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PREMIUM SEX: FACTORS INFLUENCING THE NEGOTIATED PRICE OF UNPROTECTED SEX BY FEMALE SEX WORKERS IN MEXICO

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This paper examines economic, sociocultural, and behavioral risk factors that influence the compensating price difference (premium paid) between sex with and without a condom for female sex workers (FSWs) in U.S.-Mexico border cities. Field data collected in Ciudad Juarez on the price of sex with and without a condom *for the same FSW respondent* allowed calculation of the price premium for unprotected sex based on these paired prices, holding unobservable characteristics constant. A Tobit model was used to identify the factors determining the price premium. Key predictors of a larger price premium for sex without a condom included: length of time as a FSW; number of male clients; and participation in HIV education. Key predictors of a decrease in the price premium for unprotected sex included: age; a bad financial situation; frequent alcohol consumption before or during sex; and frequent drug use before or during sex.

JEL classification codes: N36, I12, J44

Key words: prostitution, sex work, HIV/STI, sex price premiums, border health

I. Introduction

Although the prevalence of HIV/AIDS in Mexico at large is considered low according to UNAIDS criteria, these statistics disguise a “dynamic sub-epidemic” among key

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populations along the U.S.-Mexico border (Brouwer et al. 2006). These populations include injection drug users (IDUs), men having sex with men (MSM), and, as is the focus of this paper, female sex workers (FSWs). Whereas studies on HIV among Mexican FSWs conducted in the late 1980s documented an HIV prevalence of 0.5 to 1%, over the years the prevalence has increased. A study conducted from 2005 to 2006 showed that overall HIV prevalence among FSWs in the border cities of Tijuana and Ciudad Juarez was 4.8% (Brouwer et al. 2006). HIV prevalence was even higher among the subgroup of FSWs who use drugs in these cities (Strathdee et al. 2007). The increasing prevalence of HIV infection among FSWs in the Mexico-U.S. border region has led researchers and policymakers to stress the importance of developing culturally appropriate interventions targeted at high risk populations (Brouwer et al. 2006).

However, to date limited interventions have been made to alter high-risk sexual behavior among FSWs in Mexico (Patterson et al. 2006). Moreover, those interventions that have been conducted tend to address only supply-side factors such as the lack of information about safe sex or the availability of inexpensive condoms (Gertler, Shah, and Bertozzi 2005). Few studies have taken into consideration both supply and demand-side factors that may impede widespread adoption of safer sex practices, in particular the tendency for clients to pay more for sex without a condom (Ntumbanzondo et al. 2006). Recent economic literature on FSWs in Mexico has affirmed that because financial need is the primary motivation for entry into this labor market, the monetary incentive for unprotected sex can produce an important and powerful barrier to condom use (Gertler, Shah, and Bertozzi 2005; Rao et al. 2003). In addition, FSWs' economic dependence on their client makes it inherently difficult to negotiate condom use, particularly if the price difference between protected and unprotected sex is significant and there is great economic need motivating FSWs' decision-making practices.

This paper builds on the literature focused on how supply-side factors shape safe sex practices among FSWs by examining different prices charged for safe versus unsafe sex in Ciudad Juarez, a Mexican border city with a long history of quasi-legal sex trade. By identifying the economic, sociocultural, and behavioral risk factors, which influence how FSWs determine the price premium paid for unsafe sex, this paper improves the long-term sustainability of prevention and intervention programs targeted at this population. This study adds to the econometric literature such as Rao et al. (2003) on the sex trade market by using a model based on a unique paired-data sample to examine the determinants of price premiums paid for unprotected sex, thus better controlling for unobserved FSW attributes that

created biased results in previous models. Secondly, this study contributes significantly to the body of international public health literature, particularly in Latin America, where a quasi-legal sex trade exists. In these environments, unprotected sex with FSWs may be a critical path for HIV transmission to the general population, influenced by the impact of price on FSWs' decision-making concerning condom use. Finally, the results identified in our econometric model provide important insights into the factors that could allow FSWs to negotiate higher price premiums for riskier sex practices.

The remainder of the paper is organized as follows. Section II reviews key qualitative and quantitative literature. Section III describes the design of the sample and provides basic statistics for variables used in our model. Section IV formally introduces our empirical model, which is followed by the results of the model estimation in Section V. The paper closes in Section VI with a summary and conclusions, including policy implications.

II. Background

Quantitative studies focusing specifically on condom use among FSWs in Mexico are sparse (Allen et al. 2003; Bronfman et al. 2002; Gertler, Shah, and Bertozzi 2005; Howell 2003; Uribe-Zuniga, Hernandez-Tepichin, and Rio-Chiriboga 1995). Previous qualitative and quantitative studies on HIV transmission and barriers to condom use are either focused on U.S. FSWs or are not based specifically on sex workers and tend to identify gender inequality as the primary factor affecting women's negotiation of condom use (Amaro 1995; Jenkins 2000; Pulerwitz, Gortmaker, and DeJong 2000; Quina et al. 2000). Even those studies that examine how gender intersects with other structural inequalities, such as race and socioeconomic status (Bowleg, Belgrave, and Reisen 2000; Mays and Cochran 1988; Simoni, Walters, and Nero 2000) or immigrant status (Gómez, Hernandez, and Faigeles 1999), do not capture the unique set of social conditions that characterizes the experience of sex workers in Mexico. Because of the significant economic differences between the United States and Mexico, the different legal statuses of sex work in Mexico and the transnational experience of FSWs working in border cities, accounts of barriers to condom use among U.S. FSWs cannot be readily applied to a Mexican context, but they do provide a starting point for understanding the barriers to condom use in a market context.

The dominant tendency in the majority of the qualitative literature identifies supply-side factors as primary barriers to condom use among FSWs in Mexico. By

supply-side factors, we refer to controlled conditions (or controllable via intervention) by the provider of services, e.g., the sex worker herself, in a sexual transaction. The prominent supply-side factors identified in the literature include knowledge about STDs/HIV and condom use, access to condoms, individual perceptions of HIV risk, and cultural and behavioral risk factors associated with condom use decisions by this population.

Previous interventions in Mexican FSW populations have emphasized providing education on safe sex practices as well as the distribution of inexpensive and easily accessible condoms. Because affordability of condoms strongly influences the decision on condom use (Cepeda 2004; Gertler, Shah, and Bertozzi 2005), FSWs may choose not to use condoms in their work when cheap or free condoms are not available near their work site, despite their awareness of sexually transmitted infections (STIs). Thus, the availability of cheap and easily accessible condoms is critical to encouraging condom use among FSWs.

Another major focus of the literature is the cultural stigmas attached to sex work and birth control that act as barriers to condom use in Mexico. The stigma against birth control originating from the practice of Catholicism or belief in spiritualism is one obstacle to condom use (Bronfman et al. 2002; Patterson et al. 2005). However, there may be a distinction between religious doctrine and women's decisions regarding contraception and condom use, as illustrated by high rates of abortion and prevalent sex work throughout Latin America (Amaro 1982). Nonetheless, there are cultural stigmas attached to sex work, which some FSWs may attempt to avoid by classifying their professional relationships with clients as intimate, rather than transactional. Because of the commonly held belief that condoms should not be used with intimate partners, such FSWs may choose not to use condoms even with their clientele (Hansen, Lopez-Iftikhar, and Alegria 2002). However, the literature also asserts that other aspects of Latin American culture, like traditional family-centered values, can serve to encourage safer sexual risk behaviors (Hansen, Lopez-Iftikhar, and Alegria 2002). Some FSWs may be able to find support from social networks like their families that encourage them to guard against infection.

The physical and emotional stresses resulting from sex work can impart a depressed mood and a fatalistic outlook. The literature identifies depression and drug addiction as potential barriers to condom use by reducing FSWs' ability to negotiate condom use (Hansen, Lopez-Iftikhar, and Alegria 2002), especially when they are experiencing symptoms of drug withdrawal. Some FSWs suffering from psychological trauma resign themselves to the inevitability of death and lose the

will to protect themselves from infection (Bucardo et al. 2004). In such cases, FSWs may use drugs or alcohol as a coping mechanism, further compromising their abilities to negotiate safer sex.

As illustrated above, most of the literature presumes that decision-making with regard to condom use lies solely in the hands of the sex worker, ignoring the economic context that structures FSWs' choices regarding risky behaviors, specifically the financial disincentives for condom use resulting from clients' preferences for unprotected sex. Yet recent literature on commercial sex asserts that because most FSWs enter into sex work out of financial necessity, the monetary incentive for unprotected sex is the most powerful barrier to condom use (Bucardo et al. 2004). Despite their knowledge of HIV risk and the availability of condoms, FSWs' economic dependence on their clients can make it inherently difficult to demand condom use. Because many clients are averse to condom use due to reduced sensation, condom use can reduce a client's willingness to pay (Bucardo et al. 2004; Gertler, Shah, and Bertozzi 2005; Patterson et al. 2005).

A consensus among researchers has emerged over the existence of compensating wage differentials between protected and unprotected sex (Bucardo et al. 2004; Gertler, Shah, and Bertozzi 2005; Patterson et al. 2005; Rao et al. 2003). These quantitative studies provide evidence that the demand for unprotected sex produces strong financial incentives to forego condom use. Just as with suppliers in markets for other goods, FSWs in the market of providing commercial sex make production decisions based on factors such as input costs of production (condoms) and economic incentives for higher quality products.

A more generalized theory of sexual exchange developed by Baumeister and Vohs (2004) suggests that women, as the suppliers of sex, play an important role in establishing the price that men will pay for sex. Based on the notion that society attaches a value to female sexuality, sex with a woman is a scarce resource that men must pay a price to acquire. While the theory applies generally to heterosexual sex with payment, for instance, in the form of long-term commitment to provide for a woman, the theory characterizes prostitution as the most overt form of sexual exchange. The price of sex, as laid out in the theory, depends on the cultural context as well as a set of valued female sexual characteristics (Baumeister and Vohs 2004).

Much of the quantitative literature on price premiums for condom use in sexual transactions draws from the economic literature on wage differentials, broadly defined as compensation for job riskiness. Garen (1988), for instance, developed an economic model for the estimation of wage premiums for risk-taking in labor markets. He asserts that standard approaches using OLS models to estimate

compensating wage differentials are biased and thereby seriously underestimate the size of risk-compensating premiums. According to Garen (1988), two sources of bias in previous models are the unobserved heterogeneity of compensation for job risk and the likelihood that workers with greater earning ability will choose less risky jobs. He concludes that earlier models may have regressors correlated with the disturbance terms and thus may produce estimates for the wage differential that are biased downward. Garen (1988) suggests using a simultaneous equations estimation technique to correct for sources of bias in models seeking to quantify wage-risk relationships.

In one of the first quantitative studies to undertake an econometric analysis of the commercial sex industry, Rao et al. (2003) applied these insights to their analysis of compensating price differences among sex workers in India, where FSWs have been identified as important drivers in the Indian HIV epidemic. They report that FSWs in India enter the sex labor market for financial reasons and respond to economic incentives from clients, observed to be strongly averse to condom use. Despite FSWs' awareness of AIDS and risk of infection, they engage in unprotected sex. Anecdotal evidence has shown that Indian sex workers are paid significant premiums for unprotected sex and fear losing income for using condoms (Rao et al. 2003). Rao et al. (2003) attempt to quantify this anecdotal evidence by creating a model to estimate the size of the price difference, using data gathered in 1993 from a population of sex workers in the red-light district of Sonagachi in Calcutta. In specifying the model, the authors were careful to correct for possible bias in the estimates in the case that sex workers with the ability to receive higher earnings are more likely to use condoms. The model predicted a significant loss in average income, between 66% and 79%, resulting from using condoms (Rao et al. 2003).

More recently, a study by Gertler, Shah, and Bertozzi (2005) found that this loss in income attendant to condom use is consistent with the experience of FSWs in south-central Mexico, although the compensating price difference for unprotected sex was not as large as in India. Based on the observation that some FSWs are willing to risk HIV infection when clients offer additional payment for unprotected sex, Gertler, Shah, and Bertozzi (2005) developed a simple bargaining model for commercial sex that they tested against panel data collected from the Mexican states of Michoacan and Morelos. The resulting model predicts that sex workers receive a premium ranging from 23-46% for unprotected sex, in part depending on the sex worker's attractiveness, a variable affecting bargaining power (Gertler, Shah, and Bertozza 2005). On the basis of this model, Gertler, Shah, and Bertozzi (2005) concluded that FSWs engage in unprotected sex "when the client's maximum

willingness to pay not to use a condom is greater than the minimum the sex worker is willing to accept to take the risk.”

Shifting the focus even further towards the demand side, Della Giusta et al. (2006) utilized actual demand-side data in their study of the commercial sex market in the United States. Clients were classified as either an “experimenter” or a “regular,” by which an ordered logit model was constructed to estimate demand. Their model predicts greater condom use by regular clients and those clients who are opposed to gender violence (Della Giusta et al. 2007).

The literature reviewed here is paradigm shifting insofar as it emphasizes the importance of price incentives in shaping sex workers’ choices regarding condom use and other more traditional factors such as availability of information, gender roles, and, psychological state. This literature suggests that the principle of compensating wage differentials for accepting occupational risk demonstrated in other labor markets can be extended to the commercial sex labor market. As such, one implication is that it is necessary to quantify the specific characteristic and behaviors of FSWs in Mexico that affect their price premium for unprotected sex.

III. Sample design, description of variables, and basic statistics

Between January 2004 and March 2006, we recruited adult FSWs in Ciudad Juarez through the Municipal Health Clinics, street outreach, and referrals from FSWs who volunteered for this project. Eligible participants were women who provided informed consent, were at least 18 years old, and had traded sex for money, drugs, or for other material benefits within the previous month. All participants also had engaged in unprotected sex within the previous four weeks, which differentiates this study from other economic studies of sex workers such as in Rao et al. (2003) since the sample selected FSWs that practice unsafe sex. Thus the FSWs were selected from the population that is central to stemming the reported dynamic sub-epidemic that is masked by less specific sampling. As a result, a total of 450 FSWs met screening eligibility criteria and were enrolled and interviewed for the study. A description of the survey questions used to construct the variables in this study is available in an Appendix.

Statistics on selected characteristics of FSWs in Ciudad Juarez are reported in Table 1, including the price of sex with and without a condom as well as the percentage price premium for no condom sex. Sociocultural and behavioral risk factors identified in the sample are the following: speaks English, has at least one financial dependent, participated in HIV/STI education in the past six months, drinks alcohol before or

during sex, takes illegal drugs before or during sex, and physically abused by male client within last six months. Economic factors that were identified in the sample included age, years in sex trade (often considered a proxy for FSW bargaining power in price negotiation), number of male clients, and rating on personal financial situation.

Table 1. Basic statistics for selected variables

	Variable	Response	Statistics
Sociocultural and behavioral risk factors	<i>Speaks English</i>	Yes	12%
		No	88%
	<i>Has at least one financial dependent</i>	Yes	89%
		No	11%
	<i>Participated in HIV/STI education in past 6 months</i>	Yes	11%
		No	89%
	<i>Drinks alcohol before or during sex</i>	Often	24%
		Not often	76%
	<i>Takes illegal drugs before or during sex</i>	Often	11%
		Not often	89%
<i>Physically abused or sexually raped by male client within last 6 months</i>	Yes	23%	
	No	77%	
Economic factors	<i>Age</i>	mean \pm sd	34.0 \pm 8.9
		(min, max)	(18, 60)
	<i>Years in sex trade</i>	mean \pm sd	7 \pm 6.5
		(min, max)	(0.08, 35)
	<i>Number of male clients in the last month</i>	mean \pm sd	72.7 \pm 52.4
		(min, max)	(4, 378)
<i>Rates oneself in a bad financial situation</i>	Yes	35%	
	No	65%	
Price	<i>Price with condom</i>	mean \pm sd	19.9 \pm 18.2
		(min, max)	(3, 250)
	<i>Price without condom</i>	mean \pm sd	32.8 \pm 32.4
		(min, max)	(5, 300)
	<i>Percentage price premium for no condom</i>	mean \pm sd	30.7 \pm 23.5
		(min, max)	(0, 95)

Note: estimates are based on 429 net observations. Of these, 124 (28.9%) reported no price premium for unprotected sex.

The average age of the FSW sample in Ciudad Juarez was 34 years of age, ranging from 18 to 60 years of age. The average length of time in the sex trade was 7 years. The average number of male clients in the last month was 73. Over one third (35%) indicated that they would rate themselves in a bad financial situation. Only 12% of FSWs in the sample spoke English, a small percentage explained by the fact that these FSWs did not need to speak English to service their clients or the client base was either predominantly bilingual or Spanish-speaking. An overwhelming number of these FSWs (89%) had at least one financial dependent. Just 11% of the sample of FSWs had participated in HIV/STI education in the past six months. Drinking alcohol often before or during sex was practiced by 24% of the FSWs. No more than 11% of the FSWs reported using drugs often before or during sex. Physical abuse or sexual rape by a male client within the last six months was experienced by 23% of the FSWs.

The average price for one sex act with a condom was \$19.90 (U.S. dollars) and the average price without a condom was \$32.80, while the average price premium was 30.7%. With 429 observations, this mean percentage price difference is highly statistically significant ($p < .00001$).¹ This is a lower differential than the 66-79% found by Rao et al. (2003) in India, but it is consistent with the 23-46% differential found by Gertler, Shah, and Bertozzi (2005) in south central Mexico. Even at this basic statistics level, the data clearly establish the economic importance of the premium paid for unprotected sex. The evidence from descriptive statistics in Table 1 indicates that FSWs in Ciudad Juarez are paid a higher price for unprotected sex as compared to sex with a condom, confirming earlier research that there are compensating price differences or premiums for FSWs that participate in high-risk sex practices with their male clients in less developed countries. Clients in Ciudad Juarez, similar to other studies, appear to be willing to pay a premium for sex without a condom. The price premium for unprotected sex indicates that the economic incentive provided to FSWs acts as a deterrent to maintaining safe sex practices. This incentive is of particular significance over the long-term when communities consider the sustainability of safe sex prevention and intervention programs. Beyond the Rao et al. (2003) study, the price effect is consistent with earlier economic studies of Mexican sex workers (Gertler, Shah, and Bertozzi 2005), which found that a client offering more money for riskier sex may increase a FSW's willingness

¹ From the original 450 FSWs screened for the interview, we eliminated 12 participants where the price for no condom sex was less than the price for sex with a condom. An additional 9 interviewees were eliminated due to incomplete responses.

to practice unsafe sex and thereby increase her exposure to HIV and other STIs. Thus, both supply-side factors controlled by FSWs and demand-side factors influenced by clients should be considered in promoting safe sex practices within this market that we study.

IV. Empirical model

Following Rao et al. (2003) and guided by Baumeister and Vohs (2004), we determine the price of sex work as a function of a set of observable characteristics. A FSW's services are demanded for the utility they provide, which in turn is a function of the characteristics of the FSW, client preferences, and of the particular service being offered. The price paid for any particular transaction can then be decomposed into components due to the attributes of the FSW, where the price paid by the client is equal to the sum of the products of quantities of relevant characteristics possessed by the FSW and the implicit price of the corresponding characteristic.

The proposed economic model takes advantage of the unique features of our sample to improve upon the model developed by Rao et al. (2003). We do not estimate the price differential between condom and no-condom sex because we have actual price data for safe and unsafe sex practices for each FSW through our survey, so we can simply calculate the difference.² In addition, the study sample was selected to characterize high risk-taking sex workers more accurately, allowing for a more narrowly defined price function to estimate the price differential for them. Utilizing the actual prices charged for sex with and without a condom for each individual FSW, we are able to eliminate ("difference out") observable and unobservable characteristics of the FSW that affect the price and to model the price differential instead. Elimination of these variables reduces the possibility of endogeneity since there are fewer regressors to be correlated with the error term. Also, models with safe sex dummy variables necessarily impose a constant coefficient on the dummy, and therefore impose a constant no-condom price premium. Rather than imposing a constant, our emphasis is on modeling the difference as a function of the appropriate variables (as developed below).

² In other words, unlike Rao et al. (2003) we do not include a dummy variable in the equation that indicates whether the FSW practiced safe or unsafe sex because, since our sample design targeted those practicing unsafe sex, our respondents do both and we have actual data on the price difference. Eliminating the safe sex dummy prevents the potential endogeneity problem reported by Rao et al. in their original equation, that the safe sex variable may be correlated with the error term.

Even more fundamentally, since FSWs with different characteristics attract different clients, using paired prices eliminates these unobservable characteristics so instead we can concentrate on the determinants of the individual price differentials, which are at the heart of the condom versus no-condom issue. Intuitively, this is analogous to using identical twins to test heredity versus environment.

Denote the price of unprotected (no-condom) sex by p_{nc} and the price of protected (condom) sex for the same worker by p_c . Specify the reduced form models determining the price for unprotected and protected sex as the semi-logarithmic forms

$$\ln(p_{nc}) = X\alpha_1 + Z_{nc}\beta + u, \quad (1)$$

$$\ln(p_c) = X\alpha_2 + Z_c\delta + v, \quad (2)$$

where each row of the matrix X contains data on a specific FSW's observable and unobservable characteristics that have approximately similar effects on the determination of both the no-condom and condom sex prices, while the matrices Z_{nc} and Z_c contain data on characteristics that have different effects on the two prices. Stochastic errors are denoted by the vectors u and v , and the model coefficients are $\alpha_1, \alpha_2, \beta$, and δ . Subtracting equation (2) from equation (1) and implicitly defining the identically and independently distributed normal error vector $\varepsilon \equiv u - v$, we have

$$\ln(p_{nc}) - \ln(p_c) = X(\alpha_1 - \alpha_2) + Z_{nc}\beta - Z_c\delta + \varepsilon, \quad (3)$$

Recognizing that $\alpha_1 \approx \alpha_2$ and using $\ln(p_{nc} / p_c) \approx (p_{nc} - p_c) / p_{nc}$ results in

$$(p_{nc} - p_c) / p_{nc} = Z_{nc}\beta - Z_c\delta + \varepsilon. \quad (4)$$

As noted above, it is possible to difference out unique and unobserved characteristics of FSWs that do not affect the price differential because we have data on the prices of condom and no-condom sex for each worker in the sample, i.e., paired data.

Because theory does not support the possibility of a negative premium for riskier no-condom sex, price differentials are necessarily bounded by a lower limit of zero. Note, however, that zero is itself a legitimate value; it would be incorrect to simply discard these limit observations. Since our paired data can identify zero and negative values specific to an individual FSW (rather than co-mingling protected and

unprotected sex prices so that the non-positive values must be estimated), we are able to use an estimation procedure that uses this information. When dealing with dependent variables bounded by lower limits, a form of censored model is appropriate. Ordinary least squares would be inappropriate in this context: it is well known that ordinary least squares on dependent variables whose values are bounded by a lower limit leads to biased, inefficient, and inconsistent estimates³ due to violation of the assumption that the expected value of errors is zero.

The Tobit model is appropriate for estimating the censored percentage price differential that ranges from zero and upward. We use the Tobit maximum likelihood estimator to obtain estimates of the parameters of our model. The likelihood function for this estimator is a mixture of discrete and continuous parts and depends on whether the observation is zero or not; properly combining these parts and then maximizing the resulting likelihood function produces the parameter estimates used in this study. Simply for the convenience in presentation, we define $\Delta p \equiv (p_{nc} - p_c) / p_{nc} \times 100$ as the percentage price premium and rewrite equation (4) as our empirical model:

$$\Delta p = Z_{nc}\beta - Z_c\delta + \varepsilon, \quad (5)$$

where the observed Δp is censored at zero whenever the right-hand-side of equation (5) is non-positive. Then, defining $Z \equiv (Z_{nc}, Z_c)$ and $\gamma' \equiv (\beta', -\delta')$, the model to be estimated becomes

$$\Delta p = Z\gamma + \varepsilon. \quad (6)$$

Again, as is clear from equations (1) through (5) and summarized in (6) above, our model differs fundamentally from that of Rao et al. (2003) in that they model the price of sex while we model the percentage price premium for unprotected sex. The paired data we employ eliminates the need to estimate the specific effects of many of the variables in the Rao et al. (2003) model specification (as well as many other subjective and unobservable characteristics determining the price of sex). To the extent that our models share variables, it is because these variables have a different effect on the prices of protected and unprotected sex (they are in the Z matrices in equations (1) and (2) above, rather than in the X matrix).

³ That is (respectively), the estimates are not right on average, are not as precise as they could be, and do not tend to the true value as the sample gets large. The last, consistency, is the minimum property required for estimates to be worth calculating.

The Z matrix consists of a constant and ten explanatory variables in our model of the percentage price premium for unprotected sex in Ciudad Juarez. The ten variables are loosely grouped into four economic factors and six sociocultural and behavioral risk factors. The four economic factors are age, years in the sex trade, number of male clients, and financial distress. The six remaining factors are: having recently participated in HIV/STI education, drinking alcohol before or during the transaction, using drugs, speaking English, having been physically abused during sex, and having at least one financial dependent.

Half of these explanatory factors cannot be signed *a priori* since they reflect the relative importance of offsetting influences. For example, the existence of children or financial dependents is ambiguous in its effect on the percentage price premium for unprotected sex. On the one hand, it establishes financial need, which decreases the percentage price premium for unprotected sex. When the percentage price premium decreases for unprotected sex, FSWs may increase their volume of clients in order to meet a target income in the short run. On the other hand, given that FSWs must provide financially for their financial dependents over the long-term, they must also balance the adverse impact of an acquired illness from unprotected sex on their future income stream. As such, increasing the percentage price premium is an alternative choice for these women. This is a rational response by FSWs so that they can protect their future income stream from debilitating diseases such as HIV, which would diminish their long term labor productivity.

Similarly, the ability to speak English could either result in a high percentage price premium because there is high demand for FSWs' bicultural abilities, or possibly a lower percentage premium if that particular market segment is focused on no-condom sex and the price premium thus represents a condom-use discount from the norm. In the same vein, the percentage price premium negotiated by FSWs who have been physically abused may be low, reflecting low status and self-esteem, or it may be high due to increased caution. The net effect of a larger number of male clients may reflect the demand response to a lower percentage price premium, or create a cautious supply response that requires a higher premium for unprotected sex given risk from the large number of clients. The net outcome of more years in the sex trade is similarly ambiguous. The accumulated first-hand experience of seeing the results of unprotected sex could make an FSW cautious, while overt evidence that the woman has had an exceptionally large number of sex partners (within the social norm of sex work) will decrease the premium she can command, see Baumeister and Vohs (2004).

The ultimate consequences of the offsetting influences noted above on the reduced-form parameter estimates is an empirical question, to be answered by the

data. In contrast, under weak assumptions we can place theoretical signs on the remaining parameters. It is clear that HIV/STI education should have a zero or positive effect on the percentage price premium for unprotected sex, while drinking or taking drugs during the encounter will have a zero or negative effect on the negotiated price premium. Being financially distressed also changes the terms of negotiation, lowering the resulting risky sex premium. Social exchange theory employs the “principle of least interest” (Waller and Hill 1951) in allocating negotiating power, and a financially stressed FSW is not the party of least interest.

The final factor in our model is the FSW’s age. It is only possible to theoretically determine the sign of age if we have correctly controlled for the length of time an FSW has been in the profession, since the two variables are necessarily related. Our unique dataset has observations on FSWs ranging in age from 18 to 60, with time in the sex trade from less than 10 months to 35 years (see Table 1). The correlation between age and time in the sex trade is 0.40. Given the span of respondents and the relatively low level of correlation between age and time in the sex trade, it is possible to separate the two effects, one ambiguous in sign and the other clear. *Ceteris paribus*, youthful FSWs are expected to obtain a higher risky sex premium due to a higher demand by clients for unprotected sex with younger FSWs. Age alone, after correcting for years in the sex trade, is expected to have a negative effect on the percentage price premium (Symons 1995).

V. Results

The censoring in Tobit models makes them nonlinear in the regressors, so that the effects of the individual regressors on the censored dependent variable are not simply the estimated coefficients (as they are in ordinary least squares). There are several alternatives that can be calculated depending on how they are used. Since we want to examine the implications of each of the regressors for all the price premiums (both zero and positive), we are interested in

$$\frac{\partial E(\Delta p)}{\partial Z_j} = \Phi\left(\frac{Z'\gamma}{\sigma}\right)\gamma_j, \quad j = 1, 2, \dots, K. \quad (7)$$

Here K is the number of regressors, σ is the error variance, and $\Phi(\bullet)$ is the cumulative normal distribution function. In this case, $\Phi(Z'\hat{\gamma}/\hat{\sigma}) = .8035$ when evaluated at the sample means of the regressors, where the hats indicate maximum likelihood estimates. These censored partial derivatives are reported in the rightmost column of Table 2.

Table 2. Tobit model for percentage price premium

	Variable	Coefficient	Standard error	p-value	Censored partial
Sociocultural and behavioral risk factors	Intercept	34.28	9.23	< 0.01	27.54
	<i>Speaks English</i>	-3.01	4.69	0.52	-2.42
	<i>Has at least one financial dependent</i>	6.26	5.16	0.22	5.03
	<i>Participated in HIV/STI education in past 6 months</i>	9.75	4.85	0.04	7.83
	<i>Drinks alcohol before or during sex</i>	-9.37	3.45	< 0.01	-7.53
	<i>Takes illegal drugs before or during sex</i>	-11.72	4.98	0.02	-9.42
	<i>Physically abused or sexually raped by male client in the past 6 months</i>	3.04	3.62	0.4	2.44
Economic factors	Age	-0.56	0.2	< 0.01	-0.45
	Years in sex trade	0.54	0.26	0.04	0.43
	<i>Rates oneself in a bad financial situation</i>	-5.88	3.29	0.07	-4.72
	<i>Number of male clients in the last month</i>	0.07	0.03	0.02	0.06

Notes: estimates are based on 429 net observations. Of these, 124 (28.9%) reported no price premium for unprotected sex. The censored partials were calculated at the sample means of the regressors.

Since the cumulative normal distribution is non-negative, the signs of the partials are the same as the signs of the estimated coefficients. The predicted signs are all supported by the model and data for the five theoretically unambiguous factors with statistically significant parameter estimates (four at better than the 5% significance level, and one, financial distress, at the 7% level). Speaking English, having at least one financial dependent, and having experienced physical and sexual abuse, however, are not statistically significant. All other variables, whether ambiguous in sign or not, are statistically significant predictors of the percentage price premium for unprotected sex at the customary 5% significance level or below (with the exception of the above-mentioned financial distress variable with its p-value of .07); see Table 2.

Besides statistical significance, we are also interested in the magnitude of each factor’s influence on the no-condom premium. First, the model finds that age is negatively related to the price premium in an important way, i.e., younger FSWs demand and receive a larger percentage price premium than older FSWs. We find

a 4.5% (censored partial) decrease in the price premium for every 10 years of age ($p < 0.01$); this is in addition to any direct effect of age on price, which has been differenced out. A second important variable is the length of time as a FSW. In Ciudad Juarez, a FSW requires a 4.3% increase in the percentage price premium for every 10 years of experience ($p = 0.04$). Recall that there are both positive and negative influences from experience; on balance, the positive dominate empirically. The sample variation and paired data allow us to accurately separate the overlapping effects and opposite influences of age and experience: we find a positive experience effect because the negative age effect has been taken into account.

Additional variables included our model also provide important insights. First, the desperation of a FSW in a bad financial situation decreases the unprotected sex price premium by 4.7% ($p = 0.07$). We find the volume of clients served by the FSW is another important economic variable in determining the price premium. In the model, every 50 additional male clients increases the price premium by 3% ($p = 0.02$), when other things are held equal. Again, this is an empirical resolution of offsetting positive and negative influences. Social risk factors such as alcohol and drug use additionally influence the unprotected sex premium and are highly significant statistically. Frequent alcohol consumption before or during sex decreases the percentage price premium by 7.5% ($p < 0.01$). Similarly, frequent drug use before or during sex decreases the percentage price premium by 9.4% ($p = 0.02$). Finally, an important variable that influences the percentage price premium for unprotected sex is an FSW's participation in HIV/STI education within the last six months. If a FSW had participated in HIV/STI education within the last six months, her percentage price premium would increase by 7.8% ($p = 0.04$). Thus, according to our model, these programs have a desirable effect.

The economic factors that influenced the price of unprotected sex were largely determined by the FSWs' ability to negotiate a higher price, which may be gained by experience in the sex trade but could be modified by financial distress. That is, a precarious financial situation creates a riskier situation for negotiating a price premium. Our findings show that there is an overlap in economic variables that affect the negotiating ability of FSWs in Ciudad Juarez. Age, job experience (years in the sex trade), and the volume of clients (number of male clients) indicate that innate attributes as well as experience provide opportunities for FSWs to negotiate higher premiums for high risk sex. However, other important factors –such as financial need, which strikes at the heart of the reason that many low income women enter the sex trade in less developed countries– are equally significant. When women, as the major breadwinner of a family, are forced to make economic choices under

financial stress, they risk exposure to HIV and other STIs by reducing the premium for sex without a condom. Thus, when FSWs are under the most financial distress, they are less likely to negotiate for safer sex to offset the risk of not using a condom in the face of clients that are willing to pay a higher price for not using a condom during sex. The difference in the price of sex with and without a condom is lower when women are unable to reach their target income during a period of employment – in the absence of other economic alternatives, they cannot continue to maintain a higher premium for unprotected sex.

In Ciudad Juarez, similar to other large Mexican border cities, both alcohol and drug use are common practices among FSWs. Given the well-established literature on the risk factors associated with substance abuse and unsafe sex practices, it is not surprising that our model captures this adverse impact, i.e., the lower price premium charged for sex without a condom. On the other hand, it is surprising that the impact of physical abuse or sexual rape, a potentially important variable expected to be significant in influencing price negotiating skills, is not statistically significant in determining the price premium for unsafe sex. With 23% of the FSWs (more than 100 women) in our sample reporting abuse, it should have been possible to detect this effect. However, despite the well-established literature and psychometric measures indicating that sexual and physical violence should adversely impact the ability of these women to negotiate safe sex prices to their advantage, we find that other sociocultural and behavioral risk factors have a more important impact on the price premium negotiation.

Two important cultural variables in our Tobit model, speaking English and having financial dependents, also bear further consideration. The first variable, speaking English, is used to measure the extent to which an FSW in Ciudad Juarez has the language and cultural skills to serve non-Spanish-speaking clients who cross the border to engage in the sexual tourism market. If language is important to these transactions, we would expect that there would be a large positive premium associated with English-speaking FSWs from Juarez. However, in our model, these cultural skills were not statistically significant. (In our study 12%, approximately 52 FSWs, had the ability to speak English—a small but not a statistically negligible number).

The other important sociocultural variable is having financial dependents, a situation that has conflicting influences. On the one hand, it indicates financial need,⁴ which mitigates bargaining power, while on the other hand, it indicates important familial obligations that would create a protective influence for FSWs.

⁴ Although not necessarily the extreme financial need as indicated by the financial distress variable.

That is, one would expect that women with dependents need to earn money but would be less likely to risk unsafe sex due to their long-term obligation to care for their family as well as the reciprocal support of family members in sustaining a collective value structure, or familism. In Mexico, as in many Latin American countries, cultural family values create a collective identity structure that places women's needs and choices secondary to those needs of her family, thus her behavioral choices are influenced by the needs of those who are most dependent on her for their survival. It is thus not surprising that our model finds that having financial dependents raises the price premium by 5.03% but with a p -value of 0.22, not significant at conventional levels.

Finally, a very important variable is the size and significance of HIV/STI education: recent participation in HIV/STI education resulted in a 7.83% increase in the price premium. Our model supports the idea that HIV/STI education is important in providing FSWs with the necessary knowledge to understand the risks associated with unsafe sex. The FSWs in this study did translate unsafe sex into a higher price premium after they participated in HIV/STI education as compared to those FSWs who had not participated in HIV/STI education within the last six months. It is important to note that our survey did not ask for the type, duration, or quality of the educational program. Therefore, we cannot describe the program in detail. Nevertheless, in Ciudad Juarez HIV/STI education appears to have made an important difference in what is observed as the higher price premium paid for unsafe sex.

VI. Summary and conclusions

Previous studies have found that FSWs in Mexico as well as other less developed countries charge a compensating price difference for sex without a condom. In these studies, some FSWs may have chosen not to offer this option and in principle this choice can be modeled. By contrast, our dataset is based on FSWs who had engaged in unprotected sex within the previous four weeks (and who are 18 or over and had traded sex for material benefits in the prior month). These factors are taken as given in our analysis — we cannot use our dataset to analyze those who did not recently engage in unprotected sex — or those under 18 or who do not trade sex for material gain. If our dataset were not focused on high-risk FSWs we would potentially be able to model the decision not to offer no-condom sex at all using a sample selection model such as Heckman's although with a considerable increase in the complexity of the model specification. Instead, the sample design was purposely limited to

those engaging in risky sex in order to obtain the most accurate estimates possible of the determinants of the behavior of this crucial group by eliminating difficult modeling issues. Besides not focusing on the nose of the camel, the critical edge of unsafe sex by those FSWs engaging in high risk practices, these previous studies have necessarily had to develop econometric models with proxy variables that capture physical attractiveness through age and marital status, and human capital skills through general education. The fundamentally subjective nature of judging attributes such as attractiveness puts a large burden on these models: stated econometrically, measurement error in the conditioning variables results in biased and inconsistent parameter estimates. Our ability to use paired data allowed us to explicitly model a varying no-condom price differential (given that it exists) rather than assuming it to be a fixed, constant coefficient on a dummy variable. In addition, we were able to effectively eliminate (i.e., difference out) a host of highly troublesome unobservable characteristics that determine the prices charged, and concentrate instead on a key policy issue—the determinants of the premium for protected versus unprotected sex. Elimination of these latent characteristics also reduces the possibility of biased and inconsistent coefficient estimates in our model as compared to unpaired formulations. We believe that our work makes a significant contribution to the body of economic and econometric literature on the impact of market forces influencing high-risk FSWs' decision-making on condom use with their clients.

There are important insights that can be derived from our analysis with respect to understanding the underlying economic, sociocultural, and behavioral risk factors that may increase or decrease the premiums paid to FSWs for sex without a condom. Although not all the women in our study could charge a large price premium for high risk sex, in 72% of the cases a market premium for sex without a condom was charged, and both market and non-market factors influenced the size of the premium charged to clients.

Female sex workers in Ciudad Juarez charge a price premium for sex without a condom in a rational response to the risk associated with this type of sex, reflecting market conditions that allow for product differentiation between sex with and without a condom. Given the heterogeneity of FSWs, there is no law of one price for this product, however: there are a host of factors that affect the overall size of the premium charged to their clients based on both market and non-market forces. The economic market forces that impact the overall premium charged for sex without a condom include the following: economic need (bad financial situation), job experience (years in the sex trade), age, and the volume of clients (number of male clients served). Non-market factors that influence FSWs' ability to negotiate a higher

price premium include the following: substance abuse (alcohol and drug use before and during sex), having at least one financial dependent, and recent participation in HIV/STI education programs.

Using a Tobit maximum likelihood estimator and calculating the corresponding marginal effects, we were able to quantify the significance and marginal impact of each of these variables on the percentage price premium negotiated by FSWs for unprotected sex with clients in Ciudad Juarez. The results highlight the role policy can play in promoting FSWs' ability to negotiate a high price premium for unprotected sex, ultimately resulting in more consistent condom use by FSWs with their clients. In particular, HIV/STI education raises the percentage price premium for unprotected sex. More experience in the sex trade also raises the premium providing an opportunity for policymakers to target HIV/STI curricular content differentially by age and experience of the FSWs. Moreover, since experienced FSWs appear to be capable of negotiating higher no condom price premiums relative to younger, inexperienced FSWs, they could play an important role as outreach workers or peer educators in HIV/STI education campaigns. Since the financial situation of FSWs influences condom use decision-making, general or targeted employment policies, may also increase the price premium for unprotected sex by improving FSW's terms of negotiation with her clients. And finally, educational and behavioral policies that successfully reduce alcohol consumption and avert drug use by FSWs can also raise the price premium they negotiate for unprotected sex with clients.

The prevalence of HIV among FSWs in Ciudad Juarez, like other border cities in Mexico, is on the rise. This will have serious implications for the transmission of HIV and other STIs among FSWs, client populations in both Mexico and U.S., and their sexual contacts outside the sex trade if effective policy action is not taken to increase condom use by FSWs with their clients. This study identifies policies that, based on statistical analysis, have the potential to improve the price premium FSWs can negotiate for unprotected sex, thus curtailing client demand for sex without a condom and helping to curb the spread of HIV and other STIs.

Appendix

Table A1. Variables' description

Variable	Questions	Answers
Speaks English	"Do you speak English?"	Dichotomous: "yes" or "no"
Has at least one financial dependent	"How many people depend on you for financial support?"	Continuous. Dichotomized to: 1 (at least one financial dependent) and 0 (no financial dependents)
Participated in HIV/STI education in past 6 months	"In the past six months, have you participated in any other HW/STI counseling or education programs here in Ciudad Juarez?"	Dichotomous: "yes" or "no"
Drinks alcohol before or during sex	"During the past month, how often did you use alcohol before or during sex with a client?"	Responses: "never", "sometimes", "often", and "always". First two to "not often" and last two to "often".
Takes illegal drugs before or during sex	"During the past month, how often did you take illegal drugs before or during sex with a client?"	Responses: "never", "sometimes", "often", and "always". First to "not often" and last two to "often".
Physically abused or sexually raped by male client within last 6 months	"In the past six months, did any of your male clients abuse you physically (cause or threaten to cause physical harm such as slapping, punching, kicking, hitting with an object, assaulting with a knife or other weapon, etc.)?" and "In the past six months, did any of your male clients abuse you sexually (rape, forced sexual advances or non-consensual sexual acts)?"	Coded "yes" to any of the questions and "no" to both questions.

Sociocultural and behavioral risk factors

Table A1 (continued). Variables' description

Variable	Questions	Answers
Age	"How old are you?"	Continuous
Years in sex trade	"For how long have you been employed as a sex worker?"	Continuous
Number of male clients in the last month	"Now, I would like you to think only about your regular male clients. By regular, we mean men who come back to you for repeat visits/men that you have an ongoing relationship with over time. In the <i>past month</i> , how many regular male clients did you have?" and "Now, I would like you to think about your non-regular male clients. By non-regular, we mean men who do not come back to you for regular visits/men that you have seen only once or twice. In the <i>past month</i> , how many non-regular male clients did you have?"	Continuous. Both numbers added.
Rates oneself in a bad financial situation	"How would you rate your current financial situation?"	Responses: "extremely bad", "bad", "neither bad nor good", "good", and "extremely good". First two to "yes" and last three to "no".
Price with condom	"On average, how much money do you earn each time you perform sex using a condom?"	Continuous
Price without condom	"On average, how much money do you earn each time you perform sex without a condom?"	Continuous

Economic factors

Price

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