0.233 (0.284) | 0.164 (0.421) | -0.096 (0.207) | -0.183 (0.207) | -0.229 (0.174) | -0.168 (0.100) | -0.058 (0.043) |
| Heroin purity | -0.454 (0.391) | -0.065 (0.357) | -1.973 (1.539) | -0.726 (0.564) | 0.011 (0.349) | -0.306 (0.601) | -0.162 (0.235) | -0.164 (0.113) |

| | | | | | | | | |
|--------------------------------|--------------------|------------------------|------------------------|--------------------|----------------------|-----------------------|---------------------|---------------------|
| Heroin price | -0.006 (0.012) | 0.004 (0.014) | -0.053 (0.057) | -0.017 (0.019) | 0.008 (0.012) | 0.006 (0.013) | 0.001 (0.009) | 0.000 (0.004) |
| Ln(Police per capita) [t-1] | -0.002* (0.001) | -0.001 (0.001) | -0.001 (0.002) | -0.002 (0.002) | -0.006** (0.002) | -0.005** (0.001) | -0.003** (0.001) | -0.001** (0.000) |
| Ln(prisoners per capita) [t-1] | 0.057 (0.043) | -0.151 (0.100) | 0.052 (0.155) | 0.123+ (0.064) | 0.241* (0.105) | 0.186* (0.081) | 0.075 (0.051) | -0.005 (0.023) |
| Population density | 7.630 (12.405) | -133.585** (35.533) | -115.126** (39.231) | 10.010 (19.929) | 89.075** (18.003) | 100.963** (24.789) | 54.665** (7.010) | 6.954** (1.949) |
| Real Income | 0.001 (0.001) | 0.003 (0.004) | 0.005 (0.005) | 0.003 (0.003) | -0.002 (0.004) | -0.001 (0.002) | -0.003 (0.004) | -0.001 (0.001) |
| Unemployment Rate | -3.143 (3.910) | -6.185 (6.306) | -9.069 (12.048) | -2.801 (6.750) | 3.299 (3.982) | -3.563 (4.257) | -4.335 (3.293) | -1.381 (1.080) |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | 0.979 | 0.944 | 0.971 | 0.968 | 0.957 | 0.960 | 0.960 | 0.963 |

Notes: Standard errors in parentheses. + indicates significance at 10% level, * indicates significance at 5% level, and ** indicates significance at 1% level. All regressions based on 152 state-year observations.

Table 4: “Falsification” Test of Instrument Validity, Including Broadband Directly in Reduced Form Model
 Dependent Variable: Female prostitution arrests in specified age category

| Panel A: Fixed Effects Only | | | | | | | | |
|---|-------------------|-------------------|-------------------|--------------------|---------------------|---------------------|-------------------|--------------------|
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | 2.172* (0.981) | 1.612 (1.08) | 1.008+ (0.52) | -0.270** (0.07) | -1.501** (0.46) | -1.776** (0.28) | -1.608* (0.64) | 0.264 (0.50) |
| % Households with Broadband access | -1.773 (1.356) | -0.419 (1.000) | -3.256 (1.928) | 0.212 (0.538) | 0.250 (0.791) | -0.105 (0.511) | -0.281 (0.331) | -0.173 (0.134) |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | 0.927 | 0.892 | 0.965 | 0.965 | 0.928 | 0.938 | 0.945 | 0.958 |
| Panel B: Fixed Effects and Time-Varying Covariates | | | | | | | | |
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | 1.012 (0.764) | -0.016 (0.511) | 0.637 (0.532) | -0.182 (0.170) | -0.796** (0.185) | -0.719** (0.247) | -0.123 (0.252) | 0.517 (0.636) |
| % Households with Broadband access | -1.102 (1.096) | 0.171 (0.990) | -2.488 (2.265) | -0.023 (0.863) | 0.597 (0.605) | -0.661 (0.639) | -0.710 (0.424) | -0.327* (0.151) |
| Meth purity | -0.421 (0.390) | -0.395 (0.406) | -0.427 (0.539) | -0.067 (0.277) | 0.101 (0.316) | -0.040 (0.358) | -0.120 (0.163) | -0.046 (0.047) |
| Meth price | -0.005 (0.008) | -0.010 (0.008) | -0.005 (0.011) | 0.003 (0.003) | 0.004 (0.004) | 0.006 (0.005) | 0.005 (0.004) | 0.002 (0.001) |
| Cocaine purity | 4.612 (6.888) | 3.220 (6.485) | 2.398 (9.749) | -2.735 (3.341) | -2.805 (3.689) | -3.348 (3.325) | -2.410 (1.784) | -0.908 (0.884) |
| Cocaine price | 0.294 | 0.235 | 0.182 | -0.096 | -0.178 | -0.239 | -0.174+ | -0.062 |

| | | | | | | | | |
|--------------------------------|-----------------------|------------------------|----------------------|--------------------|----------------------|-----------------------|---------------------|---------------------|
| | (0.298) | (0.284) | (0.446) | (0.209) | (0.203) | (0.176) | (0.098) | (0.043) |
| Heroin purity | -0.343 (0.557) | -0.063 (0.354) | -2.187 (1.792) | -0.728 (0.592) | 0.074 (0.373) | -0.316 (0.605) | -0.198 (0.248) | -0.172 (0.114) |
| Heroin price | -0.007 (0.021) | 0.005 (0.014) | -0.061 (0.065) | -0.017 (0.019) | 0.010 (0.013) | 0.005 (0.013) | -0.000 (0.010) | -0.000 (0.005) |
| Ln(Police per capita) [t-1] | -0.001 (0.001) | -0.001 (0.002) | -0.001 (0.002) | -0.002 (0.002) | -0.006** (0.002) | -0.005** (0.001) | -0.003** (0.001) | -0.001** (0.000) |
| Ln(prisoners per capita) [t-1] | -0.107 (0.088) | -0.144 (0.090) | 0.008 (0.148) | 0.122 (0.082) | 0.264* (0.109) | 0.158+ (0.091) | 0.047 (0.061) | -0.020 (0.023) |
| Population density | -90.273** (29.645) | -134.724** (34.420) | -87.770+ (44.707) | 10.233 (24.684) | 83.542** (19.028) | 107.212** (27.606) | 59.338** (8.448) | 8.281** (1.915) |
| Real Income | 0.003 (0.003) | 0.002 (0.004) | 0.006 (0.006) | 0.003 (0.003) | -0.003 (0.004) | -0.000 (0.002) | -0.002 (0.003) | -0.000 (0.001) |
| Unemployment Rate | -6.961 (6.193) | -6.170 (6.341) | -10.135 (12.103) | -2.814 (6.985) | 3.658 (3.850) | -3.703 (4.321) | -4.320 (3.211) | -1.437 (1.003) |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | 0.949 | 0.944 | 0.971 | 0.968 | 0.958 | 0.960 | 0.962 | 0.965 |

Notes: Standard errors in parentheses. + indicates significance at 10% level, * indicates significance at 5% level, and ** indicates significance at 1% level. All regressions based on 152 state-year observations.

Table 5: 2SLS Estimates of Effect of Online Prostitution on Prostitution Arrests

Dependent Variable: Female prostitution arrests in specified age category

| Panel A: Fixed Effects Only | | | | | | | | |
|---|-------------------|------------------|------------------|-------------------|-------------------|---------------------|--------------------|-------------------|
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | -0.340 (0.280) | 1.163 (1.34) | 0.267 (0.45) | -0.193 (0.17) | -1.310+ (0.69) | -1.878** (0.41) | -2.302* (0.99) | -1.803 (1.36) |
| Anderson-Rubin p-value | 0.231 | 0.451 | 0.580 | 0.26 | 0.169 | 0.121 | 0.098 | 0.119 |
| First stage F-stat | 8.50 | 14.89 | 18.11 | 9.45 | 7.00 | 2.62 | 4.85 | 1.91 |
| Time-Varying Covariates? | No | No | No | No | No | No | No | No |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | | | | | | | | |
| Panel B: Fixed Effects and Time-Varying Covariates | | | | | | | | |
| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
| Reviewed Sex Workers per 100,000 | -0.358 (0.331) | 0.163 (0.908) | 0.000 (0.392) | -0.190 (0.214) | -0.394 (0.341) | -1.447** (0.546) | -2.133+ (1.137) | -3.527 (2.159) |
| Anderson-Rubin p-value | 0.266 | 0.860 | 0.999 | 0.386 | 0.300 | 0.028 | 0.030 | 0.012 |
| First stage F-stat | 24.86 | 24.40 | 43.6 | 21.79 | 20.13 | 7.12 | 7.06 | 4.60 |
| Time-Varying Covariates? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 152 | 152 | 152 | 152 | 152 | 152 | 152 | 152 |
| R-squared | | | | | | | | |

Panel C: Fixed Effects and Time-Varying Covariates, Excluding NY and CA

| | All Ages | 18-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-54 |
|-------------------------------------|--------------------|-------------------|-------------------|--------------------|--------------------|---------------------|--------------------|-------------------|
| Reviewed Sex Workers per 100,000 | -0.569* (0.289) | -0.408 (0.939) | -0.163 (0.374) | -0.321+ (0.174) | -0.584+ (0.338) | -1.536** (0.594) | -2.309+ (1.326) | -4.798 (3.196) |
| Anderson-Rubin p-value | 0.041 | 0.656 | 0.652 | 0.067 | 0.159 | 0.039 | 0.054 | 0.011 |
| First stage F-stat | 16.08 | 16.11 | 25.31 | 13.73 | 12.37 | 4.13 | 3.51 | 2.28 |
| Time-Varying Covariates? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 140 | 140 | 140 | 140 | 140 | 140 | 140 | 140 |

Notes: Standard errors in parentheses. + indicates significance at 10% level, * indicates significance at 5% level, and ** indicates significance at 1% level. All regressions based on 152 state-year observations.

Table 6: Comparison of Survey Variables in SASP and Church, et al. (2001)

| | Church et al (2001) | SASP (2008-09) |
|----------------------------------|----------------------------|-----------------------|
| Mean age | 28.4 | 28.3 |
| Mean age first paid for sex | 22.7 | 22.8 |
| Mean years in prostitution | 4.3 | 5.5 |
| Ever experienced client violence | 0.48 | 0.13 |

Table 7: Weighted Means of Key Characteristics and Practices among Sex Workers who Solicit on the Internet

| Variable | Mean | Linearized SD | N |
|---|-------------|----------------------|----------|
| Panel A: Worker-Level Characteristics | | | |
| Weekly Earnings | \$2,576.69 | 404.497 | 442 |
| Any Clients (0/1) | 0.760 | 0.028 | 630 |
| Total # Clients | 5.422 | 0.949 | 600 |
| # “Regular” Clients | 2.941 | 0.563 | 597 |
| # First-time Clients | 2.474 | 0.419 | 597 |
| Years since entry into prostitution | 5.457 | 0.256 | 601 |
| Have solicited on street | 0.130 | 0.022 | 602 |
| Independent/Own Boss | 0.926 | 0.019 | 603 |
| Have health insurance | 0.449 | 0.035 | 598 |
| Have second job | 0.429 | 0.035 | 599 |
| College graduate | 0.406 | 0.030 | 604 |
| Married/Cohabiting with partner | 0.128 | 0.018 | 605 |
| BMI | 23.096 | 0.386 | 591 |
| Age | 28.294 | 0.323 | 608 |
| Any children (0/1) | 0.377 | 0.036 | 604 |
| White race | 0.610 | 0.040 | 608 |
| Black race | 0.111 | 0.025 | 608 |
| Hispanic race | 0.121 | 0.043 | 608 |
| Asian race | 0.086 | 0.023 | 608 |
| Panel B: Transaction-Level Characteristics | | | |
| Compensation paid | \$486.51 | 22.925 | 2,416 |
| Length of session (mins) | 120.786 | 9.488 | 2,478 |
| Massage given | 0.367 | 0.017 | 2,487 |
| Fellatio with condom | 0.316 | 0.018 | 2,401 |
| Fellatio without condom | 0.508 | 0.018 | 2,401 |
| Vaginal sex with condom | 0.696 | 0.015 | 2,432 |
| Vaginal sex without condom | 0.052 | 0.009 | 2,432 |
| Anal sex with condom | 0.052 | 0.006 | 2,457 |
| Anal sex without condom | 0.011 | 0.003 | 2,457 |
| Group sex | 0.057 | 0.007 | 2,490 |
| Age of client | 43.033 | 0.408 | 2,369 |
| Client white race | 0.803 | 0.015 | 2,414 |
| Client black race | 0.052 | 0.007 | 2,414 |
| Client Hispanic race | 0.035 | 0.007 | 2,414 |
| Client Asian race | 0.073 | 0.012 | 2,414 |

Notes: Data are drawn from Survey of Adult Service Providers (SASP). Survey means and standard errors are weighted by population means within each age-race cell, taking all TER-reviewed workers as the population.

**Table 8: Estimated Differences between Online Sex Workers with Street Solicitation Experience and Others
Business and Insurance Practices**

| | Any Clients (0/1) | # Total Clients | # Regular Clients | # New Clients | Ln(weekly earnings) | Have Second Job (0/1) | Have Health Insurance (0/1) | Enrolled in Medicaid (0/1) |
|-----------------------------|-------------------------|--------------------|----------------------|--------------------|------------------------|-----------------------------|-----------------------------------|----------------------------------|
| Street Experience | -0.066 (0.091) | 4.315** (1.166) | 1.327** (0.594) | 1.620** (0.509) | 0.736** (0.206) | -0.422** (0.066) | -0.226* (0.093) | 0.043 (0.054) |
| Worker Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Client Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Sex Act Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State & Month Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs. | 513 | 401 | 398 | 398 | 395 | 521 | 513 | 446 |
| Model Specification | Probit | Neg. Binomial | Neg. Binomial | Neg. Binomial | OLS | Probit | Probit | Probit |

Notes: Regressions based on analysis of SASP worker-level data, with observations weighted to represent population of sex workers who solicit online. Probit and Negative Binomial coefficients are represented as marginal effects. Standard errors in parentheses. * indicates statistical significance at 5% level, while ** indicates significance at 1% level.

**Table 9: Estimated Differences between Online Sex Workers with Street Solicitation Experience and Others
Session Length and Calculated Hourly Wage**

| | Dependent Variable: | | |
|-----------------------------|---------------------|--|-------------------|
| | Ln(Length) | Indicator for Less than 60 Minutes | Ln(Wage) |
| Street Experience | -0.206* (0.09) | 0.147* (0.068) | -0.038 (0.079) |
| Worker Characteristics | Yes | Yes | Yes |
| Client Characteristics | Yes | Yes | Yes |
| Sex Act Controls | Yes | Yes | Yes |
| State & Month Fixed Effects | Yes | Yes | Yes |
| Obs. | 1649 | 1598 | 1649 |
| R-squared | 0.291 | 0.386 | 0.406 |

Notes: All regressions based on SASP transaction-level data, including most recent (up to) five sessions for 685 sex workers who solicit online.

Table 10: Estimated Differences between Online Sex Workers with Street Solicitation Experience and Others
Sexual Practices

| | No Oral Sex | Oral Sex w/Condom | Oral Sex w/o Condom | No Vaginal Sex | Vaginal Sex w/Condom | No Anal Sex | Anal Sex w/Condom | Vaginal or Anal Sex w/o Condom |
|-----------------------------|--------------------|--------------------------|----------------------------|-----------------------|-----------------------------|--------------------|--------------------------|---------------------------------------|
| Street Experience | -0.029 (0.04) | -0.004 (0.07) | 0.027 (0.09) | -0.136** (0.03) | 0.157** (0.05) | -0.047+ (0.03) | 0.001 (0.01) | 0.028* (0.02) |
| Worker Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Client Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Other Sex Act Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State & Month Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs. | 1792 | 1721 | 1790 | 1790 | 1785 | 1758 | 1745 | 1201 |
| R-squared | 0.296 | 0.218 | 0.219 | 0.272 | 0.263 | 0.224 | 0.194 | 0.493 |

Notes: Results based on analysis of SASP transaction-level data, including most recent (up to) five sessions for 685 sex workers who solicit online. Each column represents a regression in which the dependent variable is an indicator for whether the specified sex act took place during the session. Each model corrects for within-provider correlation in disturbances.