

The Economics of Sex Markets: Regulation, Online Technology and Sex Trafficking

Scott Cunningham and Manisha Shah

I. Introduction

Prohibition of sex work is the norm across the globe, even though prostitution is often touted as “the oldest profession.” Given its underground nature, it is difficult to estimate the exact number of buyers and sellers in this market. Some claim that there are over 1 million sex workers in the United States, and at least 14 million supplying sex worldwide (Havoscope.com). The vast majority of the supply side is female while the vast majority of the demand side is male, though male suppliers have been on the rise. Different data sources suggest that anywhere between 16 and 30 percent of men have paid for sex in the United States (General Social Surveys, 1992–2010; Langer et al., 2004). The sex market in the United States is estimated to generate close to 15 billion US dollars in revenue, with worldwide revenue at approximately 186 billion (Havoscope.com).

While prohibition is arguably due to moral concerns, disease transmission and victimization risks associated with sex markets are themselves salient enough concerns that they play an important role in policy (Posner and Silbaugh, 1996). Legislating sex markets is complicated due to moral repugnance (Roth, 2007), as many believe sex should not be a transaction that is priced in the market. However, any questions related to legislation, disease transmission, and crime risks associated with this market are open issues.

We explain the economic organization of sex worker markets in this chapter by focusing on three interrelated issues: (i) regulation, (ii) technology, and (iii) involuntary sex work or trafficking. While each of these issues overlap, they are distinct enough that

they have constituted a working research agenda for some economists, and thus we separate and explore them in detail.

The range of current regulatory policies around the world include (a) criminalizing sex workers, (b) licensing and regulating sex work, (c) full decriminalization, and (d) criminalizing clients (also known as the Nordic or Swedish model). We take each regime, describe it, and discuss the most up-to-date research from economics. It is important to note there is no consensus on an optimal policy, which is likely why we observe so many regimes across the globe. It is also important to note that our discussion on sex market regulation for the most part will focus on voluntary sex work. However, we note that some participants in this market are coerced and forced into sex work. We discuss the role of the Internet and public policy around technology, and how they have shaped and impacted the current state of the sex market. We then discuss the issues of involuntary sex work and trafficking in Section IV. We conclude with some recommendations for further areas of study and research.

II. Sex Market Regulation

A. Prohibition or Criminalization

Most governments across the globe—including the United States—prohibit and criminalize sex work. In addition, it is generally the female suppliers who are arrested for crimes related to sex work, not the male buyers. The public policy motivation for prohibition is to decrease sex work because of the various social ills it either creates, or because the nature of the exchange is itself morally reprehensible. However, a recent meta-analysis related to sex work laws and sex workers' health finds that repressive policing of sex workers is associated with increased risk of sexual and physical violence from clients

or other parties, HIV, sexually transmitted infections (STIs), and condom-less sex (Platt et al., 2018). The qualitative synthesis identified diverse forms of police violence and abuses of power against sex workers, including arbitrary arrest, bribery and extortion, physical and sexual violence, failure to provide access to justice, and forced HIV testing. It showed that in contexts of criminalization, the threat and enactment of police harassment and arrest of sex workers or their clients displaced sex workers into isolated work locations, disrupting peer support networks and service access, and limiting risk reduction opportunities (Platt et al., 2018).

A recent paper by Cameron, Muz, and Shah (2019) examines the impact of criminalizing sex work in a causal framework, exploiting an event in which local officials unexpectedly criminalized sex work in one district in East Java, Indonesia, but not in neighboring districts. The authors collect data on female sex workers and their clients before and after the change. Consistent with the findings from the meta-analysis above, the authors find that criminalization increases sexually transmitted infections among female sex workers by 58 percent, as measured by biological tests. This is driven by decreased access to condoms and condom use.

Their research also shows that criminalization decreases earnings among women who left sex work due to criminalization, along with their ability to meet children's school expenses while increasing the likelihood that children begin working to supplement household income. They also find STI prevalence among the general population likely increases. Their work suggests that criminalization has negative impacts both for sex workers involved in the industry as well as clients and others associated with the industry.

Cunningham and Shah (2018) also attempt to investigate the impact of re-criminalization of indoor sex work in Rhode Island. They find some suggestive evidence that reported rape offenses increase post re-criminalization in Rhode Island. Unfortunately, the time series they use is not that long post-criminalization and therefore this remains an important area of further research.

B. Legal and Regulated Sex Work

A number of countries have moved away from prohibition and criminalization. Yet, despite a common ancestry in criminalization, different countries are adopting different types of regulatory regimes. In many of these countries, sex work is legal and regulated, although activities like pimping and brothel ownership are generally illegal. This legal and regulated regime is most commonly found in Latin America, Europe, and parts of Australia. A common approach under these types of regimes is regulation of sex workers, where regulation aims to reduce infectious disease by providing government certification of female sex workers' health. In addition, distinctions are often made between indoor (brothel, massage parlor, etc.) vs. outdoor (street) sex work. While indoor sex work is legal and regulated, outdoor sex work or street-walking can be illegal.

Occupational Licensing in Low-Income Countries

The majority of the regulation literature in lower-income countries has focused on the value of this certification and the impact of enforcement on public health outcomes. Under regulation, sex work is legal if the sex worker obtains a license certifying that she is healthy and clear of infection on the basis of results of frequent STI test results and medical

checkups. The objective is to use testing to identify infected sex workers, remove them from the workforce at least temporarily, and treat them before they return to work so as to prevent them from infecting others.

In lower-income countries—unlike Western Europe where national health insurance covers medical checkups and the cost of testing—sex workers often have to pay substantial fees for the tests in terms of both time and money, and they can have substantial loss of earnings due to isolation while undergoing treatment. In addition, if they are found to be HIV positive, they cannot return to work because there is no cure. As a result, there is substantial noncompliance with the licensure regulations, thereby mitigating their effectiveness in reducing infection rates.

Gertler and Shah (2011) investigate how the enforcement of the licensing regulation (called a carnet) affects sex workers and their STI rates in Ecuador, using nationally representative sex worker data that they collected. Indoor sex workers are required to have carnets, a health certificate indicating that the worker is free from STIs and HIV/AIDS. Any costs associated with this fall on the sex worker, so there is also a vibrant illegal outdoor street market where sex workers do not have carnets. In addition, there are sex workers working in brothels without or with outdated carnets.

They find that increasing enforcement in the street sector significantly decreases STIs. Increasing enforcement in the street shifts some sex workers from the riskier street into the less risky brothels and increases street prices, reducing the overall number of street clients. As a result, overall infection rates decrease. In contrast, increasing enforcement in the brothel sector can exacerbate public health problems by inducing some unlicensed brothel sex workers into the riskier street sector.

Manian (2019) argues that low take-up of these certification programs can be explained by the information structure of sex markets using data from Senegal. She shows that these certification programs have little value because (i) prices respond to sex workers' STI status, suggesting that sex worker health is partially observable; (ii) take-up of certification is low even when there are no monetary costs; and (iii) there is no evidence for a large premium to certified sex workers.

In a sample of 291 uncertified sex workers, Manian (2019) provides information about certification and offers a one-time, monetary certification incentive to a randomly selected treatment group of sex workers. Take-up of this incentive is surprisingly low: only 7 percent of the treatment group got certified, relative to 2 percent of the control group. Manian argues this low participation rate does not appear to be driven by the time and transportation costs of certification, and that the most significant cost is self-stigma: In a context where sex work is highly stigmatized, it is costly for a woman to admit that she is a sex worker.

Ito, Lepine, and Treibich (2018), also in Senegal, find that registration has a positive effect on sex worker health but that registration reduces sex worker subjective well-being using propensity score matching. They explain this finding by the fact that registered sex workers engage in more sex acts, in riskier sex acts, have less social support from their peers, and are more likely to experience violence from clients and police officers. They argue that their results suggest that more efforts should be deployed to reduce the stigma associated with registration and to address the poor well-being of sex workers.

Both the Manian (2019) and Ito et al. (2018) results are consistent with Della Giusta et al. (2009), whose economic model of sex work gives a central role to stigma. The results

suggest that while certification programs may be valuable for a subset of sex workers who participate, they are unlikely to achieve full health coverage of female sex workers. Complementary services to reach uncertified sex workers are necessary to achieve STI control. In addition, stigma and subjective well-being are important indicators that we need to think further about.

Nevada brothels

Nevada is unique in the United States in that it legally allows for indoor sex work in the form of regulated brothels in the state's rural counties. To understand why Nevada enjoys such a unique position requires some understanding of the state's history, its cultural and political values, and its economy. Nevada's main source of income is tourism. Until the 1860s, the state was largely uninhabited, but with the discovery of silver, boomtowns like Virginia City emerged. These towns had vibrant prostitution sectors. "While gambling was number one, prostitution remained Las Vegas's number two tourist attraction" (Brents, 2016).

To make the state more palatable to more tourists, Las Vegas shifted from gambling to also making itself a resort destination. To accomplish this, Reno and Las Vegas closed all of their open prostitution establishments in the 1950s, and casino owners and local officials attempted to outlaw the brothels throughout the state during the 1970s. They were unsuccessful because these firms were key sources of reliable revenue in small towns that otherwise faced considerable cyclicalities, such as with mining. Nevada's "Old" West tradition, its libertarian values, and its tourist economy have been key to the brothels remaining open.

The state was mostly silent when it came to managing the brothel industry. The only laws were related to restricting location, advertising, and recruitment. Brothels had to stay away from “respectable” parts of town, as well as schools and churches, but otherwise Nevada left them alone (Brents, 2016). This changed with the arrival of HIV/AIDS, at which point the state’s government became more involved. During the late 1980s, the department of health worked closely with the brothel industry to craft stricter health laws. These included mandatory condoms during all intimate contact, weekly STI testing for chlamydia, gonorrhea, and syphilis, and monthly HIV tests (Brents, 2016). In a way, this worked to the brothel’s advantage. For example, during the AIDS epidemic the brothels marketed themselves as disease-free and clean places to purchase commercial sex.

As the state has limited regulations of the brothel industry, regulation fell to the local governments. The brothels are organized through a licensing system, and the licenses are allocated by the county or city. These licenses are non-transferable, and many counties have placed a cap on the number of licenses (Brents and Hausbeck, 2001; Brents, 2016). The licenses can be revoked for any cause “harmful to the health, safety and welfare of the general public” (Brents and Hausbeck, 2001), which means brothel owners must maintain good relationships with local law enforcement and officials.

The system of licensed governance left the state’s brothels with approximately 500 sex workers in employment in 20-25 brothels. It is a small market, especially when compared to the large illegal sector in Las Vegas and Reno. But, unlike many illegal markets, the Nevada brothels report very low levels of violence committed against the workers themselves. This is most likely due to the worker safety regulations that were created and which are consistently enforced. Intercoms, for instance, are in every worker’s

room. Management, therefore, listens at the beginning of the encounter during the client and worker negotiations to ensure that there are no problems. Each room is equipped with an emergency panic button connecting to an intercom or management staff. And while these are rarely used, they are credible threats, which help ensure safety on the premises.

The health regulations are most likely responsible for the brothels being effectively disease-free. There are two types of health regulations used by local governments: the universal requirement that condoms be used for every type of intimate contact, and the visible inspection of the client's genitalia for evidence of an STI. Together, the brothels have developed a reputation for being clean and STI-free.

Street Sex Work Zones

To a degree greater than that of other sex workers, street-based sex workers appear to struggle with drug addiction and substance abuse (Goldstein, 1979; Potterat et al., 1998; Church et al., 2001), worker exploitation by pimps or other managers (Reynolds, 1986; Weitzer, 2005), and high rates of mental illness (Exner et al., 1977, Alegria et al., 1994). According to several historical studies, street sex work has higher rates of sexually transmitted infections (Willcox, 1962; Dunlop et al., 1971; Potterat et al., 1979). Furthermore, a number of studies document substantial heterogeneity in characteristics, experiences, and risk behaviors between street and off-street workers (Weitzer, 2005; Cunningham and Kendall, 2010), which likely mean there exist substantial barriers and frictions that make worker movement between these sectors difficult. Given high comorbidity of homelessness, chemical dependency, and mental illness, street sex workers

may be relatively less responsive to changes in inter-sector wages. In fact, there is substantial agreement that street-based sex workers' labor supply is fairly inelastic.

Given that the indoor and outdoor sectors have evolved in locations without much between-sector movement by workers, analysis of the two groups of workers reveal there are significant differences between these workers and therefore the sectors' risks overall. In Church et al. (2001), the authors interviewed 240 female sex workers, 115 of whom worked outdoors and 125 who worked indoors in saunas or flats. They find that street sex workers are younger, have been involved in prostitution from an earlier age, report higher prevalence of illegal drug use, and experienced considerably more violence at the hands of clients than their counterparts who work indoors. Outdoor sex workers report higher frequency of being slapped, punched, or kicked compared to indoor sex workers. Sex workers working outdoors are six times more likely to have experienced recent violence by clients than those who worked indoors.

The Netherlands has historically been fairly lenient toward sex work, and in 1983 The Hague opened the first *tippelzone* – a specific area where street sex work is legal between strict hours of operation. These zones were first initiated in response to complaints by residents about the nuisance of street sex work in the neighborhood, and to the safety and health concerns of the sex workers. Unsurprisingly, residents had polarizing opinions around the tippelzones. Until recently, there has not been much research conducted on this matter.

Bisschop et al. (2017) fill this gap in empirical scholarship by studying the causal effect of the tippelzones on violence against women. They do this by taking advantage of

the temporal shifting of an area from “no tippelzone” to tippelzone legalization using a dynamic differences-in-differences design. This allows them to identify a plausible causal effect of the tippelzones on violence against women.

According to economic theory, the authors make a few predictions as to the effect of these tippelzones on crime. First, with a neoclassical Becker crime model in mind, the authors hypothesize that opening the tippelzones will reduce sexual violence because of the higher police monitoring. Crime theory predicts that the zones will reduce sexual violence on the general public because, similar to the explanation proposed by Cunningham and Shah (2018), marginal rapists will turn to procuring the services of sex workers in place of expressing sexual violence towards women. Additionally, the authors predict that the licensing system should encourage a decline in involuntary sex work and trafficking.

Bisschop et al. (2017) use data obtained from the Ministry of Justice between 1994 and 2011 for 25 Dutch cities and show that opening a tippelzone decreases registered sexual abuse and rape by about 30–40 percent in the first two years. For cities which enforced licensing in tippelzones, the authors also find reductions in drug-related crime and long-term effects on sexual assaults.

C. Decriminalization

There has been a recent push for the global decriminalization of sex work (Lancet, 2015; Amnesty International, 2015). In addition, there are state-led movements within the United States also pushing for decriminalization of sex work (e.g. New York (NY S6419, 2019), Rhode Island (RI H 5354, 2019), etc.). The decriminalization of sex work is the removal of criminal penalties for sex work. The idea is that removing criminal prosecution

for sex workers should create a safer and healthier environment: allowing sex workers to live with less social exclusion and stigma.

The theoretical effect of decriminalization on sexual violence and STI transmission is ambiguous. Decriminalization lowers the costs associated with supplying and purchasing sex services, so we would expect decriminalization to expand the market. How the size of the market changes under different regulatory schemes is an area of further research. While it has been shown that decriminalization in New Zealand did not expand the market much (Abel et al., 2007), decriminalization of indoor sex work in Rhode Island did increase the size of the sex market substantially (Cunningham and Shah, 2018).

An expansion in sex services due to decriminalization may increase population STIs due to the increase in the size of the sexual network. More sex work might lead to more STI transmission. However, theoretical research suggests that higher STI rates are not necessarily guaranteed if lower-risk sex workers enter the network. More sex in the population, even among sex workers, may reduce an STI epidemic if the marginal sex worker has lower background risk or engages in safe behaviors that dilute the risk in the sexual network (Kremer, 1996; Kremer and Morcom, 1998).

In a natural experiment where Rhode Island unexpectedly decriminalized sex work, Cunningham and Shah (2018) show that female gonorrhea incidence declines 47 percent from 2004–09 in Rhode Island during this period of decriminalization. The authors argue that decriminalization likely caused gonorrhea to decrease by diluting the “core group” through the selection of lower-risk sex workers into the network (Hethcote and Yorke, 1984) and by reducing risky sex among indoor sex workers.

Another open question, theoretically, is about the impact of decriminalization on violence against women. Decriminalization could increase sexual violence if violence is an increasing function of the number of women employed in the market. Cho (2015) suggests that prostitution and sexual violence are complements under prohibition regimes since the two behaviors are positively correlated in cross-sectional data. But Bisschop et al. (2017) show that the two are negatively correlated when law enforcement create legal zones for purchases. Decriminalization could result in safer workspaces since firms might be more willing to invest in security due to well-defined property rights post-decriminalization (Bretons and Hausbeck, 2007). Sex workers may also be more willing to cooperate with police as police can now extract fewer rents. Thus, it is unclear what we should expect theoretically from decriminalization.

Exploiting the same natural experiment described above, Cunningham and Shah (2018) find that decriminalization reduces reported rape offenses by 30 percent from 2004-2009. While the exact mechanism is difficult to nail down, they argue that some of the decrease may be driven by the marginal man substituting toward sex work (as average prices decrease due to supply increase) and away from rape. This finding is substantiated in Ciacci and Sviatschi (2019) who find that opening of adult entertainment establishments in New York City decreases daily sex crime by 13% per police precinct, and has no effect on other types of crimes.

D. The Nordic or Swedish Model

Arguably the most popular alternative to prohibition and legalization in the 21st century is the banning of purchasing sexual services in commercial sex exchanges. This policy,

often called the Nordic model or the Swedish model, has been implemented in seven countries including four of the five Nordic countries (hence its name). Many consider the reform a best practice with strong support internationally among progressives (Kingston and Thomas, 2019).

The criminalization of the purchase of sex originated in Sweden in 1999, and under this model, the client, not the seller, is prohibited from the exchange. The idea was developed so as to target what was viewed as the exploitive nature of sex work without inadvertently harming sellers who were typically viewed as victims. Ekberg (2004) notes that the cause of sex work and trafficking is male desire: “without men’s demand for and use of women and girls for sexual exploitation, the global prostitution industry would not be able to flourish or expand.”

Just as the Women’s Christian Temperance Union had been instrumental in reforming American laws and norms regarding sex work, Swedish feminists were key leaders in convincing policy makers and Swedish residents that sex work was a social problem. But their argument broke from traditional moral reasoning about sex and instead emphasized an argument that sex work was intrinsically exploitive. Many of the arguments described sex workers as victims and clients as oppressors. For instance, Ekberg (2004) writes that the “patriarchal tool of oppression that has deleterious effects on the women and girls who are induced and kept in prostitution; as well as an extreme form of male violence used to control female human beings as a class” (p. 193).

Throughout the 1980s, feminist activists lobbied to reform the country’s sex work laws. On January 1, 1999, that reform materialized in the Act on Violence Against Women. This reform prohibited the purchase of sexual services without prohibiting the sale of

sexual services. The reform was a historical innovation in sexual services, because Sweden became the “first country to asymmetrically decriminalize individuals *exploited* in prostitution (primarily women and children) while criminalizing prostitution buying (pimping and brothel keeping were already criminalized)” (Mathieson, 2016, our emphasis). The law read:

A person who obtains casual sexual relations in exchange for payment shall be sentenced—unless the act is punishable under the Swedish *Penal Code*—for the purchase of sexual services to a fine or imprisonment for at most six months. Attempt to purchase sexual services is punishable under Chapter 23 of the Swedish Penal Code. (as cited in Ekberg, 2004, p 1191).

Since Sweden’s law was enacted in 1999, several other countries have followed suit and passed similar, though not identical, legislation. Examples include Norway, Finland, Iceland, Northern Ireland, Canada, France, Ireland, and Israel. Yet, while the law is considered best practice internationally, very little is known about the law’s actual effects. Most discussion about the Nordic model has been journalistic in nature or written about by NGOs and activists. Scientific study has lagged, and to date, there are only a handful of empirical papers attempting to estimate the model’s causal effects.

Ciacchi (2019) is one of the first social scientists to estimate the causal effect of Sweden’s reform and this research focuses primarily on sexual assault. Because the Swedish reform instituted both the use of fines and imprisonment to sanction purchasing, Ciacchi (2019) attempts to estimate the relationship between police fines for purchasing sex and population level rapes against women. Since police fines are endogenously chosen by law enforcement, based on preferences of police personnel, local political support, and local supply and demand factors, this paper employs instrumental variables. The instrument is a dummy equaling one in the month/region when the number of nearby intercontinental and continental flights are a standard deviation above the annual mean.

To understand what this instrument is conceptually based on, one must understand the role that sex tourism plays in these markets. The main destination of European sex tourists, and in particular Swedish sex tourists, is developing countries (Ciacci, 2019). As a result, intercontinental flights are the main means of transportation for Swedish sex tourists. He matches each region to the nearest airport, which is defined as an airport in a radius of 50km if such exists. This instrument is highly correlated with the number of fines in a region/month (up to the controls included in his model). Intercontinental flights become abnormally high (i.e., a standard deviation above annual trips) as the number of fines issued by police increases suggesting that Swedish sex tourists are leaving the country in response to the ban. The findings suggest that a one standard deviation increase in fines causes rapes in Sweden to increase by 13%, which translates into 712 more rapes between 1999 and 2014.

To understand the mechanism, the author collects data on the number of pimps from police records by month and region. He finds that higher fines result in more pimp convictions, which is suggestive evidence that the fines are causing sex workers to switch towards working with pimps who may be able to help find potential matches with clients. Thus, while the Nordic Model may reduce demand, it primarily shifts clients both out of the country and away from domestic sex workers more generally, with the unintended effect of shifting clients towards violence against women.

Another recent study that speaks to the implications of the Swedish model on sex markets and safety is Della Giusta et al. (2019). The authors note that the UK has been moving more toward this method in order to reduce demand for paid sex. They argue that the effect of criminalizing demand on sex markets is ambiguous. On the one hand, it should

reduce the number of clients and therefore the number of transactions. On the other hand, if supply is relatively inelastic, then criminalizing demand may cause sex workers to provide higher risk services and/or lower prices due to greater competition for the declining pool of clients. Using survey evidence from the UK from 2000-2012, Della Giusta et al. (2019) show that there is no evidence for declining demand. Instead, they find that the ban changed the type of clients observed towards the more risky, which is likely worse for the welfare of sex workers and society at large.

Unfortunately there is still a lack of empirical analysis in this area and we definitely need of further research on the impacts of the Nordic model. Other work in this area by authors like Ekberg (2004), Kulick (2003), Kuosmanen (2011), and Waltman (2011) is based on more anecdotal claims and small sample sizes. The estimated effect of the Nordic model is also likely confounded by the introduction of the Internet in these markets. Because the Internet has had a significant effect on reorganizing the sex markets (especially in high income countries) and pushing transactions into more clandestine channels (Cunningham and Kendall, 2011), before-and-after comparisons likely suffer from severe selection bias, even putting aside questions about the reliability of data. More research here is of utmost importance.

III. Internet Sex Work

In 1996 the United States Congress deregulated broadcasting markets through amendments to the Communications Act of 1934. Ironically, one of the implications of the amendment was the legislation's effect on commercial sex markets in the United States. The original language of the Act included prohibitions on the transmitting of "obscene"

text and images, including making a person criminally liable if he/she knowingly used a website to send explicit material of any kind to a minor (Kuzma, 2013). The inclusion of these anti-obscenity provisions was why the bill became known as the Communications Decency Act (CDA).

The Supreme Court struck down the liability provisions in a 1997 case *Reno v. ACLU* concluding that “while [the Court] has repeatedly recognized the governmental interest in protecting children from harmful materials”, the anti-obscenity provisions of CDA violated the First Amendment. As such, these sections of the law were removed. The ramification of this decision was that, without the anti-obscenity provisions, the 1996 Telecommunications Act effectively removed *all* liability from firms whose websites were used by third parties to post illegal material. Section 230 created a way in which the Internet could legally provide illicit platforms for users by specifying the following:

“No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.” (47 USC Section 230)

“No provider or user of an interactive computer service shall be held liable on account of the publishing on the website by third parties.” (47 USC Section 230)

Following CDA, illicit material relevant to commercial sex markets began appearing online. In August 1997, the first fee-based advertising site catering to the escort market appeared on the Internet (Brooks, 2009). David Elms opened The Erotic Review, a

national review website for clients to rate sex workers, in 1999. Craigslist opened its erotic services section in November 2002 in San Francisco, CA. And many smaller sites, more regional in focus, began showing up as well.

Cunningham and Kendall (2011; 2016) and Cunningham, DeAngelo, and Tripp (2019) discuss the new technologies' relevance for commercial sex markets in the United States and much of this section comes from this source material. Gambetta (2009) notes that the key problem that must be solved in criminal organization is one of self-identification. How will a sex worker identify herself to a potential client and vice versa? Prohibition makes such communication costly, yet without creating avenues for self-identification, matching cannot occur. The Internet has reduced search costs for clients in the sex market. For example, there is the introduction of inexpensive seller-driven online advertising (e.g., Craigslist, Backpage), review websites (e.g., The Erotic Review) and verification websites (e.g., Verify Him). Cunningham and Kendall (2011; 2016) describe how these institutions work and help organize matching in sex work markets.

The Communications Decency Act made it legal for platforms to emerge that would provide key information to buyers and sellers about one another. While these sites did not complete all parts of the matching process, the provision of information was essential for that matching process to begin. The first relevant platform was Craigslist's *erotic services* section. Craigslist opened erotic services in November 2002 and eventually rolled it out to over 700 locations by 2009. A free website originally, Craigslist's erotic services provided a flexible form of inexpensive classified advertising for sex workers. These ads were organized by city and calendar date thus allowing a client to search over a geographic area for sex workers in his area.

The second platform that emerged was the review website, such as BigDoggie.net, myRedbook.com, and The Erotic Review. These sites were geared towards empowering clients by providing them with a mechanism to review and rate their experiences with a sex worker. Often these sites had VIP access requiring paid memberships, which would then give the person access to a database of hundreds of thousands of reviewed sex workers all over the world, and over a million reviews. Such websites were important both for reducing search costs, but also for providing a mechanism for enforcing contracts without access to the courts (Cunningham and Kendall, 2016).

Finally, the Internet provided a variety of means by which sex workers could learn the true identity of a client before their first meeting, which we call “screening” and in some instances “signaling”. These screening mechanisms could either be performed by the sex worker or outsourced to a third party who had the comparative advantage in collecting information about the client (e.g., Verifyhim.com, Beenverified.com). Logan and Shah (2012) note that in some instances, sex workers themselves would signal their type to potential clients, but other times it was the client signaling type to the sex worker. Cunningham and DeAngelo (2018) note that sometimes clients would provide references to a potential new sex worker containing the names and contact information of previous sex workers who could vouch for his reputation. Screening devices included meeting with the client in public, contacting him at work, and various types of background checks. The Erotic Review provided a White List containing the names of clients who had been reviewed by other sex workers. These kinds of services were popular and widespread, and played their own unique role in reshaping the risks contained within the Internet sector.

Cunningham and Kendall (2011) sought to investigate the impact that growing online sex work was having on traditional street sex work. Using data from the FBI on prostitution arrests as their proxy for street sex work, disaggregated by age of arrestee, they matched each state/year/age cell with the number of new reviews at The Erotic Review of women of the same age. They instrumented for growth in online sex work with state-level shares of broadband at the household level. The authors found that growing indoor sex work caused a decrease in sex work arrests, primarily among middle aged sex workers, and thus was responsible for the age-arrestee profile becoming bimodal by age over the sample period. But most of the growth in online sex work did *not* affect street sex work levels, because most of the growth was among the youngest aged sex workers aged 18-29. This suggests that the Internet was having two effects on commercial sex markets – it was causing a substitution away from streets, thus driving down that population, and it was causing entry.

Cunningham and Kendall (2011) then show that the sex workers online who have ever solicited from a street location have much higher risk profiles than those who have not. They see around four more clients a week, earning approximately 74% more per week, are less likely to have a second job, and are less likely to have health insurance. They also appear to be the individuals who are more likely to have brief sexual encounters with their clients, as opposed to longer dates that bundle companionship, emotional labor, and sexual experiences. These women who have ever solicited from a street location are also more likely to have unprotected sex with the client.

Street sex work has been studied extensively by social scientists and medical researchers, which is not surprising given its high victimization rates and comorbid

substance abuse and mental health struggles. The workplace homicide rate for female sex workers who work outdoors is estimated to be 204 per 100,000 whereas the second most dangerous job for a female is the liquor store employee at 4 homicides per 100,000 (Castillo and Jenkins, 1994). Cunningham, DeAngelo, and Tripp (2020) investigate the causal effect that Craigslist's erotic services had on female safety using a differences-in-differences design. Because Craigslist opened erotic services in American cities at different months between 2002 and 2009, the authors exploit a staggered rollout to estimate the causal effect of the platform on female homicides. They find that the platform is associated with a 10% reduction in total female homicides. While speculative, they present evidence that a possible mechanism could be the movement of street-based sex workers indoors and safer matching overall.

IV. Sex Trafficking

Arguably, one of the most important questions in all of the economics of sex work relates to how exactly voluntary sex work is connected to the involuntary market. There has been considerable work done on this question of human trafficking by journalists and activists, with some exceptions. Much of this work has been speculative and anecdotal, and most has not been in peer-reviewed outlets. Criticisms of this work cover issues related to measurement methodology (Feingold, 2010; Friman, 2010; Warren, 2010; Weitzer, 2011; Zhang, 2009). Often the methodology used to count trafficking is not even shared with readers and sources for the estimates are opaque (Feingold, 2010).

This is a terribly hard market to study due to lack of data and its underground nature. Involuntary sex work occurs in the shadows, and therefore there are no reliable surveys of

this population. Thus if we are to learn much about its occurrence, researchers will need to be creative with secondary data sources such as online reviews and qualitative interviews. Some of the most promising research in this area has used rigorous qualitative interviews. In Swaner et al. (2016), the authors conduct a multi-site, multi-method, study of juvenile sex work, which by definition cannot be consensual and thus qualifies as trafficking. This study breaks open the black box of trafficking and helps the reader better understand how these markets are organized, the role of intermediaries, and the incidence of fragile families, abuse, and homelessness preceding entry. The methodology used is a rigorous form of convenience sampling called respondent-driven sampling in which subjects are paid to recruit others from their social network who are then also paid, and so forth. Under certain strict assumptions with enough contacts the ensuing survey captures the social network of the respondents. Insofar as some groups of trafficked individuals are truly cut off from the seeded respondents, then these convenience samples will be incapable of telling us much about those groups, but it is the sort of transparent surveying methodology that we hope will guide and inspire researchers of trafficking going forward.

Another potentially promising path for collecting new data is to leverage existing known trafficked victims who have had their information posted to classified advertising sites, like the currently defunct Backpage.com, using law enforcement records. When combined with machine learning methods, some researchers have been able to identify other potentially trafficked victims on the same sites using natural language processing (see Esfahni, et al. 2019).

Akee et al. (2014) and Cho, Dreher, and Neumayer (2013) show that policies prohibiting sex work are better for trafficking outcomes. Cho, Dreher, and Neumayer

(2013) use a cross-section of 150 countries with data on human trafficking obtained from the United Nations Office on Drugs and Crime (UNODC) and find that legalized sex work increases reported inflows of human trafficking by 5%.

A few caveats are important about this study, though. First, the results are not causal as selection into legalized regimes is not modeled, nor do the authors use any research design capable of eliciting a causal parameter. The authors also combine all laws into one category called legalization when, in fact, laws vary considerably (Brents, 2016). The timing of legalization itself is also unclear, because the authors use a 5-year window to average into a single cross-section and thus cannot isolate the dates of exact legalization for this analysis. Finally, there is no exogenous variation in legal regime exploited and since it is cross-sectional, they are also unable to partial out unobserved heterogeneity. In conclusion, there is to date no empirical estimates of the causal effect of sex work regimes on sex trafficking. Future research that could identify such an effect using high quality and ingenious data sources and plausibly exogenous variation in regime would be extremely well received.

Whereas causal empirical work has been lacking, theoretical work has been better. Lee and Persson (2018) combine and distinguish between coercive (trafficking) and non-coercive (voluntary) sex work in their model. Their effort is meant to highlight what, if anything, would be effective in eliminating coercive sex work while still providing a means for voluntary sex workers to continue working. The goal, they argue, is to exclude coercion “without infringing on voluntary supply”. As with other writers, they decompose modern policies into four distinct models: decriminalization, traditional criminalization, the Nordic

model that criminalizes payment only, and the Dutch model which allows licensed sex work (similar to the occupational licensing model we describe above).

Their model treats trafficking as a form of employment relationship between the trafficked victim and the trafficker. The trafficker bears the weight of having a criminal business, but they do not incur costs of actually participating in the crime. In their model, trafficked and voluntary sex workers provide the same good, but the production function differs considerably because one has agency whereas the other does not.

Their modeling exercise led them to suggest a new type of policy which borrowed from others. They call this the “Dutch-Swedish model” and it incorporates aspects of the other models so as to address coercion and yet still allow voluntary sex workers to operate. Their idea is to install a licensing program for voluntary sex workers while severely punishing buyers who purchase unlicensed services. This, they argue, will lead the market to shift towards voluntary sex workers and in effect eliminate the trafficking-supplied sex work altogether.

V. Conclusion and Discussion

Sex work can be considered a type of illicit work because in many locations, it is illegal, and even where not, it is often stigmatized. It is considered illicit because many find transactional sex morally repugnant and, as with other repugnant exchanges, they seek to restrict and to ban the buying and selling piece of the transaction. These are deep philosophical questions and while economists have made some effort at better understanding the nature of the costs imposed in morally contentious activities (Elias et al. 2017), many of these questions cannot be easily answered by economic theory.

Where economists have made seminal contributions has been to our understanding of how these illicit markets are organized, who the individuals are that supply sex work, the determinants of the prices and the role of risk, and the relative effects of different forms of policies. But given repugnance continues to dominate people's minds, optimal policies have been slow to emerge, let alone be experimented with. What little we do know suggests that there are complex interactions within the sex markets between violent men and these participants, and that methods other than prohibition may help mitigate that violence, such as through decriminalization. As sex workers are often selected from a group of highly vulnerable people – namely low-income, disenfranchised female workers – it is important that policies be designed so as to reduce the harm that participants face in these markets, and not merely be based on any innate repugnance observers may feel.

In terms of future research, there are still many open questions. Considerable research on the economics of sex work has taken place in the last fifteen years which has focused on risk premia (Rao 2003; Robinson and Yeh, 2011; Gertler, Shah, and Bertozzi, 2005) and policing and policy in developing countries, and new ongoing work has shifted into the study of the organization of sex work in high-income countries. But this work is incomplete. New research has suggested that violence against women, both sex workers and non-sex workers, is endogenous to policy and technology. More research using a variety of approaches, data sources, and policy variations is needed to get a full picture of exactly how these outcomes are impacted by law and technology.

Currently some of the most significant policy debates around regulation focus on the Nordic model, which bans the purchase but not the sale of sex work. Future research should make every effort to pin down what these policies do and do not do, specifically

with regards to the welfare of sex workers and trafficked victims. Emerging work suggests that some of the promises of the Nordic model may not materialize.

Finally, the issues regarding sex trafficking remain the largest gap in our knowledge relative to the claims made by activists, journalists, and some social scientists. Future work on trafficking would benefit tremendously from basic science such as simple counts of the prevalence of involuntary and coercive sex work complete with confidence bands around the uncertainty that we face. It is always difficult to count a hidden group, and traditional survey instruments may undercount. We suggest that while costly, respondent driven sampling methods are worth efforts, as well as natural language processing with machine learning.

References

Abel, Gillian M., Lisa J. Fitzgerald, and Cheryl Brunton (2007), "The Impact of Decriminalization on the Number of Sex Workers in New Zealand". *Journal of Social Policy*, vol. 38(3), July.

Akee, Randall, Arnab K. Basu, Arjun Bedi, and Nancy H. Chau (2014). "Transnational Trafficking, Law Enforcement, and Victim Protection: A Middleman Trafficker's Perspective" *The Journal of Law and Economics*. 57(2), 349-386.

Alegria, M. Vera, D. H. Freeman Jr, R Robles, M C Santos, and C L Rivera. (1994). "HIV Infection, Risk Behaviors, and Depressive Symptoms Among Puerto Rican Sex Workers." *American Journal of Public Health*. 84.

Amnesty International (2015). "Global Movement Moves to Adopt Policy to Protect Human Rights of Sex Workers." Press Release, <http://www.amnestyusa.org/news/press-releases/global-movement-votes-to-adopt-policy-to-protect-human-rights-of-sex-workers>.

Bisschop, Paul, Stephen Kastoryano and Bas van der Klaauw (2017). "Street Prostitution Zones and Crime." *American Economic Journal: Economic Policy*, 9(4), November, 28-63.

Brents, Barbara 2016. "Nevada Brothels", *Oxford Handbook on the Economics of Prostitution*.

Brents, Barbara and Kathryn Hausbeck (2001). "State-Sanctioned Sex: Negotiating Formal and Informal Regulatory Practices in Nevada Brothels." *Sociological Perspectives*. 44(3), 307-332.

Brents, Barbara and Kathryn Hausbeck (2007). "Marketing Sex: US Legal Brothels and Late Capitalist Consumption". *Sexualities* 10(4): 425-439.

Brooks, Amanda (2009). *The Internet Escort's Handbook: Advertising and Marketing (Book 2)*. Golden Girl Press, LLC.

Cameron, Lisa, Jennifer Muz, and Manisha Shah (2019). "Crimes Against Morality: Unintended Consequences of Criminalizing Sex Work." Working paper.

Cho, Seo-Young, Axel Dreher, and Eric Neumayer (2013). "Does Legalized Prostitution Increase Human Trafficking?" *World Development*. 41, January, 67-82.

Church, Stephanie, Marion Henderson, Marina Barnard, Graham Hart (2001). "Violence by Clients Towards Female Prostitution in Different Work Settings: Questionnaire Survey. *British Medical Journal*, 322 (7285).

Ciacci, Riccardo and Maria Micaela Sviatschi (2018) "The Effect of Adult Entertainment Establishments on Sex Crime: Evidence from New York City". Working Paper, July 23.

Ciacci, Riccardo (2019). "On the Economic Determinants of Prostitution: the Marriage Compensation and Unilateral Divorce in US States." Working paper.

Cunningham, Scott and Todd D. Kendall (2010). "Risk Behaviors among Internet-Facilitated Sex Workers: Evidence from Two Datasets". *Sexually Transmitted Infections*, 86(iii), 100-105.

Cunningham, Scott and Todd Kendall (2011). "Prostitution 2.0: The Changing Face of Sex Work." *Journal of Urban Economics*. 69(3). May, 273-287.

Cunningham, Scott and Todd Kendall (2011). "Prostitution, Technology and the Law: New Data and Directions". Chapter in Research Handbook in the Law and Economics of the Family. Edited by Lloyd Cohen and Joshua Wright, Edward Elgar Publishing Limited.

Cunningham, Scott and Todd Kendall (2016). "Prostitution, Hours, Job Amenities and Education." *Review of Economics of the Household*. 15(4), December, 1055-1080.

Cunningham, Scott and Manisha Shah (2018) "Decriminalizing Indoor Prostitution: Implications for Sexual Violence and Public Health" *Review of Economic Studies*

Cunningham, Scott, Gregory DeAngelo and John Tripp. (2020). "Craigslist Reduced Violence Against Women" Working Paper.

Della Giusta, Marina, Maria Laura di Tommaso and Steinar Strom (2009). "Who is Watching? The Market for Prostitution Services". *Journal of Population Economics*. 22(2), April, 501-516.

Della Giusta, Marina, Maria Laura di Tommaso, Sarah Jewell, and Francesco Bettio (2019). "Quashing Demand Criminalizing Clients? Evidence from the UK." Working paper.

Dunlop EM, C. Lamb, DM King. (1971). "Improved Tracing of Contacts of Heterosexual Men with Gonorrhoea: Relationship of Altered Female to Male Ratios." *British Journal of Venereal Disease*. 47, 192-195.

Ekberg, Gunilla (2004). "The Swedish Law that Prohibits the Purchase of Sexual Services: Best Practices for Prevention of Prostitution and Trafficking in Human Beings." *Violence Against Women*. 10(10), 1187-1218.

Elias, Julio, Mario Macis, Nicola Lacetera and Paola Salardi (2017). “Economic Development and the Regulation of Morally Contentious Activities”. American Economic Review Papers and Proceedings, 107(5).

Esfahani, Saideh Shahrokh, Michael J. Cafarella, Maziyar Baran Pouyan, Gregory J. DeAngelo, Elena Eneva, Andrew E. Fano, “Context-Specific Language Modeling for Human Trafficking from Online Advertisements”. Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics, pp. 1180-1184.

Exner Jr, John E., Joyce Wylie, Antonnia Laura, and Tracey Parrill (1977). “Some Psychological Characteristics of Prostitutes”. *Journal of Personality Assessment*, 41(5).

Feingold, David A. (2010). “Trafficking in Numbers: The Social Construction of Human Trafficking Data”. Chapter in *Sex, Drugs and Body Counts*. (Cornell University Press, 1st edition)

Friman, H. Richard (2010). “Numbers and Certification: Assessing Foreign Compliance in Combating Narcotics and Human Trafficking.” Chapter in *Sex, Drugs and Body Counts*. (Cornell University Press, 1st edition)

Gambetta, Diego (2009). *Codes of the Underworld: How Criminals Communicate*. Princeton University Press, Princeton NJ.

General Social Surveys (1992–2010). “National Opinion Research Center”, dataset.

Gertler, Paul J. and Manisha Shah (2005) “Risky Business: The Market for Unprotected Commercial Sex” *Journal of Political Economy*. 113(3), 518-550.

Gertler, Paul J. and Manisha Shah (2011). “Sex Work and Infection: What’s Law Enforcement Got to Do with It?” *Journal of Law and Economics*, 54(4), November, 811-840.

Goldstein, PJ (1979). *Prostitution and Drugs*. Lexington Books, Lexington MA.

Havoscope (2013). <http://www.havoscope.com/prostitution-revenue-by-country>. Technical Report.

Hethcote, H. and J. Yorke (1984). *Gonorrhea Transmission Dynamics and Control*, vol 56, (Berling Heidelberg: Springer Verlag).

Ito, S., Lepine, A., & Treibich, C. (2018). The effect of sex work regulation on health and well-being of sex workers: Evidence from Senegal. *Health Economics*, 27 (11), 1627-1652.

Kingston, Sarah and Terry Thomas (2019). “No Model in Practice: A ‘Nordic Model’ to Respond to Prostitution?” *Crime, Law and Social Change*. 71, 423-439.

Kremer, Michael (1996). "Integrating Behavioral Choice into Epidemiological Models of AIDS." *Quarterly Journal of Economics*, 111, 549-573

Kremer, M. and C. Morcom (1998). "The Effect of Changing Sexual Activity on HIV Prevalence." *Mathematical Biosciences*, 151, 99-122.

Kulick, Don (2003). "Sex in the New Europe: The Criminalization of Clients and Swedish Fear of Penetration." *Anthropological Theory*, 3(2), 199-218.

Kuosmanen, Jari (2011). "Attitudes and Perceptions about Legislation Prohibiting the Purchase of Sexual Services in Sweden." *European Journal of Sex Work*, 14(2).

Kuzma, Abigail (2013). "Demand Reduction: Critical Next Step in the Fight Against Sex Trafficking". *International Law News*. 42(4).

Langer, G. C. Arnedt and D. Sussman (2004). "Primetime Live Poll: American Sex Survey", <http://abcnews.go.com/Primetime/News/story?id=156921&page=1>.

Lee, Samuel and Petra Persson (2018). "Human Trafficking and Regulating Prostitution." Working Paper, October.

Logan, Trevon and Manisha Shah (2013). "Face Value: Information and Signaling in an Illegal Market". *Southern Economic Journal*, 79(3), 529-564.

Manian, Shanthi (2019). "Health Certification in the Market for Sex Work: A Field Experiment in Dakar, Senegal." Working Paper.

Mathieson, Ane, Easton Branam, and Anya Noble (2016). "Prostitution Policy: Legalization, Decriminalization and the Nordic Model." *Seattle Journal for Social Justice*. Vol. 14(2).

Nguyen, Amanda (2016). "Optimal Regulation of Illegal Goods: The Case of Massage Licensing and Prostitution." Working Paper.

Platt, Stewart, Teela Sanders, Lucy Platt, Pippa Grenfell, and P. G. Macioti (2018). "Sex Work and Occupational Homicide: Analysis of UK Murder Database." *Homicide Studies*. 22(3), 321-338.

Posner, Richard A. and Katharine B. Silbaugh (1996). *A Guide to America's Sex Laws*. Chicago: University of Chicago Press.

Potterat, JJ, RB Rothenberg, and DC Bross (1979). "Gonorrhea in Street Prostitutes: Epidemiologic and Legal Implications." *Sexually Transmitted Diseases*, 6, 58-63.

Potterat, JJ, RB Rothenberg, SQ Muth, WW Darrow, L. Phillips-Plummer (1998). "Pathways to Prostitution: The Chronology of Sexual and Drug Abuse Milestones". *Journal of Sex Research*. 35(4), 333-340.

Rao, Vijayendra, Indrani Gupta, Michael Lokshin, Smarajit Jana (2003). "Sex workers and the cost of safe sex: the compensating differential for condom use among Calcutta prostitutes" *Journal of Development Economics*, 71(2), 2003, Pages 585-603,

Reynolds, Helen (1986). *The Economics of Prostitution*. Charles C. Thomas Publishers, Springfield, IL.

Rhode Island House 5354 (2019). "House Regulation Creating a Special Legislative Commission to Study the Health and Safety Impact of Revising Commercial Sexual Activity Laws (creates a Twelve (12) Member Commission to Study the Health and Safety Impact of Revising Commercial Sexual Activity Laws, and Who Would Report Back to the House by February 7, 2020".

Robinson, J and E. Yeh (2011) "Transactional Sex as a Response to Risk in Western Kenya," *American Economic Journal: Applied Economics* 3 (1): 35-64.

Roth, Alvin (2007). "Repugnance as a Constraint on Markets", *Journal of Economic Perspectives*. 21(3) Summer, 37-58.

Shannon, K., S. Strathdee, S. Goldenberg, et al. (2015). "Global Epidemiology of HIV Among Female Sex Workers: Influence of Structural Determinants." *The Lancet*, 385, 55-71.

Swaner, R. M. Labriola, M. Rempel, A. Walker and J. Spadafore (2016). *Youth Involvement in the Sex Trade: A National Study*. New York, NY: Center for Court Innovation.

Waltman, Max (2011). "Prohibiting Sex Purchasing and Ending Trafficking: The Swedish Prostitution Law". *Michigan Journal of International Law*, vol. 33, 133-157.

Warren, Kay B. (2010). "The Illusiveness of Counting 'Victims' and the Concreteness of Ranking Countries: Trafficking in Persons from Colombia to Japan." Chapter in *Sex, Drugs and Body Counts*. (Cornell University Press, 1st edition)

Weitzer, Ronald (2005). "New Directions in Research on Prostitution." *Crime, Law & Social Change* 43, 211-235.

Weitzer, Ronald (2011). "Sex Trafficking and the Sex Industry: The Need for Evidence-Based Theory and Legislation." *Journal of Criminal Law and Criminology*, 101(4), Article 4.

Wilcox, RR (1962). "Prostitution and Venereal Disease: Proportion of Venereal Disease Acquired from Prostitutes in Asia: A Comparison with France, the United Kingdom and the United States of America." *British Journal of Venereal Disease*, vol 38, 7-42.

Zhang, Sheldon (2009). "Beyond the 'Natasha' Story – A Review and Critique of Current Research on Sex Trafficking." *Global Crime*, 10(3). 178-195.