

“Prostitution 2.0: The Internet and the Call Girl” by Scott Cunningham¹
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Abstract The increased proliferation of Internet and other technologies has profoundly changed the market for prostitution in the United States. We argue that the Internet lowers client search costs through the expediency of the search technology, allowing clients to learn about prostitutes in an area (including making comparisons), and thus mirroring the function of the street market. The Internet also reduces the cost structure of the prostitution supply function by both reducing the fixed costs and the variable costs of producing commercial sex through its negative effect on the probability of detection and the probability of arrest. On the one hand, such reductions in the fixed costs of production suggest that the marginal escort may be shifting towards younger women for whom the opportunity cost of detection is higher or who are more risk averse. On the other hand, thin market externalities in niche markets are overcome with Internet technology, which predicts a wider variety of worker characteristics as thin market externalities are solved via the Internet.

We explore this conjecture empirically using a variety of data sources. First, we present evidence from a panel fixed effects model relating state-level prostitution arrests to the proportion of families in the state who have Internet access at home to show that Internet penetration predicts a decline in street prostitution. This negative correlation is robust to controls, but does not predict declines in other non-sex-related crimes. Second, we analyze 1998-2005 National Incident-Based Reporting System data (NIBRS). This data has to date not been used to learn about prostitution. We focus on both the cross-ORI and within-ORI changes in streetwalking offenses to learn more about the changes in jurisdictions happening to the kinds of women working in different locations. We present evidence showing that a majority of women caught by law enforcement are streetwalkers. Thirdly, we analyze data from an online clearinghouse called TheEroticReview to learn more about the change in the kinds of women working as prostitutes over time. And finally, we present data from a new dataset being fielded by the authors called the Survey for Adult Service Providers to analyze the characteristics of women currently concentrating their activities in the Internet-based, underground prostitution market. Policy implications are discussed.

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1 Introduction

Amber Carter is a 35-year old woman living in Columbus, Ohio; until Tuesday, February 10, 2009, she was employed as a fourth-grade teacher in the Bellefontaine City School District outside of Columbus. On that afternoon, she took a sick half-day and travelled to a nearby motel, where she intended to meet a man who had contacted her through an advertisement she had posted in the “erotic services” section of the popular internet portal, Craigslist. In actuality, her client was an undercover police officer, and Ms. Carter was arrested on misdemeanor prostitution charges³.

The story received news coverage throughout the country because Amber Carter is a middle-class Caucasian woman living in a suburban environment and working at a stable, good-paying job. The stereotypical prostitute is none of these things. The story makes for good copy because it begs the question: could your child’s teacher be doing this too?

In this paper, we answer that question with a “yes,” and we argue that new technology, especially the internet, has facilitated important changes in the market for prostitution which have caused shifts in the “typical” characteristics of sex workers - more women like Amber Carter, and fewer women resembling the traditional stereotype.

A large literature has found substantial effects of the internet on business practices and the characteristics of firms in equilibrium among a wide variety of industries⁴. There is no reason why markets in prohibited goods should be exempt from such effects, and in this paper, we analyze theoretically and empirically, the effects of the internet on the market for prostitution.

Our major findings are that the prevalence of the internet has changed the cost and nature of advertising, security services, and led to higher quality “matches” between prostitutes and their clients, as well as improved the ability of sex workers to hide their activities from law enforcement. We argue that the internet has led to a decline in prostitution

³See <http://news.cincinnati.com/article/20090211/NEWS0107/302110045>

⁴Ellison and Ellison (2005) provide a general survey of market effects from the web. As examples of the wide variety of industries affected by the internet, Brown and Goolsbee (2002) examine the insurance industry, Clay, Krishnan and Wolff (2001) examine online bookselling, Emre, Hortacsu and Syverson (2007) consider travel agencies, and Brynjolfsson, Hu and Simester (2007) use womens clothing as an example. An even larger number of articles focus on the effects of the internet on music, movies, and other media products.

arrest rates, reduced the prevalence of traditional “streetwalking” modes of advertisement, and allowed more women with good outside options - that is, having characteristics valued in the labor and marriage markets - to enter the prostitution market. We also find that, in this new world of technology-facilitated sex work, the returns to education among prostitutes are high, mirroring similar increases in the return to education in legal industries (Acemoglu, 2002).

Analysis of prostitution markets has suffered from low-quality data for researchers to study, even compared with other prohibited markets, such as those for illegal drugs. As Smith (2006) writes in a survey, “[i]n brief, the available studies are extremely limited in number and most are unrepresentative...” We consider one of the major contributions of our paper to be the highlighting and description of our distinct and useful datasets, three of which we believe we are the first to analyze substantively.

We first analyze the available law enforcement data: arrest data from the FBI’s Uniform Crime Reports (UCR), and detailed offender locational data from the National Incident-Based Reporting System (NIBRS). We find substantial changes over time in the number, characteristics, and location of arrestees, suggestive of the effects of the internet, but we also find that the vast majority of prostitutes who come into contact with law enforcement are those operating “off-line” - those employing the traditional streetwalking method of advertisement. Thus, we turn to two new datasets which focus specifically on sex workers who operate online. First, we analyze very detailed data on over 80,000 sex workers reviewed on a popular consumer review website operated by prostitute clients, TheEroticReview.com (TER). We also analyze data from the Survey for Adult Service Providers (SASP), a new survey of online sex workers we implemented beginning in 2008. These data allow us to better understand and track the changes in the number, characteristics, and business and sexual practices of this new, online segment of the industry which law enforcement data miss.

Besides providing details on a poorly-understood industry, our findings have important implications for public policy. Police efforts to enforce laws against prostitution must change in order to effectively combat the changed market. Moreover, on a more general level, our findings are relevant in determining the optimal degree to which such laws

should be enforced. The purpose behind prohibitions on prostitution include protection of exploited workers and reductions in public nuisance and other social externalities. To the extent that the internet changes the sophistication of workers and their business practices, improves client-prostitute matching, and moves advertising practices off the street, the optimal degree of enforcement may decline.

Section 2 describes the institutions associated with prostitution markets, and how technological advances are changing the market. Section 3 focuses on what can be learned about prostitution using law enforcement data from UCR and NIBRS. Section 4 describes and analyzes data from TER, and section 5 focuses on survey data from SASP. Section 6 concludes.

2 Theory and Background

2.1 Summary

Both street and indoor prostitution have long histories in the United States and other countries. In this section, we describe the basic market institutions associated with prostitution markets, and discuss how internet technology may have changed these institutions. Our analysis is informed by extensive perusal of the various data sources we describe in this paper, as well as previous literature. In addition, we undertook a number of ethnographic interviews of indoor sex workers as part of a new survey of sex workers (SASP, described in detail in section 5 below).

Our conclusions are that the internet is likely to lead to relative declines in the outdoor, or streetwalking, market segment, and relative growth in the off-street, or indoor, market segment. We also argue that the marginal indoor workers entering the market should have better outside options than those already in the industry, while those workers who remain in the outdoor market segment will be selected from among those with characteristics less valued in the legal employment and marriage markets, and those with fewer outside options. We also suggest that the internet should lead to an observed increase in the variance of indoor sex worker characteristics. Finally, we argue that the changes

wrought by the internet are likely to be more important in smaller niche subsegments of the prostitution market, which were previously plagued with “thin-market” problems. We conclude our theoretical analysis with a discussion of endogenous law enforcement responses to these changes.

2.2 Two Prostitution Business Models

The provision of prostitution services has always involved substantial costs, both pecuniary and non-pecuniary. No doubt this is why, in the General Social Survey, only about 2 percent of American women admit to having engaged in prostitution at any point in their lives (Smith, 2006), despite the very high wages typically available (see sections 4 and 5 for evidence on modern prostitute wages, and see Edlund and Korn (2002) for a review of complementary historical evidence). Offering sex for compensation, especially repeatedly, exposes the prostitute to a high probability of sexually transmitted infection (Philipson and Posner, 1993), and may lead to severe psychological and emotional harm (Brooks, 2006; Roberts, 2007). While the availability of birth control has reduced the likelihood of unwanted pregnancy, it has not fully eliminated it. Moreover, prostitutes face the potential for arrest and imprisonment, and a substantial risk of violence from customers and others (Brewer et al., 2006). If discovered by friends and family, prostitutes suffer social stigma and reduce social capital (Rasmusen, 1996; Giusta, Tommaso and Strom, 2008), including the lower marriage probability that Edlund and Korn (2002) identify as a crucial opportunity cost driving wages.

While many of these costs are unavoidable, regardless of the state of technology, the costs of advertising and security are particularly relevant to changes in the industry associated with the internet. Like all businesses, prostitutes advertise, although their efforts to do so are complicated by the fact that, to be useful, advertisements must attract customer attention, but not law enforcement. Moreover, because prostitutes engage in an illegal activity, they purposely attempt to avoid police, a practice that leaves them vulnerable to victimization by customers and others.

The industrial organization of the prostitution market can be usefully segmented into

two general models: “pimp/agency” and “independent” sex work, differentiated primarily by their approach to minimizing the costs of advertising and personal security ⁵.

Under the “agency/pimp” model, the prostitute delegates (at some cost) the advertisement and security aspects of the business to another individual, such as a pimp, a madam, a “driver”, or an agency owner. These individuals attempt to attract customers, facilitate payment, deter potentially violent customers, and avoid arrest. By contrast, under the “independent” model, the prostitute provides these services herself.

For independent streetwalkers, advertisement generally means physical presence on street corners, suggestive clothing, and eye contact with potential customers. A potential customer, who typically arrives by car, attracts the attention of the prostitute. The prostitute makes verbal contact with the customer, enters the car, and the two then seek an assignation location (which may be the car itself). Since open bargaining on the street is likely to attract unwanted attention from police, the initial contact between customer and prostitute typically is very brief.

This fact implies that streetwalkers face substantial difficulties in examining and screening potential clients, which in turn raises the likelihood of attracting violent customers or police officers⁶. This increases the relative value of the agency/pimp model to outdoor sex workers, as the pimp may screen clients more carefully without drawing excessive attention, and can deter violent clients through physical intimidation. While pimps themselves frequently are violent and exploitative towards the prostitutes they employ, some evidence suggests that the level of violence from pimps is lower than the violence prostitutes without pimps face from customers and police (Levitt and Venkatesh, 2007; Block, 2008).

Like streetwalkers, indoor sex workers may also operate either in an agency/pimp or independent business model. The category of indoor sex workers includes prostitutes who operate from massage parlors, hotel bars, and other locations, but here we focus on a large

⁵Reynolds (1986) constructs a detailed taxonomy of organizational structures within the 1980s, American commercial sex market that includes the brothel, the escort agency, the call girl, the bell captain’s list, the barroom escort, and others.

⁶Some screening does occur. Upon entry into a clients car, streetwalkers commonly request that the client touch them on the breast or thigh, a practice intended to screen out police officers, who may face regulations against sexual contact with prostitutes (Kuhns, 2008). This of course does not screen out violent clients.

and important class of indoor sex workers - escorts - since our data largely emphasizes this group.

In an escort agency, several prostitutes (commonly between three and ten) work for an agency manager, who generally performs all advertising (although prostitutes may bargain in joining an agency by offering a stable of client “regulars”). Before the internet, advertising traditionally took place in a variety of media, including the telephone directory, the sports section of a local newspaper, and the classified ads sections of “alternative” weekly newspapers.

Many agencies also screen clients to exclude law enforcement agents and potentially violent or non-compliant clients. A potential client who calls an agency may be required to offer proof of identification, including, for example, a drivers’ license number or work telephone number, before being allowed to meet an escort in person. Agencies also sometimes offer physical protection services, with drivers who accompany the escorts to the assignment site and are available on-call if the escort requires assistance. Agency managers may also provide payoffs to police or elements of organized crime to ensure the safety of workers.

These services come at a high price for prostitutes working in the agency model. While experienced escorts who join an agency may take home a larger portion of their earnings, it is common for many agency escorts to receive less than 50% of their fee. This suggests that self-provision of these services involves non-trivial costs to independent escorts.

2.3 Effects of the Internet

We argue that the rise of the internet, as well as other technological advances, has lowered the relative cost of advertisements and security for indoor sex workers, and so shifted the prostitution market towards indoor work (see Figure 2).

The internet facilitates advertisement by allowing prostitutes to set up, at low cost, their own websites where they may provide photos and information about rates and availability. These advertisements refer obliquely to prostitution, and explicit statements regarding rates for specific sexual services involve a substantial risk of police response.

Nevertheless, the amount of information that can be published is substantially higher than what is possible during a brief encounter on the street or in pre-internet media such as newspaper classifieds. While setting up and designing a website obviously requires some computer savvy on the part of the escort or agency manager, there are several services that provide web hosting specifically for escorts, and common templates that facilitate web design. In addition, there are a number of websites that offer classified advertisements for prostitution, including the “erotic services” section of Craigslist.org. While law enforcement agencies have attempted to crack down on some of these website⁷, enforcement against all such sites is obviously difficult.

The internet also facilitates client screening. Escorts can use search engines to locate information about potential clients, and to run background checks. In addition, the ease of communication on the internet allows escorts to screen clients through the use of references, by which an escort will only see a client if they can provide a reference to another escort with an internet presence. The escort can then find the referring escort’s contact information on the internet and confirm the potential client’s suitability. A number of companies (e.g., Room Service 2000) provide background checks for clients. A potential customer can pay a fee to one of these companies to have a background check run. Then, when the customer contacts an escort, he can provide access to his anonymized background check. This allows escorts to screen out clients with violent propensities and police officers, while clients avoid blackmail from sex workers. Finally, a number of escorts use the internet to communicate with potential clients for a time before meeting them in an attempt to ascertain the clients character and screen out those with suspicious tendencies or whose communications suggest a potential for violence. These factors have reduced the costs of screening for indoor sex workers, relative to outdoor workers and to indoor workers before the internet.

In addition to reducing the direct out-of-pocket costs of advertisement and screening, the internet has also improved client/prostitute matching technologies in the indoor market segment generally. While the brief encounter between prostitute and client generally

⁷On November 6, 2008, Craigslist announced that it would soon implement a fee-based advertisement policy with the intention of eliminating use of the site for prostitution. See <http://www.nytimes.com/2008/11/07/technology/internet/07craigslist.html>

associated with streetwalking leaves little opportunity for careful examination of characteristics and discussion of services, the internet allows for more considered matching. A number of websites offer customer reviews for escorts, in the same way as book reviews appear on Amazon.com or hotel reviews on tripadvisor.com. We describe in further detail the largest of these sites, TheEroticReview.com, in section 4. These sites allow clients to quickly access and compare detailed information on physical characteristics for a large number of prostitutes local to their area.

Some market participants suggest that this review process has led to better matching between clients and prostitutes, such that clients are able to find escorts who satisfy their unique preferences in ways not possible in an outdoor or streetwalking context. For example, one interviewee noted,

Provider: “I remember years ago, it was very common for people to say that they never kissed their clients. Kissing was considered taboo. But today, it is much more common to kiss clients on the mouth. Nowadays, it is much more common for prostitutes to admit to having orgasms with their clients, whereas such a thing seemed to me very rare from even ten years ago.”

We predict these changes in costs and market institutions have led to several distinct and important theoretical effects on the market for indoor sex workers. First, since some costs of advertisement and screening are fixed in nature, the decline in costs implies greater entry flows to the indoor market segment. This is best illustrated with another quote from a provider we interviewed in the course of this research.

Provider: [The Internet] makes everything easy. Everything is quick and fast and its just simple with it. You can get your name spread all over the place very quickly, for instance.

Interviewer: So if you didnt have the Internet you wouldnt have known exactly how to broadcast yourself to other people?

Provider: No, I would have probably thought if I would have chosen to do that, I would have had to go downtown, or something.

Interviewer: Would you have done that, do you think?

Provider: No.

Moreover, the characteristics of these marginal entrants are likely to differ from those of prostitutes who would have entered the market without the internet. Since the internet reduces the probability of arrest and detection, women with higher social status and better outside options in the legal labor market and marriage market, are more likely to enter the prostitution industry. The characteristics of women in the indoor prostitution segment should be changing to reflect this effect. In other words, the traditional barriers to entry identified by Edlund and Korn (2002) are falling in the face of new technology.

Second, since other costs of advertisement and screening are variable in nature, these effects imply a higher concentration of customers among women with the very highest quality characteristics broadly valued among customers a “superstar” effect, in the sense of Rosen (1981). Kendall and Tsui (2008) argue that, if the internet leads to a decline in variable costs in an industry, the marginal cost associated with serving additional customers falls, and the top vertically-differentiated sellers achieve greater market share. In addition, the decline in search costs associated with the internet, as discussed above, allows customers to carefully compare and consider competing escorts, and to select those with the most desirable characteristics. Again, this effect implies that the observed distribution of escort characteristics should change over time to reflect an increased presence of women with characteristics attractive in the employment and marriage markets.

The decline in search due to the internet is especially pronounced for customers with unusual or niche tastes, allowing them to find specific rare prostitute characteristics they desire. The internet thus thickens thin markets, and allows prostitutes with unusual characteristics to find enough clients to cover their average costs. Therefore, we also predict that the internet should lead to a wider variety of characteristics among the pool of indoor sex workers over time. For instance, while the previous discussion regarding declines in fixed and variable costs may imply a trend in the average escort towards younger, unmarried females, this market thickening effect implies increased variance in the ages of escorts, with more weight on both tails of the age distribution⁸.

⁸Similarly, Logan and Shah (2008) finds that the internet has created a highly developed online market

Our discussion so far has ignored the possibility of endogenous law enforcement reaction to the rise of the internet. In fact, however, the internet may have also affected law enforcement incentives to exert effort in arresting prostitutes, potentially affecting costs in the industry. However, if, as argued above, the internet increases the size of the indoor sex market relative to the streetwalking market, then police are likely to reduce efforts to arrest prostitutes, therefore reinforcing the effects we argue for above. This is so for two reasons.

First, indoor sex workers, particularly those employing the internet to advertise and screen clients, are more costly to arrest. Since, unlike streetwalkers, indoor workers meet clients outside of public venues, a much higher level of police resources are necessary for an arrest and successful prosecution. Generally, escorts are arrested through costly “sting” operations in which police pose as potential clients and attempt to induce the escort into solicitation. The lower costs of screening associated with the internet also makes it more difficult for police officers to pose as clients. Moreover, since escorts may operate in thousands of different locations within a city, a single successful sting operation can, at best, only lead to the arrest of a small number of escorts at a time, further increasing the costs to law enforcement of impacting the market⁹.

Second, law enforcement resources are typically severely limited, and governments divide these resources into fighting various crimes at least partially according to the demands of constituents. If the internet reduces street prostitution and redirects commerce to indoor workers, the prostitution market generally becomes less visible to those not directly involved in it. Thus, there is less public pressure on the government to allocate substantial police resources to arresting prostitutes.

3 Data and Methodology

Figure 1 shows that, nationally, prostitution arrests began a precipitous decline around 1996. Crime generally declined throughout the 1990s, and Levitt (2004) argues that the

for homosexual male prostitutes, relative to that for female prostitutes serving male customers.

⁹On the other hand, since the web and e-mail leave an electronic record of advertisements and discussions, prosecution of prostitutes who are caught may be facilitated by new technologies.

general decline began around 1991. The later timing of the decline in prostitution arrests suggests that factors besides those causing the general decline in crime may have affected the market for prostitution.

In this section, we examine law enforcement data to describe the on-street market for prostitution, and show how it changes during a period in which internet penetration is rising. We first supplement the admittedly circumstantial evidence in Figure 1 by examining the correlation between internet penetration and prostitution arrest rates at the state level. We find that higher state internet penetration predicts a decline in prostitution arrest rates, though we do not see a similar effect on property crime or drug-related arrest rates. While there are undoubtedly other factors that could explain this relationship, this evidence provides a *prima facie* case for the changes we describe in other datasets.

Next, we use the law enforcement data to examine the changes over time in the locations of prostitution offenses and the characteristics of prostitution offenders. We find that the vast majority of prostitutes who come into contact with police are street-based workers, although the percentage of offenses taking place on streets declines over time. Moreover, we show that the age distribution of arrested prostitutes changes substantially over time, with a higher average age and greater age variance, and that the fraction of street prostitutes who are black declines over time.

3.1 Internet Diffusion and Falling Prostitution Arrest Rates

Data on internet penetration is derived from the Current Population Surveys Internet and Computer Usage Supplement, which was implemented in 1998, 2000, 2001, and 2003¹⁰. The survey asked 50,000 households in each year, “Does anyone in this household connect to the internet from home? (yes or no)”. Since participants in the prostitution market are not a random selection of all households in a state, this variable may contain substantial measurement error, relative to an ideal measurement. Thus, standard errors may be

¹⁰We also examined data on broadband penetration over the 2000-2007 period and found very similar magnitude results as those presented in this section, with smaller standard errors, providing further evidence for the robustness of these findings. Since our theory focuses on the effects of the internet generally, and not broadband connections specifically, we report the results for overall internet penetration here. We thank Benjamin Edelman for sharing this data.

biased upwards in our findings.

Nationally, the percent of households reporting internet usage at home rose from 29 percent in 1998 to 60 percent in 2003. Moreover, the internet expanded much more quickly in some states than in others¹¹. For instance, between 1998 and 2003, the percent of households connecting to the internet more than doubled from 24 percent to over 64 percent in North Dakota; by contrast, in New Mexico internet usage only grew from 28 percent to 47 percent¹².

Arrest data is derived from the Federal Bureau of Investigations Uniform Crime Reports, which collect arrest data from individual police agencies on a wide variety of crimes. The level of arrests, of course, is due to variations not only in criminal activity, but also in police activity (see Levitt and Miles 2006, for further discussions of the limitations in FBI arrest data); nevertheless, these data are the only consistent law enforcement data on prostitution available for a broad range of subnational regions during this period. We divide arrests for each crime by the states population aged 15-49 to arrive at arrest rates.

Table 1 provides summary statistics on internet diffusion and arrest rates, plus several covariates we will employ in our analyses. Out of a potential 204 observations (50 states plus the District of Columbia, over four years), only 194 observations are available, due to non-reporting¹³. Moreover, since we employ a log-linear specification (see below), we lose five more observations for our prostitution arrest rate regressions due to zeros.

In the first two columns of Table 2, we estimate a relationship between internet activity and prostitution arrest rates of the following form:

$$\ln(\text{prostitution arrest rate})_{it} = \beta[\text{Internet usage}]_{it} + \alpha\mathbf{X}_{it} + \eta_i + \gamma_t + \epsilon_{it} \quad (1)$$

where i indexes U.S. states, t indexes years, \mathbf{X}_{it} is a vector of covariates, and η_i and γ_t represent state and year fixed effects, respectively. In column 1 of Table 2, no covariates are

¹¹Stevenson (2006) and Edelman (2009), both of whom use different datasets, also finds significant cross-state variation in the diffusion of the Internet and broadband growth rates.

¹²The reasons for differential growth rates are varied. Goolsbee (2000) finds that state sales taxes can explain much of the rise in Internet commerce, while the results of Goolsbee and Klenow (2002) suggest that peer effects are important in the diffusion of the Internet.

¹³Data is missing for the District of Columbia and Kansas in three years each, Wisconsin in two years, and Florida and Nevada in one year each.

included, while column 2 includes several standard controls for law enforcement activity and state economic characteristics.

The results of column 1 indicate that a 1 percentage point increase in a states internet penetration rate is associated with a 6.1 percent decline in prostitution arrest rates. Results in other columns may be interpreted similarly.

Of course, the results in columns 1 and 2 may be spurious, reflecting the effect of some other factor correlated with state internet diffusion. One test for such spurious correlation consists in asking whether internet diffusion also predicts declines in other crimes. Columns 3 - 6 in Table 2 perform such tests. Specifically, columns 3 and 4 show that the internet appears to have no significant correlation with property crimes, nor with drug crimes.

Therefore, to the extent that the correlation between internet access and prostitution arrests is due to an omitted variable, that variable must be specific to prostitution, and not have any general effects on crime. No doubt some such factors exist. For instance, Kendall (2007) suggests that the consumption of internet pornography may be a substitute for sexual violence. Pornography may also be a substitute for prostitution services. Therefore, these results cannot be considered entirely probative of the supply-side theories considered in Section 2. Nevertheless, the findings in Table 2 are consistent with such theories, and provide a basis for our analyses of datasets focused specifically on prostitution in this and following sections.

3.2 Street Prostitution Trends

The National Incident-Based Reporting System (NIBRS) has several notable advantages over the summary UCR. Summary UCR consists of monthly aggregate crime counts for eight Index crimes¹⁴. It records one offense per incident as determined by a “hierarchy rule,” which results in the suppression of counts of lesser offenses in multiple-offense

¹⁴In 1929, the FBI created the Uniform Crime Report (hereafter, UCR). It was, and still is today, a voluntary program that collects aggregate counts of various so-called “index” crimes - murders, assaults, rape, larceny, motor vehicle theft, and so on. The data has been widely used by criminologists and other social scientists who study crime extensively, but according to the FBI, “it pales next to the capabilities and potential of the National Incident-Based Reporting System (NIBRS)” (Rantala and Edwards, 2000).

incidents. NIBRS is different. First of all, NIBRS allows law enforcement agencies to record multiple offenses for a single criminal incident, as well as multiple offenders¹⁵. Since NIBRS data does not follow the hierarchy rule, lower ranked offenses are not suppressed when they occur in an incident with multiple offenses, as is common in prostitution incidents. Furthermore, information about the offender and the location of the incident are available in the NIBRS but unavailable in UCR.

The data in NIBRS contains numerous data segments from which the researcher can reconstruct a criminal incident. This data includes information on the offense itself, the offender(s), the victim(s), the property involved, and the arrestee(s). This analysis will primarily work with the offense and offender files. Because we are interested in the characteristics of the “marginal prostitute,” we merged the offense file with the offender file, assigning all offenses associated with a criminal incident to the offenders associated with that incident.

Because there is typically no obvious “victim” and no property damage of which to speak, NIBRS categorizes prostitution offenses as “crimes against society.” They define an action as prostitution if a person is attempting “to unlawfully engage or promote sexual activities for profit.” Personal communications with NIBRS personnel at the Department of Justice indicated that prostitution offenses are exclusively “supply-side” in nature, referring to prostitutes, and not clients of prostitutes. The two types of prostitution offenses are “Prostitution” and “Assisting or Promoting Prostitution” which are given the numerical values of 40A and 40B in the FBI’s crime coding system, respectively. Their definitions are:

- a. (40A) **Prostitution** - Definition: To unlawfully engage in sexual relations for profit. Note: This offense involves prostitution by both males and females.
- b. (40B) **Assisting or Promoting Prostitution** - Definition: To solicit

¹⁵Other differences abound. For instance, UCR does not distinguish between attempted and completed crimes, whereas NIBRS does. The Summary UCR applies the “hotel rule” only to burglary; the NIBRS extends it to include rental storage facilities, as well. The Summary UCR records rapes of females *only*. The NIBRS records rapes of both males and females. Summary UCR collects weapon information for murder, robbery and aggravated assault, whereas NIBRS collects weapon information for *all* violent offenses. And finally, UCR provides counts on arrests for the 8 Index crimes plus 21 additional offenses, and NIBRS provides details on arrests for both the 8 Index crimes plus 49 other offenses (Rantala and Edwards, 2000).

customers or transport persons for prostitution purposes; to own, manage, or operate a dwelling or other establishment for the purpose of providing a place where prostitution is performed; or to otherwise assist or promote prostitution¹⁶.

In 2005, there were 49% more female prostitutes than male prostitutes reported¹⁷. One of the key benefits of NIBRS is its detailed information about the specific offense, including at what kind of location the crime occurred. Analysis of the distribution of prostitution offenses across these locations shows that approximately three-fourths of all prostitution offenders were caught soliciting at what a highway, road or alley. We created a dichotomous variable indicating whether the offender was caught at what we consider broadly to be a “street”-like area. If an offender was caught soliciting prostitution (40A) at a transportation terminal, construction site, convenience store, grocery/supermarket, highway, road, alley, liquor store, parking lot, garage, or gas station, then that person is considered a “street prostitute.” We next plot the share of all 40A offenders from 1999-2005 for the limited 1999 ORIs we follow who were caught soliciting prostitution from a “street” by this definition. Figure 3 shows this trend. As can be seen, the percentage of all prostitutes soliciting from a street declined from a high of 84.5 in 1999 to 74.5 in 2003, before rising to 75.4 in 2005. Thus, while streetwalkers are still the majority of all 40A offenders in 2005, they fell about 10 percentage points from 1999.

Table 4 breaks down changes in the locational distribution of offenses by gender. In 1999, 87% of all male prostitutes were caught at a street location, but in 2005 that proportion had fallen seventeen points to 70%. At the same time, hotel offenders grew from only 3% in 1999 to over 15% in 2005. Thus not only does male prostitution fall over this period, but specifically the incidence of outdoor work falls relative to other categories. We do the same for females and find similar trends, though they are much more modest

¹⁶Conversations with the DOJ confirm that 40A offenders are what one typically considers as a prostitute, and 40B offenders are the management and others who are complicit in the prostitution offense, such as the Madame of a brothel, a pimp, the hotel owner who knowingly rents rooms for this purpose, etc. We thank Ramona Rantala at the Department of Justice for clarifying the nature of these offenses via email.

¹⁷A careful analysis of changes by city level reveals that most of the declines among male prostitutes occurred among cities in the 500,000-999,999 range and 25,000-49,000 range.

in magnitude.

Next we analyze the age and racial composition of prostitutes, again by gender, to help isolate what if anything is changing for more detailed demographics. Using data from UCR, which covers the entire United States, we compare the age distribution of prostitution arrests in 1995, a year just before mass-market introduction of the internet, and 2006. Figure 4 shows the age distribution in these two years for females and males separately. The mean age for females grows from 30.7 in 1995 to 32.18 in 2006, and the distribution appears to grow increasingly bimodal, with big declines in arrests among women ages 25-35. The mean age also grows for men from 33.64 in 1995 to 35.57 in 2006, and the variance of the distribution also grows, but to a much more moderate degree in comparison to the female age distribution¹⁸.

Figure 5 shows, for comparison, the age distributions in 1995 and 2006 for property crimes and drug crimes. Unlike prostitution, these age distributions do not change much over time.

These findings may imply that the Internet is selecting relatively higher quality women (prime age) to leave the streets for indoor sex work. To examine what kinds of people are more likely to be on the streets from 1999 to 2005, we used NIBRS data to estimate multivariate probits of the probability of being a streetwalker in each year.

$$\mathbf{y}_{g,r,o,p,t} = \alpha + \gamma_g + \rho_r + \omega_o + \phi_p + \tau_t + \epsilon \quad (2)$$

where \mathbf{y} is an individual offender's age, whether s/he had been cited for a drug offense as well as a prostitution offense, and whether s/he was caught working from a street location.

The control variables are a variety of fixed effects: γ_s is a gender fixed effect, ρ_r is a race dummy, ω_o is an ORI fixed effect, ϕ_p is a population category fixed effect and τ_t is a year fixed effect. The disturbance term is assumed to be uncorrelated with the regressors with expectation zero. We estimate this model separately for males and females. We estimate trends over time with the coefficients on the year effects. The results from this estimation are shown in Table 5. The τ_t coefficients are listed as years 2000-20005, with

¹⁸Age distributions in NIBRS show similar patterns, although as discussed above, NIBRS selects from a much smaller set of ORIs than UCR data.

the omitted category being 1999.

The first through third column have no population or ORI fixed effects; only population fixed effects and both ORI and population fixed effects, respectively. As we can see from columns 1 and 2, the likelihood of being a male or female prostitute was negative for most parameter estimates 2000-2005, though fewer are significant at conventional level. Column 3 includes ORI fixed effects, which eliminates any remaining statistical precision, and causes the sign of the 2004-2005 coefficients to become positive. For males, we see a similar pattern, though the third column's estimated 2005 effect is still negative. Notice that when we control for ORI fixed effects in the male prostitute regressions, the observed time trends become substantially more muted and less statistically significant.

The differences in the apparent time trends between column 2 and column 3 imply that much of the observed reduction in streetwalking over this period appears to be occurring across jurisdictions, with ORIs having large streetwalking offender populations seeing big declines in overall prostitution arrests. As total prostitution arrests fall in those jurisdictions, the proportion of that jurisdiction's offenders who are streetwalkers possibly remains roughly constant, but the level decline reduces the total fraction of offenders across all ORIs who are streetwalkers. In jurisdictions where streetwalking populations are large, the internet may shift the market towards off-street activities, causing public pressure on law enforcement to devote resources and effort at arresting prostitutes to fall. As police focus less on prostitution overall, the fraction of arrests that are streetwalkers in these ORIs may not change much, yet the aggregate fraction of arrests on the street across all cities will fall.

As Figure 2 shows, our theory predicts a migration away from streets by women with higher outside earnings and marriage market potential, and higher quality overall on the commercial sex market. To analyze this, we next focus on changes in the racial distribution of the streetwalking population, as measured by NIBRS, by estimating a multinomial logit equation on the probability of being a Black, Asian or of Unknown ethnicity, relative to the probability of being White. The coefficients from these models are transformed into relative risk ratios. We also control for the age of the offender, and whether a secondary drug/narcotic violation was reported by the attending officer. Table 6 shows that from

2000 to 2005, the coefficient on the Black outcome turned negative - there was a 35% lower chance of being Black relative to White in 2005 as there was in 1999. Asian female prostitution appears to have increased, on the other hand.

Why might we see a decline in Black streetwalking prostitution over the period of Internet diffusion? One possibility is that Blacks are concentrated among certain city neighborhoods and have traditionally been unable to access other markets outside these neighborhoods. As the internet arrives, this allows black prostitutes to move off the street and into indoor work in order to take advantage of an expanded market. This is a version of the “thin market” problem we believe the Internet is addressing.

Alternatively if labor market discrimination exists at escort agencies, then this might too limit the employment opportunities of black prostitutes in non-street markets. As a third possibility, some authors have suggested that White prostitutes include greater numbers of teenage runaways and drug users, who are less likely to be able to respond to new technology.

4 Data from an Online Escort Reviewing Website

4.1 Data Description

Section 3 showed that the vast majority of prostitutes who come into contact with police are outdoor, or street, workers. Declines in the fraction of offenders who are street workers, and changes in the average characteristics of offenders suggest changes in the market potentially caused by the internet; however, direct observation of prostitutes who advertise on the internet provide stronger evidence as to these changes. In this section, we analyze what we believe is the largest and most detailed data available on indoor sex workers who use the internet to meet customers. The data are drawn from a website known as TheEroticReview.com (“TER”), where clients share reports and reviews of escorts they have met. The general nature of the website is similar to other customer review websites, such as epinions.com or tripadvisor.com. TER was founded in 1998, and the number of escorts reviewed, as well as the overall number of reviews, has grown substantially over

the last decade as the use of the internet for advertisement by prostitutes has grown.

After meeting with an escort, a customer may fill out a very detailed form at TER, supplying information on physical characteristics, prices, and services offered. The client also rates the escorts appearance and performance on a ten-point scale. All escorts reviewed on TER must have an internet “presence” - either an advertisement on Craigslist or some similar site, or a personal website. The reviewing form demands an internet contact, including email if available, and a telephone number for the escort. Clients who submit two usable reviews in a month receive free access to other reviews (limited access to reviews is available to all users); alternatively, users may purchase access for a fee (as we did in order to collect the data).

While there exist other, similar, websites offering customer reviews on escorts, TER is by far the largest, with over 90,000 escorts (each of whom has received at least one review, and in some cases, hundreds of reviews) as of October, 2008, when we collected the data using a Perl script. Based on ethnographic interviews of escorts, TER reviews appear to be very important in establishing an escorts reputation, and escorts exert substantial effort to maintain positive reviews on the site¹⁹. In one early interview, a provider remarked that,

“A lot of girls use TER for the ratings. I have dozens of pages of reviews on there. It took me years to get those good ratings, and I make good money now because of it, but I had to work my butt off for them.”

The feedback from bad reviews to provider is rapid and largely results in decreased earnings due to a slowdown in business. Numerous providers remarked to us during phone interviews that due to the imbalance of power given to anonymous reviewers, the ratings can be used to harm providers, too. In a high profile and highly publicized case, Dave Elms (CEO and Founder of TheEroticReview.com) was arrested on weapons and narcotics violations. Secondary to these offenses, though, it was learned that Elms had been extracting sexual favors from prostitutes who used his board for advertising in exchange

¹⁹While it is possible that escorts could surreptitiously review themselves in order to improve their reputation, we have seen no evidence that this practice is common. Moreover, our results do not change when we focus on escorts with multiple reviews, who are less likely to suffer from this type of bias.

for removing damaging reviews from a prostitute’s history²⁰.

4.2 Changes Over Time in Unconditional Characteristic Means

TER reviews are also extraordinarily detailed. The reviewer form requests categorical descriptions of four distinct variables related to breast appearance alone²¹. Table 7 displays mean variables by year for only a few of the available variables, focusing on those we deemed most relevant for our theory. Each row represents an indicator variable taking a value of 1 if that row’s characteristic holds for a particular escort, and zero otherwise. Each column represents the year an escort is first reviewed on TER. Thus, for instance, Table 8 indicates that 5% of escorts who were first reviewed in 1999 were between the ages of 18 and 20 (or at least, appeared to be in that category to the clients who reviewed them); this percentage grows to 13% by 2008.

While we will later use regression analysis to examine changes over time in individual escort characteristics, holding constant other characteristics, Table 7 shows, in a simple way, the basic changes in characteristics over time.

As noted above, the age distribution in Table 8 suggests an increase in the proportion of internet-advertising escorts in the 18-25 age range, and a relative decline in older age groups. The five rows following the age variables indicate business practices. Specifically, the fraction of escorts classified as “independent” (not working with an agency or pimp) declines from 1999 to 2004, then increases afterwards. The fraction of escorts who answer their own telephone line (as opposed to taking appointments through an agency manager or someone else) increases steadily throughout the period. Both the fraction of escorts who offer exclusively incall appointments (the escort provides the assignment location), and who offer exclusively outcall appointments (the client provides the assignment location) have declined, relative to escorts who offer both (possibly at different fees).

The next six rows in Table 7 display the race distribution. The fraction of escorts who are black grows over time, while there are modest declines in other races, including

²⁰See <http://www.nytimes.com/2008/06/17/us/17erotic.html>.

²¹These are: cup size (e.g., C), bra size (e.g., 36), overall appearance, and whether implants appear to have been used.

“foreign” races, which include primarily escorts born in European countries²².

Following the race variables is the distribution of breast cup sizes, categorized into sizes A, B, C, and D (or larger), plus a variable for whether the escort has implants. Again, these variables represent reviewers possibly subjective impressions of these characteristics, and so are likely measured with some error²³. The means in Table 8 show that the fraction of women with A, B, and C cups increases over time, while the fraction with D cup size and breast implants decreases. Overall, the data suggest a trend towards smaller, more realistic-appearing breasts among indoor sex workers.

The next set of variables focuses on the actual service provided by the escort. While some escorts offer different services (possibly for different prices), the variables in Table 7 focus on the first-listed and most important service for each escort. Escorts offering escort services generally include oral and vaginal sex, but not anal sex. The “escort/anal” category includes anal sex specifically, although oral and vaginal sex are not uncommon in addition. “Sensual massage” typically includes massage, partially or fully nude, and manual stimulation, while “Massage/Fellatio” generally also includes oral sex. “Tantra” and “BDSM” services focus on various spiritualized sexual practices and bondage experiences, respectively. The data in Table 7 shows a substantial decline in the number of sex workers offering massage services, and a similarly sized increase in the number of workers who offer escort and anal services. In general, Table 7 suggests a move towards riskier sexual practices over time among TER escorts.

The final row in the “Type” section shows that a small and variable fraction of escorts reviewed on the site are transsexuals, including both cross-dressing men and post-operation transgendered women. The next grouping in Table 7 shows the distribution of body types, as characterized by reviewers (the categories shown are the options reviewers must select among). The data suggest only mild trends in the distribution of body types. The final grouping of variables in Table 8 displays the average reviewer rating of escorts, on a ten-point scale, along two dimensions, overall appearance and overall performance.

²²The vast majority of TER-reviewed escorts are located within the United States, but a small number work elsewhere, with Canada, Mexico, and Europe the most frequent non-U.S. locations.

²³This is the reason we focus on breast cup size, as opposed to bra size, which is more difficult to judge without a tape measure.

The data suggest improving trends along both dimensions.

Overall, the simple results in Table 7 suggest growth over time in the fraction of internet-based escorts who are (a) under age 25, (b) provide both incall and outcall services, (c) black, (d), have smaller breasts without implants, (e) offer riskier sexual practices, and (f) are more physically attractive and offer a better experience to clients.

These changes are generally consistent with the theory developed in section 2 and the law enforcement data in section 3. Our theory suggested that, as the internet grows, the marginal entrant into the prostitution market should have characteristics more highly valued in the employment and marriage markets. The fact that women reviewed on TER in later years are younger, have more realistic breasts, and are more physically attractive is consistent with this theory. Our theory also suggested that the rise of the internet may have led to better matching between prostitutes and clients, as well as higher levels of customer satisfaction, implications which are reflected in the fact that marginal entrants reviewed on TER appear to offer riskier sexual practices, better experiences, and more location options for assignation. Finally, the fact that women reviewed in later years on TER are more likely to be black may imply that the internet had an especially large impact on black escorts, who were enabled to expand their range of potential customers to white clients through the internet. Moreover, recall that NIBRS data showed a decline in the fraction of street prostitutes who were black over this time period. Some of these women may have substituted away from the street and towards indoor work.

The trends in individual characteristics are suggestive of increasing average “quality” among indoor sex workers. Similar evidence comes from the trend in average escort wages. The average price per hour across all services and all years in our data rose from \$273 in 1998 (on average, inflation-adjusted) and by 2008 was \$348, an increase of 27% over the 10 year period. Figure 7 shows how that average wage has changed over the years of the sample, controlling only for the type of service (i.e., escort, massage, etc.) and the city-region where the escort operates. While the year-to-year changes in average prices are not large, the trend over time between 2001 and 2008 is unambiguously towards higher real wages. By 2008, real wages have increased by \$50 per hour relative to what they were in 2001, on average. This again suggests that marginal entrants into the industry either have

higher opportunity costs or offer characteristics and services particularly highly valued by prostitution customers (or both).

4.2.1 Regression Analyses of Changes over Time in Conditional Characteristic Means

While the apparent changes in characteristics evident in Table 7 are suggestive, it is not obvious from that Table that they represent independent changes. For instance, the apparent decline in breast cup size may simply be due to the decline in the prevalence of implants, since implants generally make breasts larger. Alternatively, it could be that the distribution of escort characteristics varies across cities, and TER may have become relatively more popular in certain cities over time. Tables 8-9 display regression analyses with year dummy variables to show trends over time in the particular characteristics displayed in Table 7, holding constant other characteristics, thus providing a test for whether the results apparent in Table 7 are independent of each other, and hold within particular cities. In general, the results support the findings in Table 7.

Table 8 presents multinomial logit coefficients for each age category, regressed on year dummy variables to show trends over time, and other relevant escort characteristics. Also included in this regression (but not displayed) are city fixed effects, and controls for the body type categories displayed in Table 6 (e.g., “thin,” “athletic,” and so on), the escorts height, and dummy variables for whether the escort answers his/her own telephone and is a transsexual/transgender (as discussed in Table 6). The inclusion of city fixed effects is particularly important, since it shows that the evident time trends are not being driven by variation in the rate of growth in TERs popularity across cities with different average escort characteristics. Standard errors are clustered at the city level, as well.

The coefficients in Table 8 are relative risk ratios, not marginal effects (as is common in least squares regressions), and each column in Table 8 shows these risk ratios for the relative probability displayed at the top of the column. For instance, the 0.908 coefficient in the first column for the year 2000 dummy variable should be interpreted to mean that, in the year 2000, an escort is 9.2% ($= 1 - 0.908$) less likely to be in the 18-20-year old category, relative to the 31-35-year category (the comparison age group), holding constant

other characteristics. Similarly, the 1.661 coefficient in the first column for the year 2001 dummy variable implies that an escort is 66.1% more likely to be in the 18-20-year olds category, relative to the 31-35-year old category in the year 2001 (again, controlling for other characteristics).

Thus, the results of the regression in Table 8 confirm the findings in Table 7 that, over time, the age distribution of escorts moves towards the 18-25 year old groups (relative to the 31-35 year old group). In addition, unlike Table 9, Table 8 shows that there is also some (mild) growth among women older than 35. These findings are consistent with the theory in section 2, which implied lower average ages, but also greater variance in ages, among indoor sex workers, as previously-thin markets for older escorts thicken to allow more older workers to find enough clients to cover their average costs.

Some of the coefficients on the covariates are also of interest. For instance, in Table 8, note that the coefficient on the “independent” dummy variable rises substantially between the 18-20 column and the 46+ column, suggesting that older escorts are more likely to operate independently of a pimp or agency. This may be because younger escorts lack the client base and human capital to operate their own business, and must rely on an agency to provide advertising and security services.

Table 9 displays the similar multinomial logit regression results for breast cup size, with D cups as the comparison group. As in Table 7, there appears to be a trend towards smaller breast cup sizes over time, as the increasing coefficients on the year dummy variables in the first column of Table 8 suggest. In comparison with Table 7, Table 9 shows that this trend is not simply due to changes in the prevalence implants, the racial distribution, or other factors. Similarly, Table 10 shows (in a probit specification) that the apparent decline over time in the prevalence of breast implants visible in Table 7 also holds when other characteristics and city effects are held constant. Thus, the trend among escorts who advertise on the internet is towards both smaller breasts, and fewer breast implants.

Table 11 confirms, through least squares regression, the apparent trend in Table 7 towards higher average appearance ratings over time, controlling for other characteristics. However, the conditional trend in performance scores is less clear in Table 11 than it

appeared to be in Table 9²⁴. Table 12 again employs a multinomial logit specification to examine the trends over time in the racial distribution of TER-reviewed escorts, controlling for other characteristics. As in the simple means from Table 9, Table 12 shows an increasing prevalence of black escorts. Table 12 also shows upward trends in Hispanic and Asian escorts, suggesting an overall trend towards more minority representation among the pool of otherwise similar escorts. Again, this finding is consistent with the theory in section 2, which suggested increasing variance in the characteristics of indoor sex workers.

Table 13 performs a multinomial logit examining the relative prevalence of various body type categories. As in Table 7, however, the regression in Table 13 shows no clear trends in these categories over time, except perhaps a mild relative increase in the “muscular” body type, relative to “average” body type. Table 13 performs a multinomial logit examining the relative prevalence of various escort services, relative to the most common service, “escort,” which typically includes oral and vaginal sex, but not anal sex. As in Table 7, the data suggest that, controlling for other characteristics, there is a trend towards riskier sexual behaviors, with a rise in the conditional prevalence of anal sex and a decline in the conditional prevalence of massage services.

4.2.2 Summary

The evidence in this section suggests important and significant changes in the characteristics of marginal entrants to the indoor prostitution market segment during the last decade. In general, the typical escort today has characteristics indicative of better outside options in the labor and marriage markets than escorts entering the industry a decade ago. Our analysis shows that, even comparing escorts with similar other characteristics in common, time trends reveal escorts who are younger, more attractive, offer better customer service, and have breasts sized more similar to those of non-prostitute women in later years. In addition, the evidence suggests greater variance over time in the distribution of age and race among indoor sex workers, a trend which is consistent with the ability of the inter-

²⁴The coefficients on the age category variables in Table 11 also imply that younger women receive higher average appearance scores, as one might guess, but that older women receive higher performance scores. This may either be due to learning-by-doing, or a selection effect by which only the most talented women are able to maintain market share in the industry as they age.

net to improve the quality of prostitute-client matches, particularly among niche market segments.

4.3 Survey for Adult Service Providers (SASP) Analysis

In July of 2008, we began planning to survey the providers whose contact information we had collected from the Erotic Review as well as providers who advertise at Eros.org. In preparing the survey, we interviewed a number of clients of prostitutes who post to various websites, as well as spoke extensively to providers. We were persuaded that a successful convenience sampling of the providers from TER would need to use a combination of Internet-based contacts as well as telephone calls to providers.

For a template, we used a modified retrospective panel similar to Gertler, Shah and Bertozzi (2005). Towards the end of our survey, we asked detailed question about the client session, which was then repeated four more times for the last five clients the provider had seen. In addition to these health variables, we also collected information on business practices and providers' labor market experience and background.

The survey was written and posted onto University servers in August of 2008. The approximately 90,000 providers from our TER data base were then grouped by city, which we would then use to systematically contact as many as we can. Because our TER data dates back to 1998, many emails went undelivered, and as such we have not yet constructed an accurate estimate of the study's response rate. Typically, providers are sent an introductory email explaining the purpose of the study and requesting their participation. A Frequently Asked Questions (FAQ) document was stored on the authors' website²⁵, which recipients were encouraged to read. As of February 13, 2009, we have contacted roughly half our sample, and received so far approximately 350 responses.

We wrote the survey in order to collect labor market information not available from the TER records, such as the respondents' marital status, educational background, insurance status, experience as a provider, family background (including birth order in own family and number of children), whether the provider had a second job, and the provider's height

²⁵http://business.baylor.edu/Scott_Cunningham/SASP_files/faq.pdf

and weight which we use to estimate each respondent’s body mass index (BMI). We also, as mentioned, modeled a section of the survey off of the Gertler, Shah and Bertozzi (2005) survey, wherein we asked detailed questions about the last five clients a provider had seen. In the next analysis, we present preliminary results from the analysis of this data in both its cross-sectional form, as well as its retrospective panel form.

In our data, we collect information on earnings in two forms. We ask providers how much they earned in compensation (including tips) over the last seven days, and we ask providers how much a client paid them (including tips) in a single session. Figure 5 shows the distribution of the client-based wage data²⁶. As can be seen, the mean is \$334.67, which is slightly higher than the mode. On average, providers in our sample earn \$300-400 per hour, though as the reader can see, there are outliers who earn much more.

There is arguably no other worker whose physical appearance affects their earning potential more than that of a prostitute, which was why we asked respondents to provide their height in feet and inches, as well as their weight. Using this information, we constructed a simple measure of each respondents’ body mass index (BMI) equal to:

$$BMI = \frac{weight \times 703}{height^2} \quad (3)$$

Next we drew the distribution of SASP BMI (Figure 9). Normal BMI for women is between 19.1- 25.8, so the mean BMI score of 23.97 suggests the average prostitute in our sample is “normal” by these standards. But, as can be seen from the figure, the mean is several points higher than the mode due to a long right tail. Three women in our sample had BMIs>50. For instance, one respondent stated that she weighed 360 pounds and was 5’7” tall, giving her a BMI of 54.73²⁷. The median prostitute in our sample has a BMI of 22.31, which is closer to the peak bin shown in Figure 9. Even at the 25th and 75th percentile, our sample has a BMI that is still within the “normal range”²⁸. The overall picture we see from this data is of a distribution of individuals whose body mass is tightly clustered in a short range of the BMI “normal” measurement.

²⁶Because the distribution has a long right tail, we drop all observations with a wage greater than \$2,500, in order that the basic shape of the wage distribution can be displayed clearly on the histogram.

²⁷ $\frac{360 \times 703}{68^2} = 54.73183$

²⁸The 25th percentile in the BMI distribution is 20.52 and the 75th percentile is 25.79.

Figure 10 shows the distribution of children across our sample. Approximately half the same reportedly did not have any children, condition on having any children, over 20% reported one child.

Analysis of NIBRS and UCR data showed a growing mean age in streetwalking populations. Here we see that while the mean age of providers in SASP is 35.77, the modal prostitute in our sample is approximately 30 years old. There is a large left-tail in the distribution and the distribution begins to fall more rapidly after roughly 45. Table 17 converts SASP, TER and NIBRS data into a common categorizing of age. Each set of data captures a different distribution of prostitutes. For instance, the most common provider in the NIBRS data are 46+ year olds, as well as 31-40 year olds. In TER, though, only 16% of the entire sample consists of that age range, and only 1% of the 46 and older range. TER providers, on the other hand, are more typically very young (or believed to be), in their early 20s. For instance, 81% of the entire TER data in 2008 was 18-30 years old, while for NIBRS, only 33% of caught offenders were in that age range.

SASP respondents, in their age profile, have some similarities with both these other data. For instance, like NIBRS, a minority share of providers are 18-20 (1%) - a fact we believe is due to that age range being more likely to work for an escort agency, and escort agencies have been notoriously difficult to reach with our survey design. As Table 9 showed, if a person were an independent, they were almost 48% less likely to be 18-20 than 31-35 years of age. And as you move across the “independent” row from Table 9, independence is increasingly associated with being older. Thus, while on the surface the women in SASP have a similar age distribution as NIBRS on the two ends of the distribution, it is more likely driven by the fact that SASP women are more likely to be independent, which is negatively correlated with young workers. Next, we break down the differences in mean BMI measurements by race and age. The race BMI measurements show that Asians have a lower mean and a lower standard deviation in BMI, whereas Hispanics have a higher mean and higher standard deviation. Whites and Blacks have similar means and deviations from the mean.

While TER allowed us the possibility of examining trends in prostitution markets over time, and thus some support for the notion that the Internet was bringing in a greater

variety of providers, we were limited with that data as well. For instance, we could not examine the relationship between worker’s BMI and their earnings, education, the use of technology, or other such factors. Here we present regression results focused on exploring the role of education, BMI and the use of references to screen in determining a worker’s wage. To examine this relationship, we estimated OLS and two-stage least squares using two different measurements of earnings from the data. The equation we estimate is:

$$y_{i,c,t} = \beta \mathbf{X}_i + \chi_c + \tau_t + \epsilon_{i,c,t} \quad (4)$$

where i indexes an individual, c a city/state, and t a month dummy. We control for time because this survey was implemented over a period that coincided with the 2008 recession. Table 19 presents six columns of regression output. In the first column for ‘weekly earnings’ and the natural log of the constructed hourly wage variable, we used OLS and clustered the standard errors at the state level. Not surprisingly, the more clients a provider sees in the last 7 days, the more he or she makes, and the amount is about \$100 less than the mean wage in our sample. Other than that, BMI and the coefficient on widows are the only marginally significant variables from the regressions. A single unit increase in a person’s BMI score is associated with \$75 fewer each week, whereas widows earn almost \$1,400 less on average than single/never-married providers. Estimating the equation with the natural log of wage causes some new variables to become significant - most notably that of education. Increasing education by one year is associated with 10.7% higher weekly earnings, whereas a one-unit increase in BMI is associated with 3.5% lower earnings. Few else changes, though, when we use the natural log of wage as a dependent variable.

Education may be an endogenous variable in this wage regression, if education is highly correlated with unobserved factors that could affect a provider’s wage, though it is not unreasonable to believe that this is a causal effect. First of all, more educated women may be valued in these markets since educated prostitutes would be more suitable for dinner companions or other socializing events. Educated providers may also appeal to highly educated men, who prefer women with whom they can have conversation, as

well. Education may also simply be picking up the fact that educated women have higher opportunity costs, and thus we are identifying one of the margins on which the Internet has brought in new escorts - women for whom the legal sector offers alternatives for which the educated provider must be compensated in order to work as a commercial sex worker. We asked providers both about their own education as well as their mother and father's education. We use maternal education as an instrument since studies have found same-sex parental education to be a causal pathway in the transmission of human capital (Currie and Moretti, 2003; Chevalier, 2004; Carneiro, Meghir and Parey, 2007). The second and fifth columns both report the effect of education on prostitute earnings and wage outcomes using maternal education as an instrument.

As can be seen in Table 19, the first stage F-statistic is large (10.94) and technically exceeds the "rule of thumb" borne out of the weak instrumental variable literature (Staiger and Stock, 1997; Stock and Yogo, 2005). Instrumenting for the endogeneity of education increases the magnitudes dramatically in both specifications. For the weekly earnings in levels regression, now education causes a provider's earnings to increase on average by over \$1000 each week. Since a typical client in our sample pays approximately \$300-400 per 60 minute session, the IV results suggest that another year of schooling is equivalent to between 3-4 additional clients per week. Similarly large magnitudes show up in the lagged dependent variable regression of column 5 where another year of schooling is said to cause the client-adjusted weekly earnings to increase 34%. This second column may help explain a possible interpretation of this sizable coefficient. The dependent variable is an adjusted income measure equal to weekly reported earnings divided by number of clients. Thus, one possible interpretation of this effect of schooling on earnings is that it selects providers into a more exclusive clientele.

Next, we present some additional evidence that the Internet may lead to a reduction in the cost of working when we control for providers' use of security measures to better screen new clients. Prostitution is a risky work along several dimensions, not the least of which is that providers cannot tell *ex ante* their new clients' type. A new client could be a legitimate client seeking companionship, or he may be a violent predator (e.g., Jack the Ripper) or law enforcement. Before the Internet, prostitutes had few

methodologies that they could use to separate new clients by type, since assignation was usually a quick transaction, making the collection and displaying of credible, costly information a difficult, if not impossible, task. Post-Internet, though, information can be collected and sent between new clients and providers in ways that may effectively mitigate the historical “lemons” problems that plagued these underground markets. One simple method that providers use in today’s environment is to require that new clients present some verification, via a reference who will vouch for them, that they are a legitimate client and not a dangerous person. These references are either another prostitutes with whom the client has had sexual intimacy in the past, or may simply be another client the provider knows and trusts. We asked providers if they used any security measures before meeting with a new client, and if so, which ones did they use. Over 60% of our sample said that they used a reference system before meeting with a new client. In a separate project, we show that reference screening operates as a separating equilibrium in perfect Bayesian equilibrium because the costs of sending the signal is so incredibly costly for the copycat client, such as law enforcement (Cunningham and Kendall, 2009). Such methods will be inherently difficult for law enforcement if the private benefits of arresting a prostitute are less than the private costs of sending the signal. We note that there is at least some anecdotal evidence for this when in August of 2008, it was discovered that a Beaumont, Texas police department had secretly instructed two of its officers to sleep with prostitutes as part of a larger sting operation involving a drug trafficking network that also ran a brothel out of a spa²⁹. When the public learned that the officers were having consensual vaginal sex with prostitutes in order to make the case, pressure on the police department led to the police suspending the officers, claiming the department had not given authorization. One of the officers has counter-sued for wrongful termination, and the case is currently pending. The overall impression many are left with from the events, though, lends some credibility to the notion that reference signaling can effectively reduce the probabilities of an arrest since the cost of sending a reference signal is so high for law enforcement. Here we include this control as a regressor in columns 3 and 6, and as can

²⁹http://www.beaumontenterprise.com/news/local/prostitution_sting_cop_fights_for_his_job_and_reputation_01-22-2009.html

be seen, both specifications reveal as strongly positive and significant association between the use of the signal and earnings. This is suggestive of two things. Not only may this technology be widely used to effectively minimize the risks of arrest and harm, but it appears associated with higher earnings conditional on observables.

Finally, we analyze the effect of certain sex acts on earnings of providers, using the *within*-provider variation in prices and sex acts to identify this effect. Thus all coefficients presented in Table 20 were estimated using a linear fixed effects estimator with cluster robust standard errors adjusted at the state level. Each provider had been asked about the last five clients, thus giving us a chance to construct a sample of nearly 1200 observations. As with the other regressions from SASP, we control for city and month fixed effects, not shown. We are primarily interested in exploring the degree to which compensating differentials may exist in the market for risky sex in the escort market. On the one hand, one would expect theoretically that providers could be compensated to have unsafe penetrative intercourse with clients, even if the acts exposed them to STI risk. Previous studies, such as Rao et al. (2003) and Gertler, Shah and Bertozzi (2005), focusing on streetwalkers in developing countries, both find evidence for compensating differentials. Gertler, et. al. utilizes a panel methodology, exploiting the within-prostitute variation in the use of condoms and brides, to identify the parameters of interest, where as Rao, et. al. uses a quasi-experimental design in which health agencies randomly relayed information about safe sex practices prior to the collection of survey data among brothel workers. But no one, to our knowledge, has attempted to determine whether the compensating differential may exist in a developed country context.

Alongside the collection of the survey data, we also interviewed several prostitutes over the phone. In many of these, we asked about the practice of having unprotected penetrative intercourse with clients. We were told time and time again that the practice was uncommon, but did occasionally happen. One provider described the incidence as follows:

“If you’re asking me whether I think most providers had unsafe sex in the last week, I’d say that a vast majority - maybe 90% or more - have not had unsafe sex recently with a client. But if you’re asking me whether they have *ever* had

unsafe sex with a client before in their careers, then that number is much lower. Maybe as low as 15% have never had unsafe sex. In my experience, it tends to happen for a few different reasons. It'll sometimes happen when a provider is just starting out. She's new, and doesn't really have the experience or the confidence to say not to a client (who will badger providers about this issue). Or, it'll happen because she'll have an influential client who has threatened her in some way or another. Maybe he will give her bad reviews if she doesn't. Those can both be avoided, or at least managed somewhat, and to happen more to newer women without experience or reputation. The third way I've seen it happens involves women who start to think a certain client is their boyfriend - which is easy to do. One day, it might just happen, and after that, may happen again occasionally."

In our sample, only 36 out of 1600 recorded instances did unprotected vaginal sex occur. These 36 were concentrated among 26 different providers.

Unprotected anal sex was even rarer - there are only 6 recorded instances out of 1600 in which providers had anal receptive intercourse without a condom. Four separate providers were the ones who answered yes to that question. Thus, the interviewee's point that the marginal occurrence of an unprotected sexual encounter for Internet-based prostitutes is rare, at least as borne out in our data³⁰.

Much more common than either unsafe receptive intercourse of any kind is fellatio without a condom. Over 42% of our sample answered "yes" when asked if they had oral sex and if so whether they had oral sex without a condom. Table 20 presents regression results on the hourly compensation a provider received from a session with a client, controlling for types of sexual encounters individually, and then altogether in column 4. Interestingly, only fellatio without a condom is statistically significant, and unlike studies which have found a compensating differential effect on wages associated with unsafe sex (Gertler, Shah and Bertozzi, 2005; Rao et al., 2003), we find the exact opposite. When a provider had unprotected oral sex with a client, the cost of the session was typically \$136.56 less

³⁰We do not ask providers if they have *ever* had unprotected receptive intercourse, and thus cannot examine the interviewee's other points.

on average. This is an odd result, and one we cannot completely explain. We note only, though, that studies suggest the risk of disease transmission from unprotected oral sex is minimal, if not very unlikely (Laumann et al., 1994). In Brooks (2006), the author gives practical guidance to novice prostitutes attempting to learn basic skills about the work before working for the first time, and notes in the book that unprotected fellatio is not uncommon, and attributes its practice among prostitutes to be mainly a matter of taste and preference over that of risk profiles. Vaginal intercourse, and anal receptive intercourse even moreso, are both activities which can cause physical irritations to prostitutes over long periods of time. Unprotected oral sex may therefore be a low cost substitute for penetrative intercourse which is practiced as a kind of price discrimination among sellers.

5 Conclusion

In this article, we have attempted to lay out a basic theory regarding the increased diffusion of information technologies and the markets for commercial sex. Smith (2006) cites survey data showing that there has been no notable change in prostitution behavior - at least picked up by sampling of populations. We argue, though, that it is likely there has been a change in behavior and practice, though precisely how large it is, we cannot say. But we present evidence that we think shows a change in the kinds and characteristics of prostitutes working in the United States by analyzing FBI UCR arrests data, NIBRS data on street prostitutes, data harvested from a popular prostitution ratings board called TheEroticReview, and a proprietary survey of prostitutes that the authors are currently fielding. The evidence we presents suggests that streetwalking is falling in some areas because of increased diffusion of the Internet which appears to have shifted at least some of this underground and into the more clandestine independent escort market (see Figure 2). Over time, the women advertising at one of the most widely used, nationally recognized clearinghouses and ratings sites for prostitutes (TER) have become younger, and more diverse in terms of their characteristics and practices. Their wages have also risen, and their physical appearance, even conditional on extensive observables, has risen from 1999-2008. Our analysis of the SASP data suggests that the women who are now working as

Internet-based escorts are typically more skilled and have learned to harness the power of these new technologies to better manage the risks of this underground occupation.

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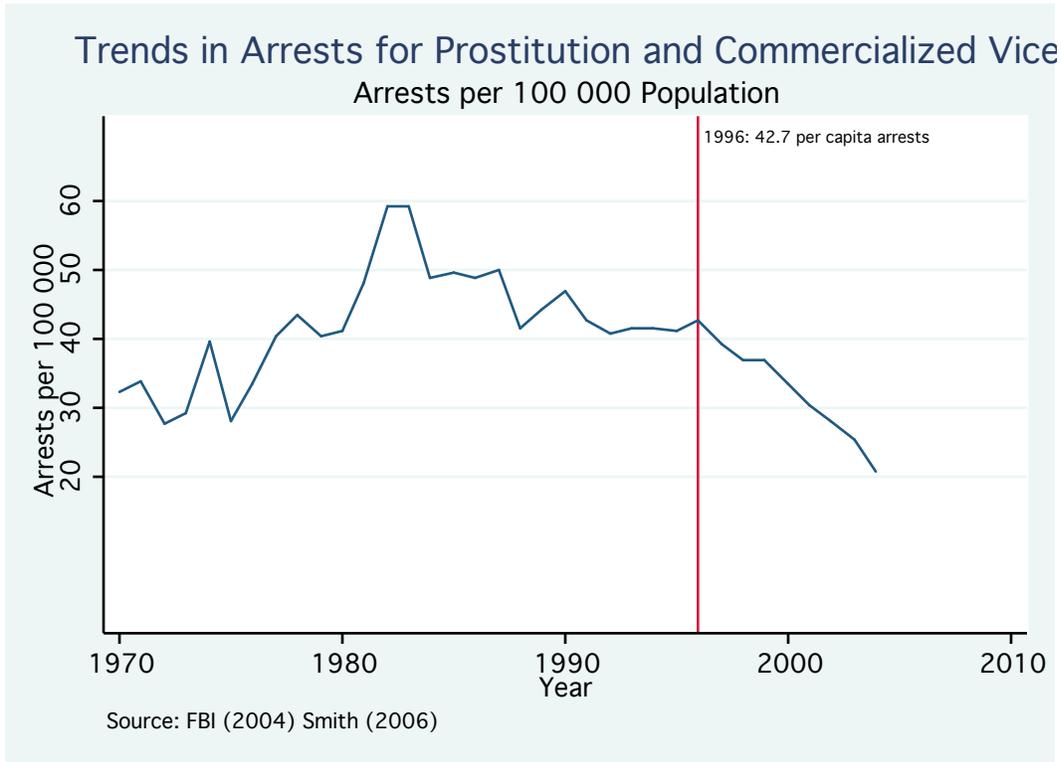


Figure 1 Prostitution Arrest Rates Begin Falling in 1996, Reaching Historic Lows by 2004 (Uniform Crime Reports)

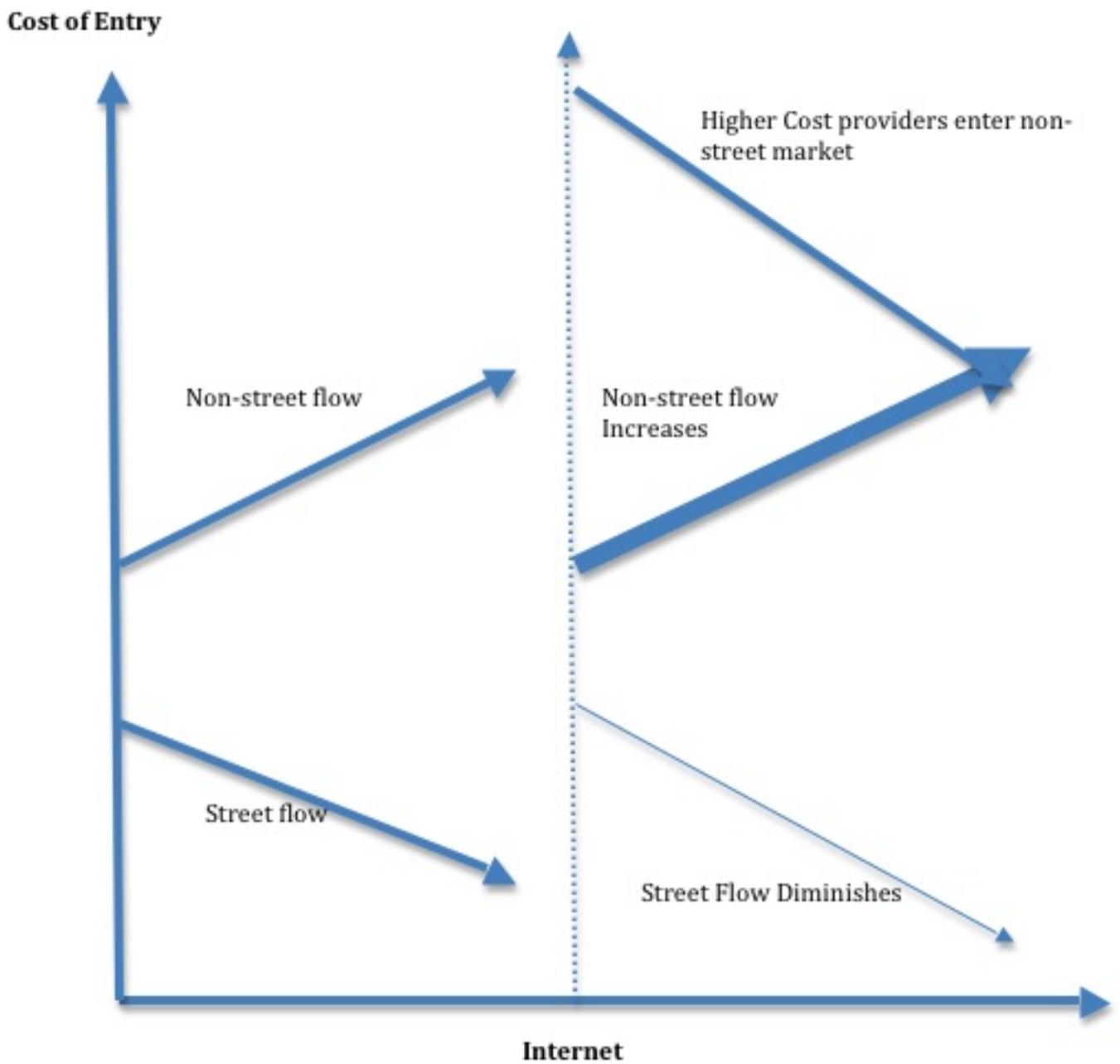


Figure 2 Diagram of Internet's Effect on Suppliers of Different Costs

Table 1 Summary Statistics for Variables Used in Equation (1)

Variable Labels	Mean	Overall Standard Deviation	Between Standard Deviation	Within Standard Deviation
Prostitution arrests per 1,000 persons	0.410	0.554	0.591	0.157
Violent crime arrests per 1,000 persons	2.873	1.700	1.537	0.853
Property crime arrests per 1,000 persons	9.927	4.288	3.786	2.510
Drug crime arrests per 1,000 persons	7.848	3.733	3.404	1.905
Internet penetration	0.486	0.138	0.070	0.120
Police per 1,000 population _{<i>t</i>-1}	3.187	1.980	1.331	1.601
Prisoners per 1,000 population _{<i>t</i>-1}	4.023	1.691	1.644	0.346
State income per capita (\$2003)	\$27,111	\$5,131.83	\$4,937.41	\$2,849.32
Poverty rate (x 100)	10.97	3.29	3.12	1.40
State unemployment rate (x 100)	4.65	1.18	0.91	0.80
Population density per 1,000 mi ²	231.49	690.26	1,279.17	7.81

Table 2 Estimate of the Effect of Internet Diffusion on Prostitution Arrests per 1,000 age 15-54 with Falsification Crime Categories (Violent, Property, Drug)

	[1]	[2]	[3]	[4]	[5]	[6]
	Prostitution	Prostitution	Property Crimes	Property Crimes	Drug Crimes	Drug Crimes
Internet penetration	-6.115 (1.79)	-6.404 (1.88)	0.129 (0.09)	0.261 (0.20)	-1.295 (0.64)	-0.645 (0.42)
ln(police per capita) _{t-1}	(1.28)	(1.28)	(0.08)	(0.19)	(0.53)	(0.37)
ln(prisoners per capita) _{t-1}		-0.228 (0.66)		-0.140 (0.73)		-0.130 (0.56)
ln(state income per capita) (\$2003)		-0.837 (0.84)		0.066 (0.16)		0.534 (0.88)
Poverty rate		2.140 (0.48)		2.139 (1.02)		4.054 (1.52)
State unemployment rate		0.026 (0.40)		0.008 (0.28)		0.024 (0.064)
Population density ($\times 1000$)		-0.116 (0.09)		0.024 (0.28)		0.032 (0.30)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.80	0.80	0.79	0.80	0.76	0.77
N	189	189	194	194	194	194

Table 3 Number of Originating Agency Identifier (ORI) by Population Levels)

Population Size	No. ORI	Percent	Cumulative
Cities			
500,000 - 999,999	2	0.07	0.07
250,000 - 499,999	4	0.14	0.21
100,000 - 249,999	22	0.77	0.98
50,000 - 99,999	45	1.58	2.56
25,000 - 49,999	129	4.52	7.08
10,000 - 24,999	292	10.24	17.32
2,500 - 9,999	631	22.12	39.45
< 2,500	751	26.33	65.78
Non-MSA Counties			
>100,000	1	0.04	65.81
25,000 - 99,999	70	2.45	68.27
10,000 - 24,999	208	7.29	75.56
< 10,000	451	15.81	91.37
MSA Counties			
> 100,000	18	0.63	92.01
25,000 - 99,999	85	2.98	94.99
10,000 - 24,999	27	0.95	95.93
< 10,000	103	3.61	99.54
MSA State Police	13	0.46	100.00
Total	2,852	100.00	

These population values reflect the 1998 NIBRS estimates of ORI population size only.
All populations are inclusive.

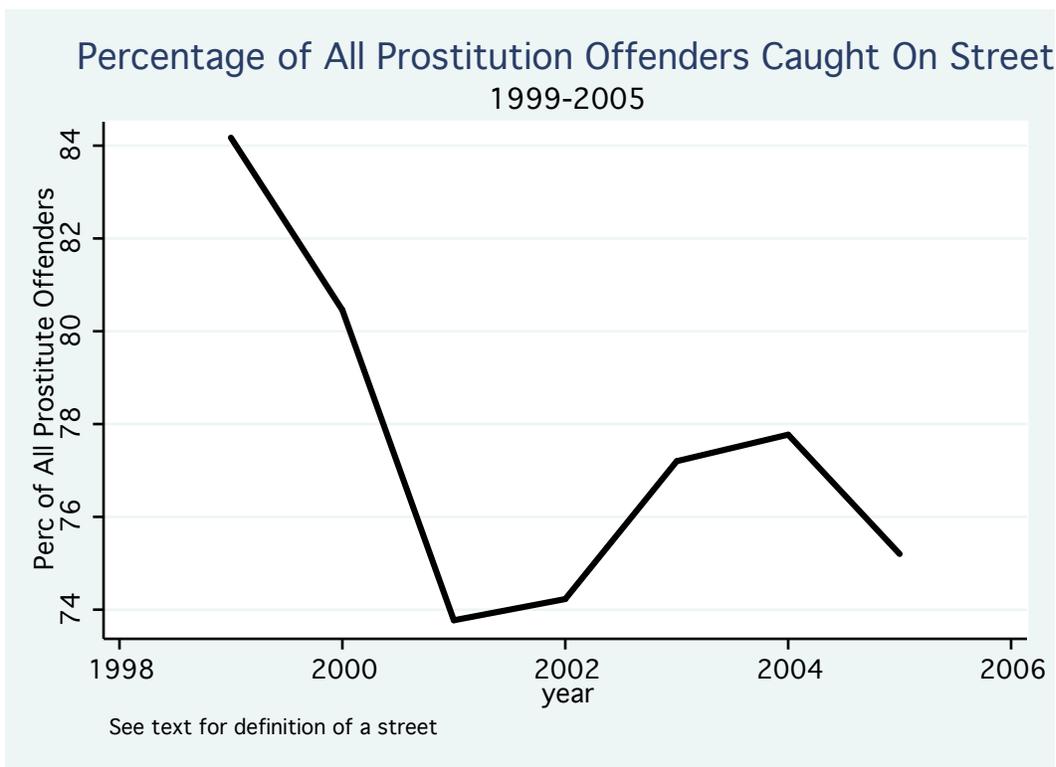


Figure 3 Share of All Prostitution Offenders Caught on Streets, 1999-2005 NIBRS

Table 4 Change in Male and Female Prostitution Offenders by Location, 1999 to 2005

	Variable	1999	2005
Male	Street	.8674189	.6998224
	Hotel	.0300893	.1509769
	Home	.0235073	.0686797
	Commercial Building	.0042313	.0065127
	Other	.0747532	.080521
Female	Street	.8164962	.7899761
	Hotel	.0671355	.0799523
	Home	.0530691	.0564837
	Commercial Building	.0057545	.0107399
	Other	.0575448	.066428

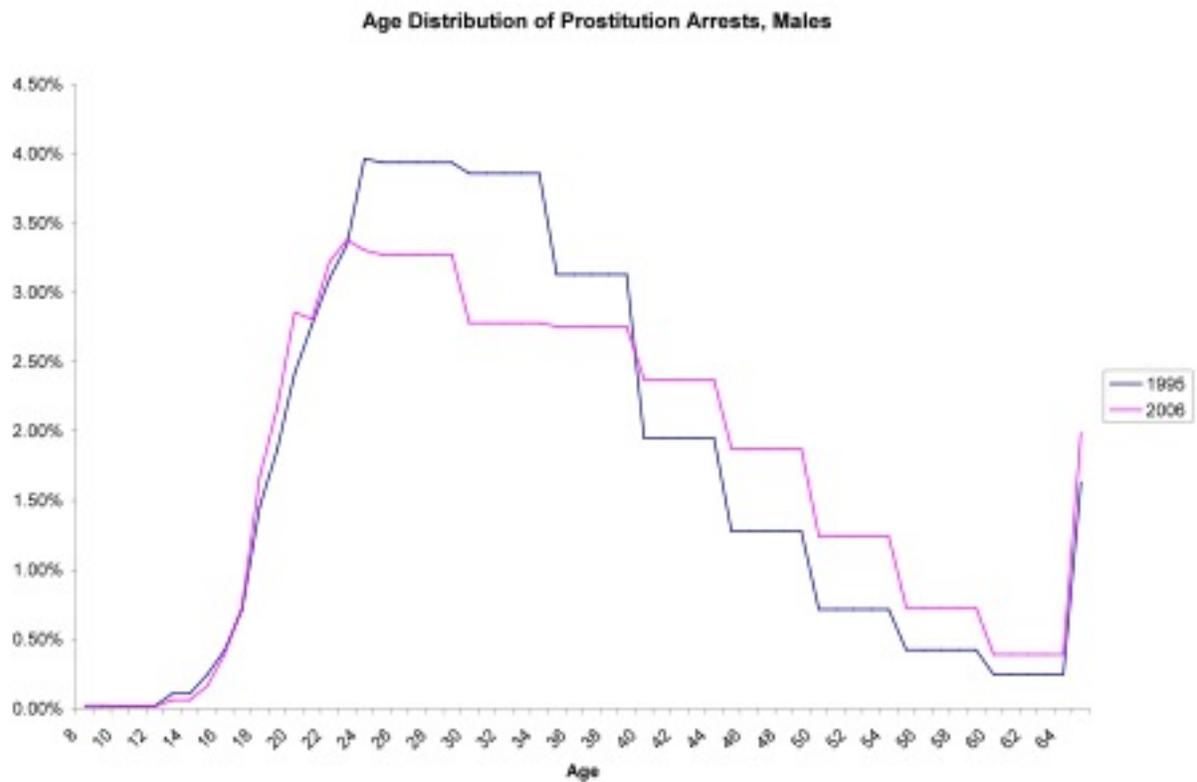


Figure 4 Histogram of Prostitution Arrests by Age and Gender, Drawn from FBI UCR Data, 1995-2006

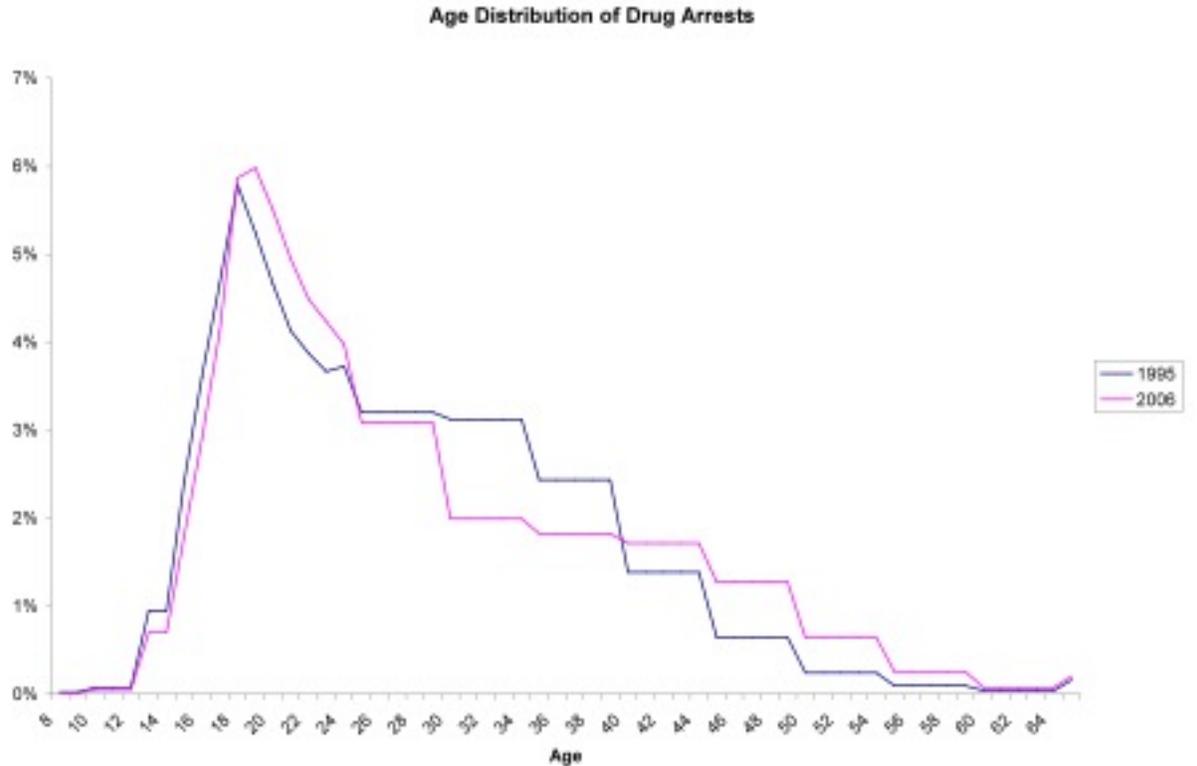
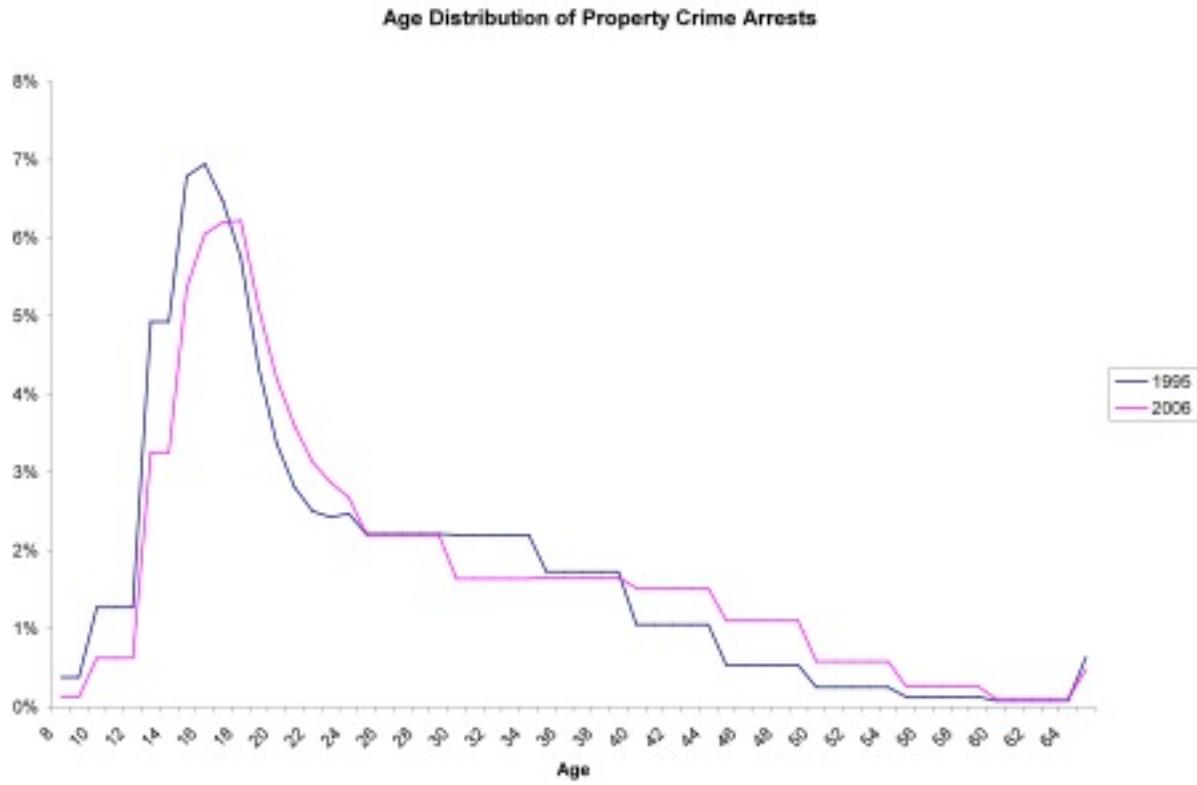


Figure 5 Histogram of Property and Drug Crime Arrests, Drawn from FBI UCR Data, 1995-2006

Table 5 Probit Estimates of Street Walker Probabilities, Presented as Marginal Effects
(Separated by Gender)

	Female			Male		
	1	2	3	1	2	3
Age of Offender	0.005 (0.001)	0.004 (0.001)	0.004 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Drug	-0.031 (0.029)	-0.020 (0.024)	0.004 (0.016)	-0.044 (0.030)	-0.026 (0.029)	0.015 (0.025)
black	0.103 (0.019)	0.085 (0.020)	0.054 (0.010)	0.028 (0.027)	0.017 (0.025)	0.002 (0.017)
2000	-0.052 (0.032)	-0.067 (0.035)	-0.040 (0.028)	-0.098 (0.046)	-0.081 (0.041)	0.003 (0.043)
2001	-0.033 (0.040)	-0.049 (0.035)	-0.030 (0.028)	-0.170 (0.084)	-0.143 (0.068)	-0.049 (0.048)
2002	-0.041 (0.034)	-0.067 (0.035)	-0.055 (0.034)	-0.165 (0.078)	-0.149 (0.058)	-0.066 (0.044)
2003	-0.005 (0.032)	-0.023 (0.030)	-0.014 (0.029)	-0.124 (0.082)	-0.106 (0.060)	-0.005 (0.046)
2004	0.013 (0.036)	-0.004 (0.034)	0.010 (0.032)	-0.130 (0.089)	-0.107 (0.077)	0.001 (0.064)
2005	-0.046 (0.056)	-0.067 (0.051)	0.001 (0.036)	-0.163 (0.099)	-0.159 (0.087)	-0.055 (0.059)
$N \times T$	27903	27903	27903	17844	17844	17844
McFadden's Pseudo R^2	0.0351	0.0754	0.2442	0.0114	0.0430	0.2126

Omitted race category is all non-Black race groups, including White, Asian, Indian and Other; Years include 1999-2005, and the omitted year is 1999; Omitted Gender Variable is Male. Standard errors are clustered at the ORI level. Column 1 includes only shown covariates. Column 2 adds categorial population control variables. Column 3 adds categorial population control variables and ORI fixed effects. All models estimated using probit, and coefficient estimates are all transformed marginal effects evaluated at the sample means of the other covariates.

Table 6 Multinomial Logit Estimates of Changing Racial Composition of Street Prostitutes Over Time

Covariate	Female			Male		
	$\frac{Black}{White}$	$\frac{Asian}{White}$	$\frac{Unknown}{White}$	$\frac{Black}{White}$	$\frac{Asian}{White}$	$\frac{Unknown}{White}$
Age of Offender	1.018 (0.005)	0.986 (0.006)	1.067 (0.028)	0.982 (0.005)	0.964 (0.021)	0.967 (0.007)
Drug	1.547 (0.154)	1.911 (0.265)	0.733 (0.383)	0.544 (0.233)	0.628 (0.387)	0.482 (0.139)
2000	0.960 (0.144)	1.057 (0.167)	1.081 (1.170)	4.744 (4.503)	0.813 (0.334)	0.354 (0.095)
2001	0.870 (0.142)	1.166 (0.219)	1.323 (1.513)	4.336 (3.363)	0.915 (0.360)	0.450 (0.186)
2002	0.808 (0.121)	1.249 (0.218)	1.811 (2.327)	3.202 (2.245)	0.887 (0.190)	1.249 (0.703)
2003	0.725 (0.111)	1.379 (0.288)	0.720 (0.780)	3.866 (2.741)	0.640 (0.339)	0.821 (0.346)
2004	0.650 (0.091)	1.502 (0.365)	1.012 (1.095)	3.080 (2.225)	0.485 (0.218)	0.595 (0.282)
2005	0.649 (0.102)	1.643 (0.377)	1.496 (1.698)	2.949 (2.157)	0.306 (0.207)	0.935 (0.356)
$N \times T$	11952			9760		
McFadden's Pseudo R^2	0.0246			0.0390		

The sample of data used in this model is a balanced panel of ORIs that appeared in 1999-2005. Due to the number of ORI fixed effects, the model was unable to converge, and so this table displays outcomes unconditional on ORI fixed effects. Model was estimated using multinomial logit and coefficients are expressed as relative risk ratios. The base outcome is being a White street prostitute. Each coefficient is a transformed exponentiated relative-risk ratio. The relative risk ratio tells us how the probability of being in the numerator group relative to being a White prostitute changes if we increase the covariate by one unit. An example of the interpretation is as follows: the relative risk of being a Black prostitute in 2005 was 0.649, which means that in 2005, the risk of being a Black street prostitute was 35.1% lower than being a White street prostitute. All models include population fixed effects, but not ORI fixed effects, and standard errors are clustered at the city-level.

Table 7 Sample Mean Changes in TER Provider Characteristics (1999-2008)

	Variable	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Age	18-20	0.05	0.05	0.08	0.09	0.10	0.10	0.11	0.13	0.13	0.13
	21-25	0.30	0.35	0.38	0.42	0.43	0.45	0.46	0.46	0.45	0.44
	26-30	0.26	0.30	0.30	0.28	0.27	0.26	0.25	0.25	0.24	0.24
	31-35	0.20	0.20	0.14	0.13	0.12	0.11	0.10	0.10	0.10	0.10
	36-40	0.12	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.05
	41-45	0.05	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	46-up	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Org	Independent	0.76	0.59	0.52	0.48	0.45	0.44	0.47	0.54	0.59	0.62
	Answertel	0.55	0.59	0.59	0.59	0.60	0.63	0.64	0.69	0.70	0.71
	Incall	0.53	0.47	0.37	0.34	0.34	0.36	0.32	0.29	0.30	0.33
	Outcall	0.25	0.24	0.22	0.22	0.19	0.17	0.17	0.14	0.14	0.13
	Incall/outcall	0.21	0.28	0.40	0.44	0.47	0.46	0.51	0.56	0.56	0.54
Race	White	0.58	0.52	0.52	0.55	0.53	0.51	0.51	0.51	0.51	0.51
	Black	0.06	0.05	0.08	0.08	0.08	0.09	0.10	0.12	0.13	0.13
	Asian	0.13	0.22	0.16	0.14	0.15	0.18	0.16	0.15	0.14	0.13
	Hispanic	0.10	0.12	0.15	0.14	0.15	0.15	0.15	0.16	0.15	0.16
	Foreign	0.07	0.08	0.07	0.07	0.07	0.07	0.06	0.05	0.05	0.05
	Other	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Breast	A-cup	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.07	0.08	0.08
	B-cup	0.25	0.32	0.27	0.29	0.30	0.31	0.31	0.31	0.30	0.30
	C-cup	0.28	0.32	0.36	0.34	0.35	0.34	0.34	0.34	0.34	0.33
	D-cup	0.38	0.30	0.31	0.30	0.28	0.27	0.27	0.28	0.28	0.29
	Implants	0.29	0.20	0.20	0.18	0.17	0.16	0.15	0.13	0.14	0.15
Type	Eescort	0.60	0.63	0.68	0.73	0.74	0.75	0.78	0.79	0.78	0.80
	Escort/anal	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03
	Sensual Massage	0.35	0.31	0.21	0.16	0.14	0.14	0.11	0.09	0.10	0.09
	Tantra	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Massage/Fellatio	0.02	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.01
	BDSM	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
	Transexual	0.00	0.00	0.05	0.08	0.06	0.06	0.07	0.06	0.05	0.04
Body Type	Thin	0.29	0.29	0.31	0.33	0.34	0.34	0.34	0.34	0.32	0.32
	Athletic	0.24	0.26	0.27	0.26	0.29	0.27	0.27	0.27	0.26	0.26
	Average	0.24	0.23	0.20	0.18	0.18	0.19	0.19	0.19	0.19	0.20
	Muscle	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
	Babyfat	0.12	0.13	0.13	0.13	0.12	0.11	0.12	0.12	0.13	0.13
	Fat	0.08	0.07	0.07	0.07	0.06	0.06	0.07	0.07	0.07	0.08
	Other	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Rankings	Performance	6.12	6.23	6.31	6.33	6.59	6.68	6.65	6.71	6.74	6.74
	Appearance	6.70	6.85	6.90	6.96	7.14	7.19	7.21	7.25	7.24	7.26
N		578	2,362	6,249	8,639	10,801	12,589	12,788	14,552	16,976	8870

Values in each year cell represent the proportion of all providers in that year that occupied the corresponding variable category. Data was collected from TheEroticReview in the summer of 2008. The 1998 data not shown since only 11 cases had data for ages in 1998. Distributions were drawn from 95,834 records adult service providers.

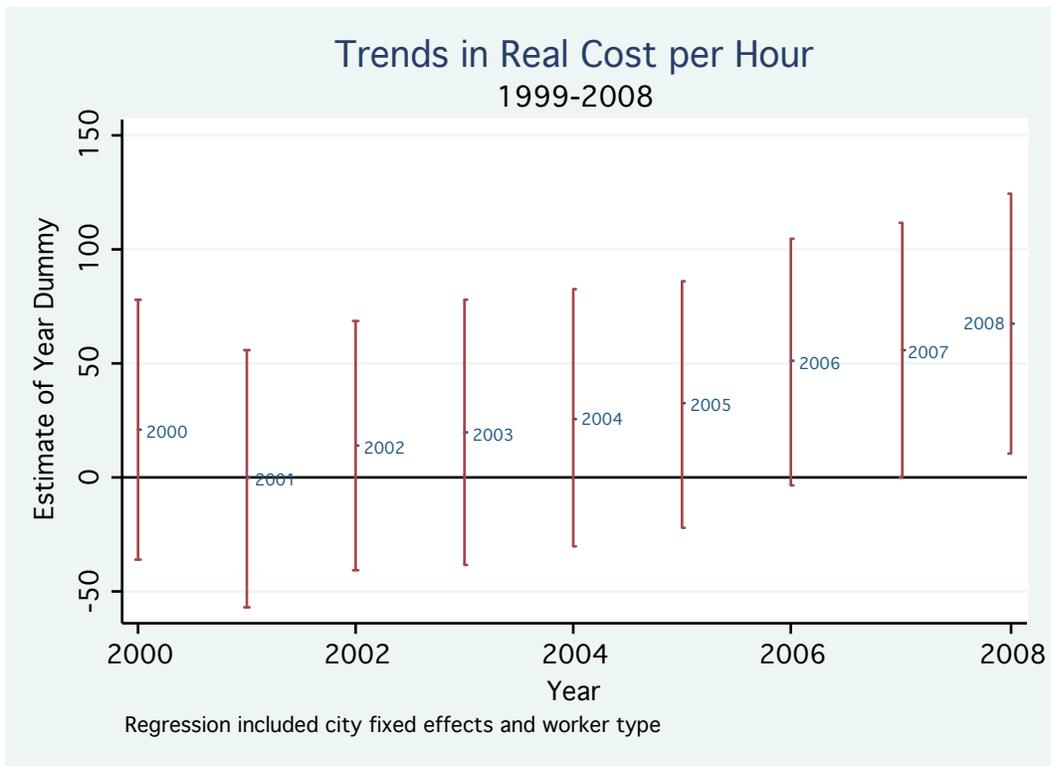


Figure 6 Regression Estimates of Year Dummies on Real Cost per Min, with controls for city and service type

Table 8 Multinomial Logit Estimates of Time Trends on Age of Providers in TER Data

Covariate	$\frac{Pr(18-20)}{Pr(31-35)}$	$\frac{Pr(21-25)}{Pr(31-35)}$	$\frac{Pr(26-30)}{Pr(31-35)}$	$\frac{Pr(36-40)}{Pr(31-35)}$	$\frac{Pr(41-45)}{Pr(31-35)}$	$\frac{Pr(46+)}{Pr(31-35)}$
2000	0.908 (0.206)	0.985 (0.120)	1.069 (0.134)	0.604 (0.162)	0.543 (0.192)	1.227 (0.613)
2001	1.661 (0.554)	1.402 (0.298)	1.418 (0.277)	0.698 (0.099)	0.843 (0.269)	1.386 (0.718)
2002	2.126 (0.717)	1.672 (0.364)	1.464 (0.253)	0.732 (0.143)	0.742 (0.212)	1.525 (0.719)
2003	2.229 (0.764)	1.741 (0.384)	1.500 (0.284)	0.838 (0.147)	0.745 (0.209)	1.349 (0.699)
2004	2.355 (0.855)	1.867 (0.462)	1.465 (0.283)	0.800 (0.145)	0.896 (0.257)	1.300 (0.657)
2005	2.760 (0.946)	2.072 (0.511)	1.568 (0.323)	0.869 (0.168)	0.807 (0.232)	1.382 (0.709)
2006	3.202 (0.990)	2.205 (0.484)	1.654 (0.298)	0.827 (0.149)	0.799 (0.223)	1.405 (0.713)
2007	3.258 (1.032)	2.167 (0.525)	1.620 (0.324)	0.791 (0.145)	0.836 (0.235)	1.734 (0.823)
2008	3.377 (1.134)	2.147 (0.501)	1.564 (0.344)	0.876 (0.157)	0.921 (0.273)	1.514 (0.757)
br_a	3.776 (0.218)	1.744 (0.105)	1.084 (0.061)	0.973 (0.081)	1.098 (0.199)	1.353 (0.205)
br_b	3.585 (0.204)	2.016 (0.106)	1.227 (0.052)	1.012 (0.056)	1.062 (0.107)	0.897 (0.082)
br_c	2.247 (0.117)	1.612 (0.072)	1.162 (0.053)	0.989 (0.042)	1.161 (0.084)	0.994 (0.080)
escortanal	1.019 (0.077)	0.970 (0.072)	0.992 (0.068)	1.262 (0.126)	1.585 (0.280)	1.147 (0.221)
massage	0.380 (0.047)	0.656 (0.060)	0.875 (0.041)	1.066 (0.063)	1.116 (0.120)	1.583 (0.159)
tantra	0.226 (0.104)	0.464 (0.103)	0.846 (0.171)	2.140 (0.543)	2.413 (0.634)	4.130 (1.634)
massage_fellatio	0.456 (0.058)	0.607 (0.049)	0.843 (0.082)	1.236 (0.117)	1.604 (0.251)	1.448 (0.294)
bdsm	0.227 (0.057)	0.440 (0.085)	0.739 (0.091)	0.979 (0.102)	1.381 (0.209)	1.687 (0.247)
independent	0.523 (0.043)	0.549 (0.030)	0.718 (0.025)	1.370 (0.070)	2.079 (0.201)	2.703 (0.351)
black	4.486 (0.365)	3.775 (0.224)	2.156 (0.142)	0.507 (0.059)	0.286 (0.059)	0.226 (0.065)
asian	0.431 (0.045)	1.265 (0.072)	1.277 (0.051)	0.753 (0.064)	0.425 (0.051)	0.260 (0.049)
hispanic	1.803 (0.155)	2.182 (0.128)	1.742 (0.101)	0.744 (0.096)	0.514 (0.092)	0.285 (0.100)
foreign	0.878 (0.091)	1.067 (0.085)	1.039 (0.055)	1.023 (0.155)	1.031 (0.183)	0.727 (0.127)
oth	2.627 (0.431)	2.317 (0.275)	1.734 (0.198)	1.015 (0.207)	0.550 (0.137)	0.516 (0.151)
$N \times T$	94,403					
McFadden Pseudo R^2	0.0699					

Model was estimated using multinomial logit and coefficients are expressed as relative risk ratios. The base outcome is the 31-35 year old age group. Each coefficient is a transformed exponentiated relative-risk ratio. The relative risk ratio tells us how the probability of being in the numerator group relative to being 31-35 year old changes if we increase the covariate by one unit. An example of the interpretation is as follows: the relative risk of being 18-20 in 2001 versus being 31-35 was 1.661. This means the relative risk of being 18-20 in 2001 was 66.1% compared to being 31-35. All models include city fixed effects, controls for weight class and height category, whether the person answers her own telephone, and whether she makes incalls or outcalls only. Standard errors are clustered at the city level.

Table 9 Multinomial Logit Estimates of Time Trends on Breast Cup Sizes of Providers in TER Data

Covariate	$\frac{Pr(A=1)}{Pr(D=1)}$	$\frac{Pr(B=1)}{Pr(D=1)}$	$\frac{Pr(C=1)}{Pr(D=1)}$
2000	0.869 (0.394)	1.155 (0.393)	1.141 (0.255)
2001	0.953 (0.389)	0.883 (0.259)	1.180 (0.211)
2002	1.059 (0.398)	0.978 (0.293)	1.168 (0.191)
2003	1.088 (0.449)	0.996 (0.309)	1.227 (0.210)
2004	1.220 (0.472)	1.033 (0.305)	1.179 (0.175)
2005	1.219 (0.467)	1.050 (0.328)	1.214 (0.193)
2006	1.061 (0.406)	1.008 (0.302)	1.164 (0.176)
2007	1.309 (0.520)	1.065 (0.316)	1.208 (0.185)
2008	1.455 (0.533)	1.078 (0.316)	1.189 (0.189)
age18_20	2.272 (0.130)	2.188 (0.129)	1.633 (0.071)
age21_25	1.380 (0.086)	1.585 (0.083)	1.368 (0.055)
age26_30	1.074 (0.063)	1.177 (0.052)	1.119 (0.051)
age36_40	0.931 (0.086)	0.976 (0.067)	0.957 (0.039)
age41_45	0.912 (0.159)	0.937 (0.094)	1.084 (0.079)
age46_up	1.212 (0.190)	0.850 (0.087)	0.961 (0.084)
escortanal	1.907 (0.192)	1.161 (0.061)	1.093 (0.059)
massage	1.143 (0.055)	1.081 (0.037)	1.040 (0.026)
tantra	1.115 (0.343)	1.189 (0.262)	1.500 (0.324)
massage_fellatio	0.907 (0.067)	0.957 (0.062)	0.958 (0.056)
bdsm	0.997 (0.200)	1.031 (0.128)	1.105 (0.100)
independent	0.787 (0.045)	0.696 (0.020)	0.794 (0.018)
br_implants	0.003 (0.001)	0.025 (0.002)	0.233 (0.012)
black	0.684 (0.047)	0.676 (0.030)	0.760 (0.031)
asian	3.475 (0.520)	3.148 (0.344)	2.651 (0.201)
hispanic	0.904 (0.063)	1.017 (0.065)	1.101 (0.053)
foreign	0.832 (0.100)	1.023 (0.052)	1.026 (0.029)
oth	0.952 (0.188)	0.998 (0.103)	1.000 (0.098)
$N \times T$	94,403		
McFadden Pseudo R^2	0.1570		

Model was estimated using multinomial logit and coefficients are expressed as relative risk ratios. The base outcome is having a D-cup breast size. Each coefficient is a transformed exponentiated relative-risk ratio. The relative risk ratio tells us how the probability of being in the numerator group relative to having a D-cup breast size if we increase the covariate by one unit. An example of the interpretation is as follows: the relative risk of being someone with an A-cup breast size in 2008 versus a D-cup breast size was 1.455. This means the relative risk of having an A-cup breast size in 2008 was 45.5% compared to having a D-cup breast size. All models include city fixed effects, body and weight categories, controls for transsexuality, and organizational criteria (incall, outcall, etc.). Standard errors are clustered at the city level. Note that D-cup includes both D-cup as well as all sizes larger than D-cup (DD, DDD, etc.).

Table 10 Marginal Effects of Factors Influencing the Probability of Having Breast Implants (Probit)

Covariate	Pr(Breast Implants=1)
2000	-0.025 (0.011)
2001	-0.031 (0.012)
2002	-0.035 (0.011)
2003	-0.040 (0.012)
2004	-0.040 (0.012)
2005	-0.042 (0.012)
2006	-0.050 (0.011)
2007	-0.043 (0.013)
2008	-0.038 (0.013)
br_a	-0.107 (0.002)
br_b	-0.189 (0.003)
br_c	-0.096 (0.003)
age18_20	-0.080 (0.002)
age21_25	-0.050 (0.003)
age26_30	-0.010 (0.002)
age36_40	-0.004 (0.004)
age41_45	-0.017 (0.006)
age46_up	-0.007 (0.008)
escortanal	0.014 (0.007)
massage	-0.026 (0.005)
tantra	-0.026 (0.012)
massage_fellatio	-0.018 (0.005)
bdsm	-0.060 (0.003)
independent	-0.002 (0.003)
black	-0.041 (0.003)
asian	0.063 (0.009)
hispanic	0.027 (0.004)
foreign	-0.006 (0.004)
oth	-0.004 (0.007)
$N \times T$	94400
McFadden's Pseudo R^2	0.2952

Model was estimated using probit. Coefficients are expressed as marginal effects. City fixed effects, body weight, height, organization criteria and transsexuality were included by not shown, and standard errors are clustered at the city level.

Table 11 OLS Estimates of Factors Influencing Average Appearance and Performance Scores

Covariate	Average Appearance	Average Performance
2000	0.095 (0.043)	-0.022 (0.059)
2001	0.083 (0.041)	-0.004 (0.083)
2002	0.109 (0.044)	-0.060 (0.073)
2003	0.170 (0.042)	0.019 (0.074)
2004	0.207 (0.042)	0.061 (0.082)
2005	0.239 (0.044)	0.014 (0.085)
2006	0.243 (0.046)	0.027 (0.090)
2007	0.254 (0.043)	0.039 (0.084)
2008	0.277 (0.044)	0.024 (0.085)
perf	0.329 (0.005)	
app		0.924 (0.013)
age18_20	0.611 (0.014)	-0.845 (0.037)
age21_25	0.487 (0.013)	-0.638 (0.032)
age26_30	0.247 (0.011)	-0.297 (0.021)
age36_40	-0.247 (0.019)	0.247 (0.023)
age41_45	-0.368 (0.037)	0.429 (0.030)
age46-up	-0.626 (0.049)	0.527 (0.056)
br_a	-0.542 (0.026)	0.040 (0.026)
br_b	-0.325 (0.013)	0.072 (0.019)
br_c	-0.157 (0.010)	-0.004 (0.015)
escortanal	-0.179 (0.022)	0.676 (0.070)
massage	0.046 (0.011)	-0.420 (0.035)
tantra	0.024 (0.055)	-0.128 (0.108)
massage_fellatio	-0.116 (0.017)	0.118 (0.024)
bdsm	0.366 (0.033)	-0.258 (0.058)
independent	0.023 (0.013)	0.316 (0.071)
black	-0.109 (0.016)	0.080 (0.031)
asian	-0.121 (0.020)	0.266 (0.068)
hispanic	0.016 (0.024)	-0.047 (0.029)
foreign	0.047 (0.026)	0.035 (0.026)
oth	0.009 (0.028)	0.022 (0.043)
$N \times T$	94403	94403
R^2	0.535	0.425

Model was estimated using OLS with standard errors clustered at the city level. The model includes city fixed effects, body and height categories, business criteria (incall, outcall, etc.) and transsexuality, all not shown.

Table 12 Multinomial Logit Estimates of Time Trends on Race of Providers in TER Data

Covariate	$\frac{Pr(Black=1)}{Pr(White=1)}$	$\frac{Pr(Hispanic=1)}{Pr(White=1)}$	$\frac{Pr(Asian=1)}{Pr(White=1)}$	$\frac{Pr(Foreign=1)}{Pr(White=1)}$	$\frac{Pr(Other=1)}{Pr(White=1)}$
2000	0.822 (0.165)	1.138 (0.160)	1.556 (0.238)	1.002 (0.154)	0.756 (0.261)
2001	1.187 (0.217)	1.356 (0.168)	1.254 (0.173)	0.948 (0.123)	0.777 (0.174)
2002	1.242 (0.238)	1.233 (0.185)	1.318 (0.237)	0.871 (0.104)	0.735 (0.215)
2003	1.313 (0.228)	1.354 (0.188)	1.566 (0.249)	0.889 (0.130)	0.806 (0.194)
2004	1.367 (0.246)	1.374 (0.210)	1.885 (0.309)	0.881 (0.120)	0.715 (0.217)
2005	1.587 (0.284)	1.403 (0.226)	1.994 (0.287)	0.781 (0.128)	0.774 (0.223)
2006	1.670 (0.301)	1.514 (0.251)	2.067 (0.285)	0.740 (0.124)	0.866 (0.235)
2007	1.893 (0.353)	1.502 (0.254)	2.197 (0.286)	0.730 (0.115)	0.908 (0.212)
2008	1.863 (0.366)	1.579 (0.260)	2.098 (0.317)	0.709 (0.132)	0.966 (0.267)
age18_20	4.478 (0.374)	1.812 (0.154)	0.494 (0.052)	0.860 (0.083)	2.603 (0.422)
age21_25	3.739 (0.245)	2.192 (0.126)	1.353 (0.078)	1.050 (0.083)	2.309 (0.270)
age26_30	2.155 (0.153)	1.751 (0.104)	1.328 (0.059)	1.024 (0.055)	1.724 (0.196)
age36_40	0.516 (0.060)	0.739 (0.097)	0.774 (0.063)	1.025 (0.152)	1.024 (0.209)
age41_45	0.295 (0.061)	0.503 (0.089)	0.423 (0.044)	1.046 (0.177)	0.550 (0.138)
age46_up	0.241 (0.071)	0.286 (0.101)	0.267 (0.053)	0.737 (0.130)	0.521 (0.155)
br_a	0.821 (0.057)	0.752 (0.054)	2.493 (0.366)	0.875 (0.095)	0.910 (0.178)
br_b	0.812 (0.032)	0.909 (0.060)	2.411 (0.265)	1.078 (0.054)	1.015 (0.094)
br_c	0.856 (0.034)	1.029 (0.049)	2.260 (0.170)	1.058 (0.030)	1.027 (0.096)
escortanal	1.462 (0.101)	1.644 (0.165)	0.905 (0.175)	0.825 (0.151)	1.043 (0.214)
massage	1.108 (0.080)	0.834 (0.073)	1.751 (0.282)	1.126 (0.331)	1.179 (0.110)
tantra	1.240 (0.371)	0.556 (0.260)	1.438 (0.415)	0.881 (0.288)	1.706 (0.546)
massage_fellatio	1.517 (0.225)	1.529 (0.226)	4.052 (0.637)	1.007 (0.222)	1.678 (0.332)
bdsm	0.835 (0.117)	0.286 (0.042)	0.281 (0.032)	0.485 (0.097)	0.565 (0.158)
$N \times T$	94404				

Model was estimated using multinomial logit. City fixed effects, body and height controls, transsexuality and organizational criteria controls were included but not shown. Standard errors are clustered at the city level. Appearance and Performance variables were both measured as the average rating received over all reviews.

Table 13 Multinomial Logit Estimates of Factors Influencing the Probability of Having Various Weight Categories

Covariate	$\frac{Pr(Thin)}{Pr(Average)}$	$\frac{Pr(Athletic)}{Pr(Average)}$	$\frac{Pr(Muscle)}{Pr(Average)}$	$\frac{Pr(Babyfat)}{Pr(Average)}$	$\frac{Pr(Fat)}{Pr(Average)}$	$\frac{Pr(Other)}{Pr(Average)}$
2000	0.838 (0.134)	1.136 (0.154)	1.452 (1.210)	1.242 (0.236)	1.113 (0.176)	0.911 (0.477)
2001	1.075 (0.115)	1.325 (0.158)	1.994 (2.294)	1.434 (0.270)	1.527 (0.234)	1.127 (0.475)
2002	1.161 (0.158)	1.413 (0.200)	1.707 (2.059)	1.521 (0.291)	1.739 (0.245)	1.413 (0.637)
2003	1.171 (0.135)	1.574 (0.225)	2.311 (2.780)	1.449 (0.240)	1.481 (0.204)	1.313 (0.518)
2004	1.072 (0.140)	1.451 (0.207)	1.733 (2.042)	1.330 (0.245)	1.560 (0.185)	1.316 (0.566)
2005	1.078 (0.128)	1.436 (0.202)	1.938 (2.315)	1.360 (0.254)	1.773 (0.225)	1.269 (0.575)
2006	1.120 (0.142)	1.407 (0.212)	2.037 (2.393)	1.343 (0.277)	1.647 (0.216)	1.296 (0.516)
2007	1.001 (0.119)	1.311 (0.180)	2.255 (2.587)	1.389 (0.279)	1.657 (0.238)	1.255 (0.536)
2008	0.987 (0.108)	1.332 (0.179)	1.271 (1.525)	1.301 (0.263)	1.724 (0.252)	1.153 (0.472)
age18_20	2.353 (0.136)	1.454 (0.085)	0.399 (0.115)	1.567 (0.085)	0.428 (0.034)	1.101 (0.189)
age21_25	1.842 (0.110)	1.490 (0.073)	0.431 (0.061)	1.286 (0.068)	0.566 (0.036)	1.074 (0.109)
age26_30	1.292 (0.066)	1.319 (0.062)	0.694 (0.088)	1.137 (0.055)	0.726 (0.042)	1.144 (0.111)
age36_40	0.865 (0.052)	0.737 (0.045)	0.755 (0.175)	0.778 (0.053)	1.180 (0.090)	1.166 (0.161)
age41_45	0.969 (0.088)	0.605 (0.061)	0.582 (0.246)	0.792 (0.085)	1.822 (0.146)	1.846 (0.326)
age46_up	0.899 (0.086)	0.396 (0.060)	0.468 (0.263)	0.624 (0.090)	2.163 (0.259)	1.805 (0.390)
br_a	8.165 (0.901)	0.837 (0.070)	1.068 (0.237)	0.366 (0.029)	0.298 (0.028)	0.441 (0.055)
br_b	2.840 (0.179)	0.756 (0.040)	0.314 (0.044)	0.353 (0.018)	0.233 (0.014)	0.268 (0.022)
br_c	1.443 (0.062)	0.846 (0.033)	0.390 (0.048)	0.516 (0.021)	0.324 (0.016)	0.351 (0.029)
escortanal	0.893 (0.050)	1.180 (0.080)	1.503 (0.581)	1.269 (0.122)	1.363 (0.116)	1.142 (0.157)
massage	0.937 (0.044)	1.158 (0.054)	2.355 (0.303)	1.071 (0.053)	1.170 (0.077)	1.116 (0.123)
tantra	1.005 (0.217)	0.977 (0.168)	2.778 (1.420)	1.061 (0.278)	1.150 (0.322)	1.272 (1.070)
massage_fellatio	1.052 (0.083)	0.995 (0.051)	2.839 (0.758)	1.276 (0.111)	1.484 (0.125)	1.257 (0.290)
bdsm	0.934 (0.112)	1.821 (0.160)	4.601 (1.041)	1.132 (0.133)	1.329 (0.188)	1.908 (0.240)
black	1.145 (0.074)	1.721 (0.067)	3.834 (0.602)	1.258 (0.098)	1.501 (0.150)	2.256 (0.238)
asian	1.508 (0.068)	0.844 (0.056)	0.669 (0.126)	0.799 (0.030)	0.474 (0.043)	0.780 (0.100)
hispanic	0.763 (0.031)	1.078 (0.071)	1.104 (0.197)	1.132 (0.064)	0.954 (0.058)	1.113 (0.120)
foreign	1.164 (0.066)	1.276 (0.090)	1.301 (0.310)	0.913 (0.052)	0.875 (0.085)	1.351 (0.161)
oth	0.986 (0.076)	1.215 (0.131)	1.626 (0.553)	1.209 (0.173)	1.077 (0.173)	1.280 (0.264)
$N \times T$	94404					
McFadden's Pseudo R^2	0.0842					

Model was estimated using multinomial logit. City fixed effects, body and height controls, transsexuality and business criteria were included but are not shown here. Standard errors are clustered at the city level. Due to difficulty in achieving convergence, the 6'5" and higher height category was not controlled for. Out of the 94,404 observations, 5 providers were reportedly taller than 6'5".

Table 14 Multinomial Logit Estimates of Determinants of Escort Type in TER Data

Covariate	Escort & Anal Sex	Sensual Massage	Tantra	Massage & Fellatio	BDSM
2000	2.307 (0.713)	0.957 (0.104)	1.407 (0.365)	1.579 (0.477)	2.179 (1.724)
2001	2.947 (1.129)	0.781 (0.104)	1.484 (0.815)	2.648 (0.710)	6.816 (4.362)
2002	3.954 (1.726)	0.676 (0.114)	1.824 (1.058)	1.957 (0.504)	8.126 (5.338)
2003	3.504 (1.381)	0.573 (0.104)	1.349 (0.729)	1.808 (0.439)	8.221 (5.683)
2004	3.594 (1.298)	0.518 (0.088)	1.021 (0.467)	1.430 (0.382)	7.362 (4.931)
2005	3.240 (1.270)	0.425 (0.087)	0.886 (0.432)	1.037 (0.283)	6.706 (4.740)
2006	3.708 (1.482)	0.349 (0.072)	0.793 (0.549)	0.961 (0.260)	6.087 (3.970)
2007	3.793 (1.412)	0.372 (0.091)	0.587 (0.372)	1.070 (0.304)	5.596 (3.729)
2008	3.399 (1.382)	0.296 (0.068)	0.603 (0.361)	0.714 (0.208)	3.721 (2.640)
age18_20	1.080 (0.081)	0.396 (0.044)	0.229 (0.105)	0.490 (0.063)	0.224 (0.057)
age21_25	0.973 (0.077)	0.675 (0.058)	0.471 (0.109)	0.649 (0.052)	0.442 (0.081)
age26_30	0.967 (0.071)	0.877 (0.040)	0.844 (0.183)	0.869 (0.079)	0.714 (0.084)
age36_40	1.276 (0.126)	1.059 (0.060)	2.151 (0.539)	1.228 (0.109)	0.994 (0.108)
age41_45	1.645 (0.271)	1.063 (0.113)	2.427 (0.618)	1.615 (0.270)	1.346 (0.205)
age46_up	1.249 (0.251)	1.523 (0.159)	4.238 (1.645)	1.548 (0.316)	1.606 (0.256)
independent	1.720 (0.171)	0.875 (0.091)	1.613 (0.311)	0.821 (0.077)	1.318 (0.237)
black	1.422 (0.092)	1.087 (0.079)	1.184 (0.353)	1.521 (0.227)	0.793 (0.118)
asian	0.758 (0.131)	1.634 (0.272)	1.359 (0.382)	3.758 (0.606)	0.370 (0.055)
hispanic	1.558 (0.174)	0.803 (0.075)	0.541 (0.254)	1.474 (0.215)	0.292 (0.042)
foreign	0.818 (0.145)	1.074 (0.303)	0.804 (0.267)	0.978 (0.215)	0.496 (0.101)
oth	0.995 (0.208)	1.199 (0.106)	1.776 (0.569)	1.685 (0.330)	0.589 (0.176)
$N \times T$	89867				
McFadden's Pseudo R^2	0.1453				

Model was estimated using multinomial logit and coefficients are expressed as relative risk ratios. The base outcome is the "escort" category of provider, which is the most common type of provider in all years (60% in 1999 and 80% in 2008). Each coefficient is a transformed exponentiated relative-risk ratio. The relative risk ratio tells us how the probability of being in the numerator group relative to being an escort changes if we increase the covariate by one unit. An example of the interpretation is as follows: the relative risk of being a Tantra specialist in 2001 versus being an escort is 1.407, or 40.7% higher. All models include city fixed effects, body and height categorical controls, business criteria controls and transsexuality were all controlled for but are not shown here. Standard errors are clustered at the city level.

Table 15 Multinomial Logit Estimates of Factors Correlated with Prostitute Hair Color in TER Data

Covariate	$\frac{Pr(Black)}{Pr(Blonde)}$	$\frac{Pr(Brown)}{Pr(Blonde)}$	$\frac{Pr(Red)}{Pr(Blonde)}$	$\frac{Pr(Bleached)}{Pr(Blonde)}$
2000	0.683 (0.113)	0.866 (0.148)	0.588 (0.102)	1.114 (0.141)
2001	1.133 (0.147)	1.175 (0.164)	0.819 (0.161)	0.272 (0.045)
2002	1.066 (0.145)	1.094 (0.160)	0.774 (0.159)	0.247 (0.034)
2003	1.079 (0.148)	1.119 (0.163)	0.705 (0.160)	0.238 (0.036)
2004	1.182 (0.173)	1.173 (0.156)	0.702 (0.143)	0.216 (0.030)
2005	1.192 (0.181)	1.182 (0.185)	0.669 (0.142)	0.225 (0.032)
2006	1.166 (0.158)	1.166 (0.171)	0.649 (0.147)	0.209 (0.031)
2007	1.387 (0.183)	1.241 (0.174)	0.605 (0.122)	0.195 (0.029)
2008	1.581 (0.217)	1.298 (0.187)	0.598 (0.138)	0.222 (0.032)
br_a	1.628 (0.100)	1.472 (0.091)	1.677 (0.160)	1.532 (0.117)
br_b	1.403 (0.062)	1.396 (0.047)	1.336 (0.099)	1.159 (0.066)
br_c	1.111 (0.037)	1.189 (0.039)	1.104 (0.044)	1.026 (0.043)
escortanal	0.884 (0.109)	0.869 (0.098)	1.162 (0.162)	0.910 (0.099)
massage	1.525 (0.068)	1.306 (0.073)	0.955 (0.058)	0.982 (0.084)
tantra	2.602 (0.582)	1.906 (0.437)	1.207 (0.356)	0.894 (0.266)
massage_fellatio	1.227 (0.190)	1.049 (0.097)	0.894 (0.129)	0.824 (0.134)
bdsm	2.982 (0.301)	1.308 (0.101)	2.071 (0.295)	0.712 (0.091)
age18_20	1.009 (0.074)	1.248 (0.063)	0.854 (0.067)	0.859 (0.065)
age21_25	1.003 (0.053)	1.131 (0.034)	0.765 (0.047)	0.855 (0.057)
age26_30	1.069 (0.048)	1.119 (0.040)	0.863 (0.058)	0.912 (0.055)
age36_40	1.042 (0.070)	0.976 (0.068)	1.198 (0.067)	1.103 (0.090)
age41_45	0.998 (0.071)	0.928 (0.063)	1.495 (0.182)	1.260 (0.094)
age46_up	0.932 (0.100)	0.851 (0.106)	1.350 (0.212)	1.662 (0.162)
independent	0.925 (0.032)	1.056 (0.033)	1.328 (0.043)	0.785 (0.031)
black	190.072 (15.904)	15.728 (1.191)	2.595 (0.322)	7.718 (1.116)
asian	326.181 (62.662)	25.383 (5.395)	4.410 (1.234)	15.845 (3.559)
hispanic	18.764 (2.230)	5.938 (0.737)	1.128 (0.137)	2.891 (0.332)
foreign	3.264 (0.301)	1.655 (0.124)	1.014 (0.098)	1.330 (0.097)
oth	55.986 (7.876)	10.635 (1.270)	1.802 (0.414)	4.021 (0.852)
$N \times T$	94404			
McFadden's Pseudo R^2	0.1665			

Model was estimated using multinomial logit and coefficients are expressed as relative risk ratios. The base outcome is the 31-35 year old age group. Each coefficient is a transformed exponentiated relative-risk ratio. The relative risk ratio tells us how the probability of having the numerator hair color relative to having blonde hair (the denominator hair color). All models include city fixed effects, body and height categories, transsexuality and business administration criteria control variables (not shown). Standard errors are clustered at the city level.

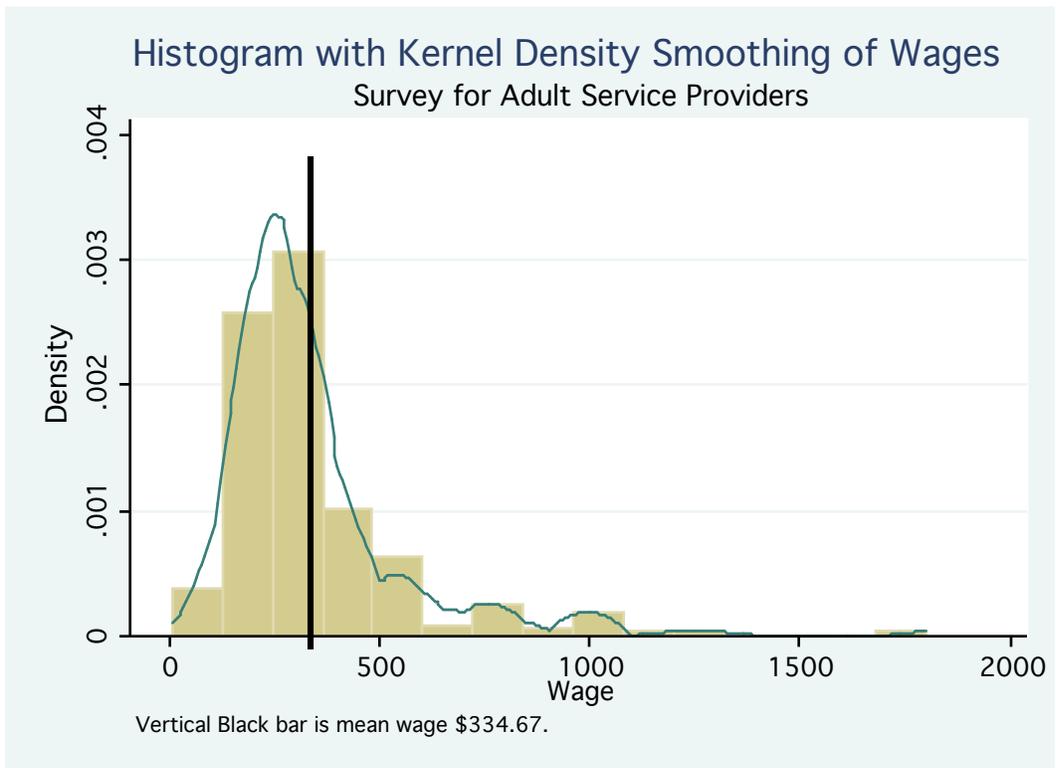


Figure 7 Histogram with Kernel Density Smoothing of SASP Respondent Wages

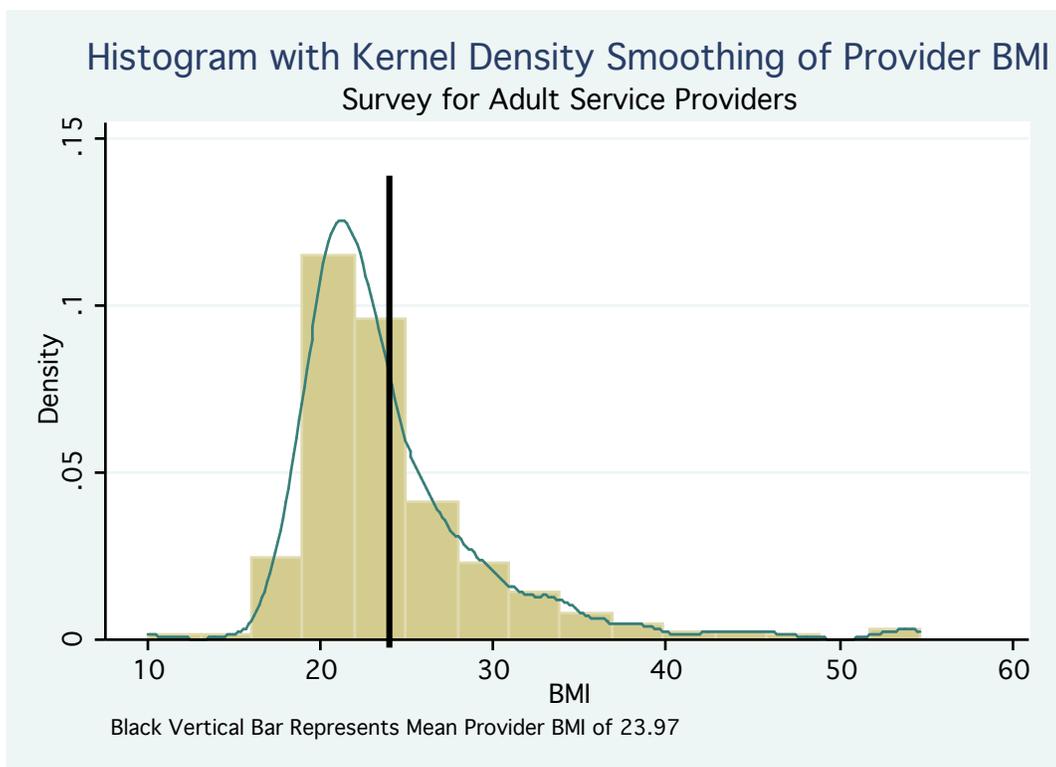


Figure 8 Histogram with Kernel Density Smoothing of SASP Respondent BMI

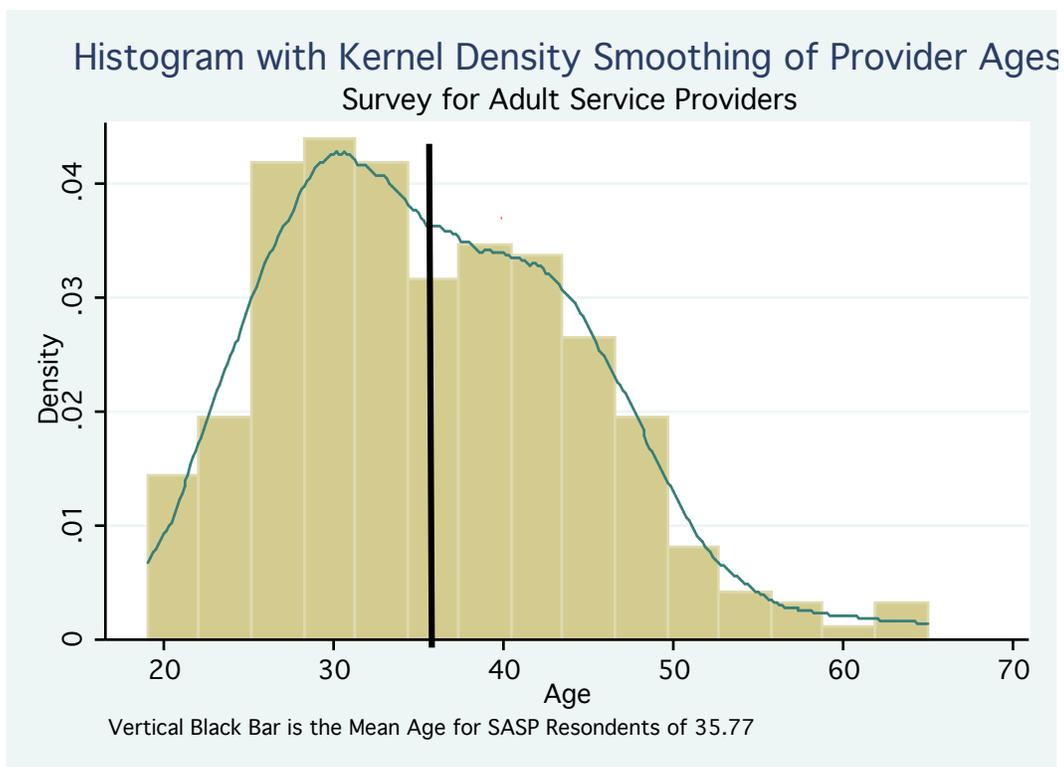


Figure 9 Histogram with Kernel Density Smoothing of SASP Respondent Ages

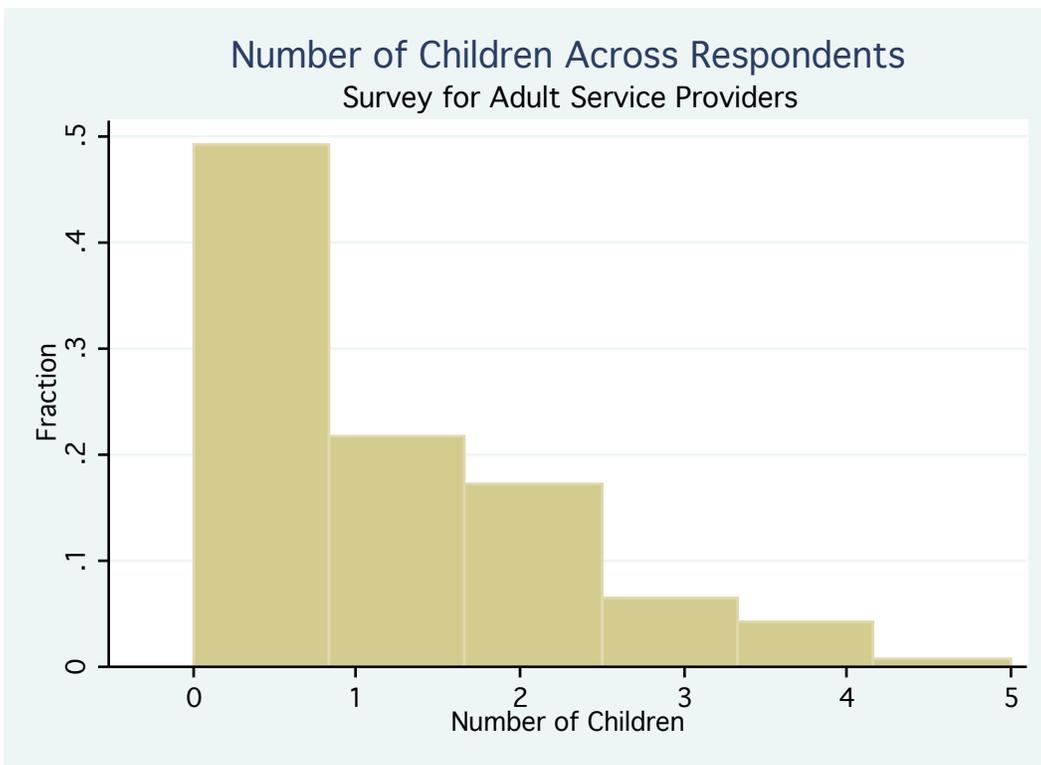


Figure 10 Distribution of the Number of Children Across all Respondents

Table 16 Age Distributions for SASP, TER and NIBRS

Age Category	SASP 2008/2009	TER 2008	NIBRS 2005
18-20	0.01	0.13	0.05
21-25	0.10	0.44	0.13
26-30	0.22	0.24	0.15
31-35	0.19	0.10	0.18
36-40	0.16	0.05	0.18
41-45	0.16	0.02	0.13
46 up	0.16	0.01	0.18

Each cell represents the proportion of that dataset's respective sample that was within the age category range shown on the left-hand side. Thus, 1% of SASP respondents were 18-20, whereas 13% of TER in 2008 were 18-20, and 5% of NIBRS 2005 were.

Table 17 Sample Summary Statistics from SASP

Variable	N	Mean	SD	Min	Max
Number of Child	338	0.97	1.20	0	5
High School Graduate	338	0.92	0.27	0	1
Some College	338	0.82	0.39	0	1
Bachelors Degree	338	0.48	0.50	0	1
Currently Enrolled	338	0.11	0.30	0	1
Works Another Job	338	0.47	0.50	0	1
Has Health Insurance	338	0.50	0.50	0	1
Medicaid	338	0.10	0.31	0	1
BMI	318	23.97	5.76	9.98	54.73
Cohabiting and living with partner	327	0.16	0.36	0	1
Currently Married and Living with Spouse	327	0.17	0.37	0	1
Divorced, not Remarried	327	0.29	0.46	0	1
Married and Separated	327	0.046	0.21	0	1
Single and Never Married	327	0.32	0.47	0	1
Widowed and Not Remarried	327	0.02	0.13	0	1
Age	320	35.77	8.80	19	65
First Age as a Provider	324	27.75	9.12	7	58
Years of Experience	319	8.10	7.20	0	43

Data is Drawn from SASP.

Table 18 BMI Distribution in SASP by Race and Age

	Category	Mean BMI	SD
Race	White	24.00	5.87
	Black	25.12	6.80
	Asian	19.80	1.57
	Hispanic	28.04	8.44
	Multiracial	23.54	3.92
Age	<25	23.23	5.00
	25-35	23.87	5.21
	35-42	23.75	6.70
	42-up	24.65	5.99

Table 19 OLS and Instrumental Variables Estimates of the Effect of Education on Weekly Earnings in SASP

	Depvar: Weekly Earnings			Depvar: Ln(Wage)		
	OLS	2SLS	OLS	OLS	2SLS	OLS
No. Clients in Last 7 Days	226.393 (67.737)	219.249 (64.571)	242.097 (69.166)			
No. Days/Nights Worked in Last 7 Days	161.103 (111.169)	110.664 (116.540)	162.265 (106.587)			
Education	71.506 (157.279)	1282.489 (696.673)		0.107 (0.046)	0.341 (0.171)	
Reference Screening			950.232 (466.003)			0.590 (0.173)
BMI	-75.119 (25.072)	-65.556 (30.078)	-72.788 (25.074)	-0.036 (0.008)	-0.035 (0.009)	-0.034 (0.007)
Screens at All			-138.463 (432.523)			-0.002 (0.166)
Age	34.178 (122.530)	82.114 (152.634)	2.844 (20.464)	-0.021 (0.045)	-0.013 (0.045)	0.003 (0.007)
Age ²	-0.588 (1.540)	-1.507 (2.037)		0.000 (0.001)	0.000 (0.001)	
Asian	299.906 (1764.142)	1383.706 (1636.466)	44.100 (1633.176)	0.060 (0.279)	0.265 (0.336)	-0.106 (0.280)
Black	-424.809 (1502.862)	-224.104 (1441.802)	-465.052 (1466.972)	0.014 (0.265)	0.066 (0.254)	-0.002 (0.257)
Hispanic	546.740 (878.097)	-927.914 (985.066)	1117.000 (775.488)	0.131 (0.303)	-0.144 (0.350)	0.563 (0.248)
Multiracial	0.000 (0.000)		0.000 (0.000)	0.000 (0.000)		0.000 (0.000)
Other	-1061.458 (2128.747)	-225.755 (1572.579)	-999.082 (1977.482)	0.289 (0.390)	0.482 (0.347)	0.373 (0.312)
US Born	513.891 (575.774)	391.408 (646.101)	377.372 (581.213)	0.135 (0.186)	0.131 (0.191)	0.032 (0.182)
Cohabiting (living with partner)	-1094.511 (797.505)	-1597.012 (1111.967)	-885.386 (802.791)	-0.259 (0.234)	-0.357 (0.227)	-0.106 (0.227)
Married and Living with Spouse	-461.547 (746.638)	-384.445 (819.964)	-412.263 (741.307)	0.128 (0.267)	0.134 (0.257)	0.144 (0.258)
Divorced and Not Remarried	-843.601 (667.600)	-970.515 (779.236)	-926.224 (681.494)	-0.117 (0.188)	-0.142 (0.180)	-0.186 (0.182)
Married and Separated	-134.426 (581.553)	588.056 (714.687)	-168.693 (556.057)	0.058 (0.203)	0.179 (0.246)	-0.083 (0.200)
Widowed and Not Remarried	-1358.710 (804.042)	-2227.544 (1117.404)	-1614.233 (857.229)	-0.624 (0.302)	-0.821 (0.329)	-0.747 (0.329)
Any Children	416.430 (379.762)	582.657 (476.002)	352.029 (389.752)	-0.007 (0.154)	0.010 (0.152)	-0.041 (0.151)
Cragg-Donald (N-L)*CDEV/L1 F-statistic		10.41				
Robust F-statistic		10.94				
<i>N</i>	203	201	203	204	202	204
<i>R</i> ²	0.503	0.179	0.516	0.454	0.327	0.505

The sample of data used in these regressions are providers who provided answers to questions represented by the above covariates. The dependent variables in the first two columns is the total earnings over the last seven days, including any tips. The dependent variable in the columns 3 and 4 is reportedly weekly earnings divided by the number of clients over the last week ("wage"). We then took the natural log of this value, making the dependent variable the natural log of the constructed wage variable. The endogenous variable is education. In the second and fourth columns, we use maternal education as an instrument for the own-education. Robust F-statistics are shown. Both models includes month and state fixed effects.

Table 20 Fixed Effects (Within-Estimation) Estimates of the Effect of Client Characteristics and Session Practices on Hourly Wage, including Tips (SASP)

	1	2	3	4
Vaginal Sex	41.230 (46.255)	41.814 (46.517)	41.075 (43.769)	-7.251 (46.166)
Unprotected Vaginal Sex				709.712 (635.678)
Anal Sex		-12.406 (36.412)	-12.856 (36.902)	-0.539 (45.342)
Unprotected Anal Sex				-629.326 (641.158)
Fellatio			10.614 (69.086)	74.399 (89.392)
Fellatio without Condom				-136.559 (70.273)
Age of Client	4.425 (5.717)	4.408 (5.728)	4.412 (5.731)	3.256 (4.801)
Asian Client	316.252 (232.226)	317.130 (231.892)	317.488 (232.079)	334.768 (227.962)
Black Client	229.043 (226.385)	230.039 (225.883)	230.795 (226.217)	245.858 (214.804)
Hispanic Client	152.332 (223.974)	154.075 (223.156)	153.585 (223.082)	182.817 (223.738)
Other Ethnicity	211.298 (200.714)	212.092 (200.321)	212.213 (200.448)	221.806 (187.606)
Provider Fixed Effects	Yes	Yes	Yes	Yes
<i>N</i>	1187	1187	1187	1187
<i>R</i> ²	0.011	0.011	0.011	0.034

All three models are estimated using within-provider fixed effects.