

2018

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Source Publication:

40 Law & Pol'y 4 (2018)

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Using Incentives to Increase HIV/AIDS Testing by Sex Workers: Evidence from a Randomized Field Experiment in China

MARGARET BOITTIN

Can incentives increase the use of HIV/AIDS testing in criminalized populations? Lawbreakers engaged in activities that place them at heightened risk of HIV/AIDS infection fear that engaging with the state to request an HIV test could increase their likelihood of incurring sanctions for violating the law. This article reports on a randomized field experiment that evaluates whether material incentives can spur lawbreakers to seek state assistance. Sex workers in Beijing, China, were randomly assigned to receive an in-kind incentive equivalent to \$1 (control group) or \$15 (treatment group) for getting an HIV test. Fifteen dollars corresponds to the average amount a sex worker in the study might earn for one sexual transaction, and about 3 percent of her monthly earnings. The larger incentive increased HIV/AIDS testing rates by forty-two percentage points, on average. Both low-tier sex workers, who solicit on the streets and in brothels, and those in the middle tier, who work in karaoke bars and clubs, responded strongly to the large incentive. In addition, the large incentive was effective regardless of whether or not respondents were aware that prostitution is against the law. These findings suggest that modest incentives can have important effects among criminalized populations in authoritarian settings.

I. INTRODUCTION

Lawbreakers who are at heightened risk of HIV/AIDS infection, such as sex workers and intravenous drug users, hesitate to come forth and request HIV/AIDS tests. As with individuals who are not illegal actors, they incur both the psychological costs of HIV/AIDS testing, such as fear of learning that they might be HIV positive and anxiety about possible stigma from their community, and the monetary costs associated with time and travel for getting tested (Howell and Shepperd 2013; Thornton 2008; Grusky, Roberts, and Swanson 2007; Wolff et al. 2005; Ford et al. 2004; Hutchinson et al. 2004; Sullivan et al. 2004; Kalichman and Simbayi 2003; Ginwalla et al. 2002; Mugusi et al. 2002; Coulibaly et al. 1998). In addition, their involvement in illegal behavior creates another barrier: they fear that engaging with the state to request an HIV test could increase their likelihood of incurring sanctions for having violated the law (Kaufman 2011; Wan et al. 2010; Zi Teng 2008; Wolffers and van Beelen 2003; Blankenship and Koester 2002).

I am grateful to Douglas J. Ahler, Miguel de Figueiredo, Jake Grumbach, F. Daniel Hidalgo, Amy Lerman, and Laura Stoker, all of whom provided invaluable feedback on the research presented in this article. I am also indebted to my contacts in China who facilitated the access necessary to carry out this project.

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Yet the state needs to reduce the spread of diseases among high-risk populations. This requires easy access to these communities and trusting relationships whereby individuals such as sex workers and drug users are willing to speak openly about their habits, get tested for diseases such as syphilis or HIV/AIDS, and receive treatment. Three policies may help achieve these goals. The first is to decriminalize or legalize the activity.¹ The second is to transfer health service provision for these populations to nonstate actors, with whom lawbreakers are more likely to feel comfortable interacting than state agents.² The third, evaluated in this study, is to provide incentives to encourage illegal actors to request HIV/AIDS tests.

Specifically, this article presents findings that refute previous assumptions about the extent to which barriers to HIV/AIDS testing are entrenched among sex workers in China and about the difficulties involved in increasing testing among those most in need of it.³ I carried out a randomized controlled trial in which I varied the value of the incentive provided to sex workers in Beijing for getting an HIV/AIDS test. While previous studies of the general population in democratized countries have found that incentives can increase the demand for HIV/AIDS testing (Ngatia 2016; Thornton 2008), this is a rare study design to carry out, as it involves not only an illegal population but also one living in an authoritarian regime. Study participants were randomly assigned to receive an in-kind incentive equivalent to either \$1 (for the control group) or \$15 (for the treatment group) for completing an HIV/AIDS test. The “Experimental Design” section of this article discusses the steps taken to address concerns that study respondents might ascribe a different value to an object than its monetary cost. These included selecting an object useful to a sex worker and of which she knows the value, which was also mentioned to each respondent in the course of the study. Fifteen dollars is equivalent to the amount a sex worker in the sample might earn for one sexual transaction, representing about 3 percent of her monthly earnings. The larger incentive increased testing by forty-two percentage points. Among those who received it, almost all (93 percent of study participants) obtained an HIV/AIDS test. Sex workers in both the lowest tier of the sex industry (who solicit on the streets and in brothels) and in the middle tier (who work in karaoke bars and clubs) responded strongly to the larger incentive. In addition, the large incentive was effective regardless of whether or not study respondents were aware that prostitution is against the law. Fifteen dollars is affordable from the perspective of the state and nongovernmental organizations looking to reduce HIV/AIDS infection rates in the community—it is an incentive amount that has been used in the context of other health interventions in China that have been scaled up to reach large numbers of individuals in the population (Fan 2017; Miller 2016; Jacobs 2009). The results of the experiment thus show that a modest incentive can have important results for illegal populations living in authoritarian regimes whose activities present public health risks. It could also have implications for criminalized populations in other political regime types. These are individuals who, even in democratic regimes, often avoid any engagement with the state (Weaver and Lerman 2010; Goffman 2009; Rose and Clear 1998). Such behavior can deprive them of important social services (in areas such as health and education) that are of benefit to both themselves and the community at large.

II. THE ROLE OF INCENTIVES IN MODIFYING BEHAVIOR

The intervention described in this article builds on a rich body of randomized controlled trial studies that explore the role of incentives in changing behavior and, more specifically, a subset of this literature that specifically examines how incentives—both

monetary and in-kind—affect the demand for health. Although incentives are not always successful at promoting healthful behavior (Acland and Levy 2013; Charness and Gneezy 2009; Martins, Morris, and Kelly 2009; Volpp et al. 2006, 2009), plenty of evidence points to their ability to increase the demand for health (Petry et al. 2012; de Walque et al. 2012; Banerjee et al. 2010; Cohen and Dupas 2010; Kremer and Miguel 2007; Morris et al. 2004; Loevinsohn and Loevinsohn 1987). As pertains specifically to incentives for HIV/AIDS testing, the two studies of which I am aware (Ngatia 2016; Thornton 2008) both find this to be the case. Yet the research described in this article distinguishes itself from these previous studies on the demand for health in two ways: first, it focuses on a criminalized population; and second, it does so in an authoritarian regime.

With specific reference to the studies most pertinent to the research presented here, Thornton (2008) provided financial incentives ranging from \$0 to \$3 (USD) for obtaining the results of a free door-to-door HIV test in Malawi and found that incentives doubled the demand for HIV test results. She proposes that the incentives might help to address psychological obstacles to learning HIV results, reduce the costs of time or travel, and/or reduce the stigma around HIV testing by providing a public excuse for individuals to request their results at a testing center (Thornton 2008).⁴ Pursuing related questions, also in Malawi, Ngatia (2016) randomly assigned respondents to receive both a small bag of sugar and a cash payment ranging from \$0 to \$4 (USD) in exchange for taking an HIV test at a local testing center. The results indicated that the bag of sugar increased the likelihood of getting tested by 50.71 percent, with each additional dollar increasing the likelihood by 5.73 percent.⁵ In Thornton's design, study participants received door-to-door HIV testing and then were provided with an incentive if they traveled to an HIV center to get their results. Ngatia's design, on the other hand, provided an incentive for taking the test.⁶ Like Ngatia's, my design focuses on the initial request for an HIV test. In China, HIV/AIDS tests are only available at certain state-run health institutions, and door-to-door testing run through those institutions is not widely available. As such, the key behavioral change upon which to focus is a sex worker's willingness to physically go to a testing center to request the test.

The research presented here differs in two main ways from these two other studies on the effects of incentives on the demand for HIV tests and their results. First, instead of focusing on the general population, it specifically explores the impact of incentives on a criminalized population: female sex workers. Second, it takes place in China, an authoritarian country with a very different political, social, cultural, and economic environment than Malawi.

On one level, sex workers in China articulate the same concerns about testing as individuals who are not engaging in criminalized activity and who do not live under an authoritarian regime. Indeed, this is a population whose barriers to testing include those often attributed to the general population in many environments: anxiety and fear of learning they may be HIV positive, the stigma attached to HIV-positive status, and the costs (in money and time) of traveling to a testing site. Some of the costs associated with the stigma attached to being HIV positive are internal; as one sex worker put it, "I'm not willing to get tested. It's because I'm scared I'd learn I have [HIV], which I would be completely unable to accept."⁷ Other costs are external and are tied to the marginalization that can result from testing positive. One sex worker who was HIV positive described this stigma powerfully: "If people back home found out [I have HIV]," she said, "they would drown me in their spit."⁸

On another level, Chinese sex workers face additional barriers specific to their particular circumstances. As sellers of sex, they fear loss of income if a positive result prevents

them from continuing to engage in prostitution.⁹ They worry not only about the stigma tied to being HIV positive but also about possible divulgence of their engagement in prostitution, which could occur in the process of requesting an HIV test. As illegal actors, they also fear that getting an HIV test could increase their likelihood of being arrested for prostitution (Kaufman 2011; Wan et al. 2010; Zi Teng 2008; Wolffers and van Beelen 2003; Blankenship and Koester 2002). It is here that the authoritarian regime plays a key role in shaping sex worker perceptions of HIV/AIDS testing. On paper, China's HIV/AIDS policies, as well as doctor–patient confidentiality rules more generally, formally guarantee an individual's anonymity and protect her identity. Chinese health professionals should therefore not reveal information about the HIV status of a patient, or the patient's engagement in prostitution. As such, a Chinese sex worker, just like a sex worker in a democratic regime where prostitution is against the law, should in theory be protected from unwanted law enforcement interventions resulting from interactions with health workers. However, these policies are not necessarily respected. If they are not, the limited protections for the individual rights of citizens in China mean that a sex worker in the country is powerless to contest any unlawful state interference into her life. More generally, the political regime has a serious impact on the experience a sex worker might have if she were to be arrested. In describing the situation of some sex workers in the United States, Levine and Mellema (2001) note that these women view incarceration as an opportunity to “plan future scams, to rest, to get healthy, to get food, to take advantage of social services, and to have a warm bed” (Levine and Mellema 2001, 183). Harsh law enforcement tactics and police abuse are such that sex workers in China (Boittin 2013, 2015; Human Rights Watch 2013) would be unlikely to espouse a perspective similar to the one described in Levine and Mellema's work. Instead, women engaged in prostitution in China who are considering an HIV test voice concerns about their distrust of the government and their fear of arrest (Boittin 2013, 2015). The following testimonies of Chinese sex workers illustrate these issues:

Sex workers don't trust the government. We are scared that the government will frame us, and that if we enter a hospital [for an AIDS test], we won't come back out.... I guarantee that most sex workers won't go to a government clinic.¹⁰

Every time I go get tested ... I worry that the hospital worker will know that I am a sex worker ... and report me to the police.¹¹

I don't want any trouble.... Sometimes I don't feel good, but I am not willing to get tested. It's because I'm scared to get tested, if they find out I am a sex worker.¹²

I'm not willing to get tested. It makes me really nervous, I'm terrified that people will know that I am a sex worker ... and then the police will catch me.¹³

Such concerns could also exist for sex workers in democratic regimes, where much greater protections exist to prevent situations where a request for a health service could result in trouble with law enforcement. Research on individuals who belong to criminalized populations in the United States shows that they “define the power of the state as a nemesis to be avoided rather than an ally to be cultivated” (Rose and Clear 1998, 465) and view their illegality as “an all-encompassing aspect of their identity” (Weaver and Lerman 2010, 820). Like Chinese sex workers, black men in Philadelphia who have had entanglements with law enforcement are instilled with an “overriding fear of capture” that can lead them to “avoid institutions, places, and relations on which they formerly relied” (Goffman 2009, 340). More generally, experiences with the American criminal justice system have been

found to shape citizens' political attitudes and behaviors, and "there is a large, negative effect of criminal justice contact for several aspects of political life—turning out to vote, involvement in civic groups, and trusting the government" (Weaver and Lerman 2010, 827). These types of issues are all heightened in an authoritarian regime, where citizens are powerless to effectively contest state overreach into their lives.

Given the differences that exist between China and Malawi, and between an illegal population, such as sex workers, and the general population, it is valuable to pursue a research question similar to Thornton's and Ngatia's in a different setting and with a different population. Thornton herself articulates this when she notes that "[i]t is important to keep in mind, however, that these results may differ in settings with higher prevalence rates or different social circumstances" (2008, 1859). Despite all of these contextual differences, and as discussed in greater detail below in Section V.C, the impact of the incentives in these two contexts is comparable.

To be clear, the causal claim I make in this article is that an in-kind incentive equivalent to \$15 increases HIV testing rates for sex workers by forty-two percentage points, on average. This increase is relative to an in-kind incentive equivalent to \$1. I am not able to make a causal claim with respect to the exact mechanism by which the incentive may be effecting change—whether it might be working to compensate for fears of disease or arrest, addressing the direct costs of time and travel tied to testing, or reducing social stigma by providing an excuse for getting tested. Instead, I highlight these as the most frequently articulated obstacles to increasing HIV testing for illegal populations, and show that a modest incentive can effectively overcome these stated barriers—even among lower tier sex workers, who tend to have the highest risk of HIV/AIDS infection, and among sex workers who know that prostitution is against the law.

III. PROSTITUTION, HIV/AIDS, AND CLASS IN CHINA

A. PROSTITUTION AND HIV/AIDS

Prostitution is against the law in China. Sanctions include fines of up to ¥5,000 (\$750, about fifty times the average price of a transaction in my sample), several years of incarceration, and public humiliation through shame parades (Fu and Choy 2009; Watts 2006). Police abuse of sex workers while in custody, including torture, is also reported (Boittin 2013; Human Rights Watch 2013). Official data reports an average of 150,712 arrests per year for "prostitution and soliciting prostitutes" from 1997 to 2013.¹⁴ These figures are likely to significantly underestimate the actual number of arrests (Fu and Choy 2004). In this study, 8 percent of sex workers reported having been arrested for prostitution. Despite this illegality, prostitution is rampant. China's business culture, centered around venues that harbor prostitution, such as karaoke bars, results in a high demand for commercial sex (Zheng 2009; Uretsky 2008). Official sources, likely to underestimate the magnitude of the phenomenon, cite figures ranging from three to ten million sex workers in China, and other estimates are as high as twenty million (Huang 2010; Bell 2007).

The incidence of HIV/AIDS infection among sex workers in China is high. In some areas of the country, 10 percent of the sex worker population has tested positive for HIV (Kaufman, Kleinman, and Saich 2006; Chen et al. 2005). While official data report that less than 1 percent of sex workers are HIV positive (Ministry of Health of China 2010), important weaknesses in the state monitoring system suggest that this rate presents a significant underestimation (Boittin 2015; Human Rights Watch 2013). As discussed later, basic awareness of HIV/AIDS among sex workers is high, yet actual sexual

practices are a cause for concern. According to the country's most representative study of sex worker sexual behavior, only 19 percent of sex workers reported consistent use of condoms (Horizon Market Research 2002).

This high supply of and demand for commercial sex, along with high rates of HIV/AIDS among sex workers and unsafe sex practices, all present a potentially explosive public health situation. As the virus spreads from sex workers and clients to third parties, such as unsuspecting spouses, HIV/AIDS is taking root within the general population. Sexual transmission has become the primary mode of HIV/AIDS infection in China (Ministry of Health of the PRC 2013). In 2014, 92 percent of reported cases were acquired through sexual contact, up from 33 percent in 2006 (Ministry of Health of the PRC 2015). Nationally, the prevalence of HIV/AIDS is uncertain. As of December 2014, the official number of reported people living with HIV in China was 501,000 (*ibid.*). Nongovernmental experts suggest that the actual number is significantly higher (Wan et al. 2010; Saich 2006); by some estimates, it is around ten to fifteen million (Kaufman, Kleinman, and Saich 2006). The infection rate also appears to be growing steadily at a rate of at least 30 percent annually (*ibid.*; *BBC News* 2006). The results of this study are thus all the more valuable given the overall number of HIV cases and the current increase in sexual transmission: they suggest that a real opportunity exists to curb the spread of the disease before it becomes firmly entrenched in the general population.

Chinese citizens who want an HIV/AIDS test need to go to state-run health institutions, which are generally the only facilities authorized to provide such tests. HIV tests are provided free of charge (Wu et al. 2010). If an individual tests positive, the state provides them with free antiretroviral (ARV) drugs under the "Four Frees, One Care" policy (the "Four Frees" are free voluntary HIV counseling and testing, free antiretroviral treatment, free services for prevention of mother-to-child HIV transmission, and free education for AIDS orphans; the "One Care" is social and financial support for HIV patients).

B. HIV TESTING AND CLASS

The Chinese sex industry can be divided roughly into three tiers. In the lowest tier, women solicit on the streets and in brothels. These venues, which often masquerade as hair salons and massage parlors, signal the services they actually provide with red lights glowing in the windows. They also tend to lack sinks, scissors, and other tools generally found in legitimate beauty parlors. Sex is the only service provided in this tier of the sex industry. In the middle tier, karaoke bar and club hostesses drink, dance, and talk with guests in addition to selling sex. In the top tier, a population that is not the object of this study, escorts, mistresses, and second wives cater to elite businessmen and government officials.

Within the overall population of sex workers, those of the lowest socioeconomic status are both the least likely to get tested and the most likely to need testing (Hong et al. 2012; Yi et al. 2010; Choi and Holroyd 2007; Global Fund 2006). Low-tier sex workers are at the greatest risk of contracting and spreading HIV, having the most clients, the least knowledge of HIV/AIDS, and the least agency to impose condom use on clients. They are also at higher risk of arrest for prostitution: in contrast to women in the middle tier, who can hide their engagement in prostitution behind the legitimate hostessing activities in which they engage, low-tier women work on the streets and in venues that only provide sexual services, leaving them more exposed to law enforcement. Experiences with law enforcement can further decrease the willingness of these sex workers to reach out to other types of state agencies such as health service providers. As discussed below, the sex workers in this study reflect these tier-based differences.

IV. EXPERIMENTAL DESIGN

I conducted this experiment in December 2009 in a red light district in Beijing. In the heart of the red light district, venues that act as fronts for prostitution, including karaoke bars, massage parlors, and hair salons, line both sides of the streets. The entire district is several square miles in area.

Staff at a sex worker outreach community center in the district recruited all sex workers to be interviewed.¹⁵ Six of my research assistants conducted face-to-face interviews with a total of 213 sex workers, either at the community center or at the sex work venues themselves. The interviews were about thirty minutes long. Among other questions, respondents were asked whether they had ever been tested for HIV/AIDS. Upon completion of the interview, incentive amounts were allocated through simple randomization: the respondent was invited to draw a ping pong ball out of a bag, with different colors indicating which of the in-kind incentives she would receive upon completing an AIDS test. These incentives are described below. The participant was then given a card (Figure 1), with a unique identifier for each participant, that gave detailed instructions on getting to the hospital, getting her AIDS test, and redeeming her incentive.

Sex workers who were assigned to receive the small incentive received a white card, while those who were assigned to receive the large incentive received a pink card.

Each cardholder was entitled to an AIDS test. As noted earlier, these must be provided free of charge in China. That said, without the card, participants could not have gotten tested at the particular time and place indicated on the card.¹⁶ The hospital was located a few blocks away from the heart of the red light district.¹⁷

During the designated days and hours specified on the card—three weekday afternoons during and following the days when respondents were interviewed for the pretest survey—research assistants and community center staff waited in the hallway wing of the hospital where the health tests were conducted, right outside the section where hospital staff drew blood for HIV tests. Any participant who got the test would walk by the researchers on her way out and show both the experiment voucher and the form confirming that she had gotten the test.¹⁸ The researchers would verify both and make a note of the card color (indicating small or large incentive) and number. Participants could then collect their incentive.

I provided incentives in the form of objects, rather than cash. This decision was made to address the concerns of leaders of the local community organization, who worried that cash incentives might create an expectation of monetary remuneration for their future projects and programs. In addition, they objected to having a “pure” control group that would receive nothing in exchange for requesting an HIV test. They wanted to diminish the possibility of resentment from individuals in the control group and felt

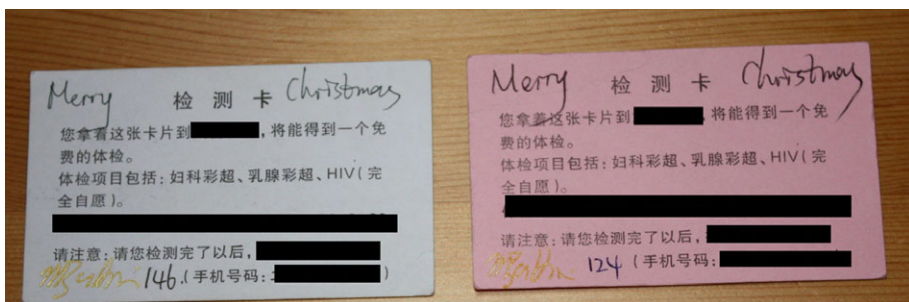


Figure 1. Image of Cards Provided to Study Participants.

that a token incentive would suffice to protect them from criticism in the community. The large incentive was a big boxed set of bed sheets and pillowcases, worth 100 yuan (\$15), and the token incentive was a small pillow, worth 10 yuan (about \$1) (Figure 2).

Incentives were chosen in collaboration with the community center and a focus group of sex workers. The goal was to choose objects whose monetary value the women would be able to identify. In addition, we wanted the large incentive to be useful. We chose the boxed set of bed sheets and pillowcases because, in their line of work, sex workers frequently need to purchase them and know how much they cost. In selecting the small pillow, we sought to ensure that they would recognize it as a small token and not place much value on it. To further emphasize the monetary worth of each incentive, the enumerators would state their value to each study participant. A number of previous randomized experiments have also successfully substituted objects for cash incentives (Lacetera, Macis, and Slonim 2012; Banerjee et al. 2010; Goette and Stutzer 2008). As the authors of these studies note, the key issue with providing objects is that individuals may ascribe a different value to them than their monetary cost. A number of nonfinancial factors—color, utility, prior possession of object, etc.—may influence one's object preference. The selection process I used minimizes these concerns.

V. EXPERIMENTAL RESULTS

A. PARTICIPANT CHARACTERISTICS

Table 1 presents statistics on the characteristics of study participants. Given how difficult it is to access sex workers in China, none of the limited number of carefully conducted surveys of this population have samples that are representative, either nationally or locally. That said, in order to provide some sense of how sex workers in this study compare to others, Appendix I compares some of the basic characteristics of study participants with those of other surveys of Chinese sex workers.

The sex workers in my sample are older than might be expected. Two factors may be at play here. First, the red light district where the survey was conducted caters mainly to middle- and lower-class men. Younger women, who are in greater demand, are more likely to work in more elite venues where they are paid higher amounts. Second, while some women enter the sex trade around the age when they would otherwise enter the legitimate workforce, others are pushed into prostitution later on in life. In Northeastern China, where 56 percent of respondents are from, significant layoffs of employees of state-owned enterprises (SOEs) in the late 1990s resulted in high levels of unemployment



Figure 2. Images of Small Incentive (Pillow) and Large Incentive (Set of Bed Sheets and Pillowcases).

Table 1. Descriptive Statistics of Field Experiment Participants

| Variable | |
|---|-----------------------------|
| Respondent Characteristics | |
| Age (mean) (<i>N</i> = 209) | 32 years (SD: 6.7) |
| Married (%) (<i>N</i> = 213) | 63 |
| From Rural Area (vs. Urban) (%) (<i>N</i> = 213) | 55 |
| Completed Mandatory 9 Years of Schooling (Graduated from Middle School) (%) (<i>N</i> = 213) | 78 |
| Have Children (%) (<i>N</i> = 194) | 70 |
| Number of Children among Respondents with Children (mean) (<i>N</i> = 130) | 1.1 (SD: .46) |
| Number of Children (mean) (<i>N</i> = 194) | .75 (SD: .65) |
| Sex Work Experience | |
| Number of Years Selling Sex (mean) (<i>N</i> = 211) | 3 years (SD: 2.4) |
| Age at which Started Selling Sex (mean) (<i>N</i> = 198) | 28 years old (SD: 6.1) |
| Middle Tier Brothel Work (Karaoke Bar) (%) (<i>N</i> = 213) | 82 |
| Lower Tier Brothel Work (%) (Massage Parlor, Hair Salon, Street) (%) (<i>N</i> = 213) | 18 |
| Reported Price of Most Recent Transaction (mean) (<i>N</i> = 191) | ¥548 /\$86 (SD: ¥321 /\$50) |
| Health Knowledge and Practices | |
| Has Heard of Sexually Transmitted Diseases (STDs) (%) (<i>N</i> = 211) | 92 |
| Has Heard of AIDS (%) (<i>N</i> = 212) | 98 |
| General Health Checkup in Previous Year (%) (<i>N</i> = 211) | 65 |
| Previously Had an AIDS Test (%) (<i>N</i> = 210) | 25 |

for men and women. Prostitution has emerged as an alternative for women unable to find other employment.

The 63 percent marriage rate may appear high for sex workers. Sex workers are overwhelmingly migrants whose husbands do not migrate with them. Shielding a husband from knowledge of one's involvement in prostitution is not difficult in such circumstances. Some respondents reported having more than one child. In rural areas, the one-child policy allows for a second child if the first one is a girl.¹⁹ Additional children require parents to pay a fine, usually proportional to the violator's income. This fine may precipitate someone's decision to migrate and enter the sex trade (Boittin 2015).

Education is mandatory in China through middle school, and the state reports about an 80 percent attendance rate through middle school (Ministry of Education of the PRC n.d.). The women in this sample, with 78 percent graduating from middle school, closely approximate official nationwide figures.

Within my sample, 82 percent of participants were middle-class sex workers working in karaoke bars. The remaining 18 percent were from the lowest stratum of sex workers, soliciting in massage parlors, hair salons, and on the streets.²⁰

The reported mean of ¥548 (\$86) for their most recent transaction is likely inflated, as the stigma of prostitution leads respondents to report higher payment for one transaction. In reality, the sex workers in this study were most likely earning closer to \$15 per transaction, rather than \$86 (Boittin 2015). More specifically, women who work in middle-class venues such as karaoke bars might earn ¥100 to ¥200 (\$16 to \$32) per transaction. Those in the lowest tiers of prostitution, working in massage parlors, hair salons, and on the streets, earn between ¥20 and ¥100 (\$3 to \$16).

All but 2 percent of respondents had heard of HIV/AIDS, and 92 percent were also aware of the existence of sexually transmitted diseases. Such levels are consistent with those reported in other research on sex workers (Horizon Market Research 2002). In addition, 65 percent of respondents noted that they had had a health checkup in the previous year. Sex workers generally seek out such checkups at unregistered clinics that are

Table 2. Comparison of Low- and Middle-Tier Sex Workers for Key Variables

| Variable | Low Tier (Mean) | Middle Tier (Mean) | P-Value |
|--|-----------------|--------------------|---------|
| Age (Years) | 33 | 31 | 0.09 |
| Education (Mandatory 9 Years) (%) | 84 | 77 | 0.34 |
| Age at Which Started Selling Sex (Years) | 30 | 28 | 0.05 |
| Reported Price of Most Recent Transaction (Yuan) | 415 | 573 | 0.01 |
| Has Heard of STDs (%) | 97 | 92 | 0.24 |
| Has Heard of AIDS (%) | 92 | 99 | 0.00 |
| Previous AIDS Test (Self-Reported) (%) | 22 | 26 | 0.58 |
| General Health Checkup in Previous Year (%) | 53 | 67 | 0.08 |

neither regulated nor legal (Bristow 2009). These are ubiquitous in red light districts. This high rate of checkups cannot be interpreted as evidence of sex worker willingness to interact with state institutions and used to counter the earlier discussion of additional barriers to HIV testing that this population faces. Table 1 also shows that 25 percent of participants reported having received an HIV/AIDS test at some point in the past. Given social desirability bias issues, this is likely an overestimate of the percentage of respondents who have actually gotten this test in the past.

The tier-based differences mentioned earlier, where low-tier sex workers are both more at risk of HIV/AIDS infection and less likely to get tested, come through in an examination of some of the key variables examined in the previous table, broken down by prostitution tier. Table 2 compares characteristics of low- versus middle-tier sex workers for relevant variables.

Lower-tier sex workers reported lower payments for their most recent transaction in comparison to their middle-tier counterparts. While I noted earlier that these numbers are generally inflated, there is no reason to believe that they would be disproportionately exaggerated in one group compared with the other. Lower rates per transaction may lead to greater numbers of clients, which in turn can increase one's risk of HIV/AIDS. This difference is statistically significant. General knowledge of both STDs in general and HIV/AIDS in particular is high across the board for both groups. A smaller percentage of low-tier sex workers (92 percent) than middle-tier sex workers (99 percent) had previously heard of AIDS, and the difference is statistically significant. In contrast, a greater proportion of low-tier sex workers (97 percent) than middle-tier ones (92 percent) had heard of STDs, and this difference is not statistically significant. As expected, low-tier sex workers were less likely to have had a health checkup in the year preceding the intervention (53 versus 67 percent), and this difference is statistically significant. Finally, a smaller percentage of women in the low-tier group reported having had a previous AIDS test (22 versus 26 percent), though this difference is not statistically significant.

B. RANDOM ASSIGNMENT

Using simple randomization, participants were assigned to receive either a small incentive (the control group) or a large incentive (the treatment group) by lottery. Through this process, 107 participants were assigned to receive the small incentive, and 106 participants were assigned to receive the large incentive. Randomization ensures unbiased assignment to the control and treatment conditions and provides an expectation that the two groups will have the same observable and unobservable attributes. To check for balance across potential confounders, I conducted a simple difference-in-means test across fourteen baseline covariates: five basic demographic variables, four variables pertaining

Table 3. Results of Covariate Balance Tests

| Variable | Small Incentive (Control) Mean and Standard Deviation | Large Incentive (Treatment) Mean and Standard Deviation | Difference | P-Value |
|--|---|---|------------|---------|
| Basic Demographic | | | | |
| Age (in years) | 28 (6.4) | 28 (5.9) | 0.02 | 0.98 |
| Rural | 57% (.048) | 54% (.048) | 0.03 | 0.637 |
| Married | 64% (.046) | 62% (.047) | 0.02 | 0.74 |
| Completed Mandatory Education | 78% (.041) | 79% (.04) | 0.02 | 0.77 |
| Low Tier of Prostitution | 25% (.042) | 10% (.029) | 0.15 | 0.00 |
| Perceptions of and Experiences with Authorities | | | | |
| Trust in Local Government | 83% (.04) | .75% (.05) | 0.08 | 0.18 |
| Trust in Police | 53% (.05) | 57% (.05) | 0.04 | 0.59 |
| Previous Arrest | 8.4% (.03) | 7.5% (.03) | 0.008 | 0.82 |
| Think Prostitution Is Legal | 23% (.04) | 26% (.04) | 0.03 | 0.63 |
| Health Behaviors and Knowledge | | | | |
| Previously Had an AIDS Test | 21% (.04) | 30% (.04) | 0.09 | 0.154 |
| Had a Health Checkup in Previous Year | 59% (.05) | 70% (.04) | 0.11 | 0.09 |
| Knowledge of STDs | 94% (.02) | 91% (.03) | 0.03 | 0.41 |
| Knowledge of AIDS | 96% (.02) | 100% (0) | 0.04 | 0.04 |
| Length of Time Selling Sex (in months) | 37 (3) | 34 (2.6) | 3.5 | 0.39 |

Note: Regressing the treatment variable on all fourteen covariates fails to reject the null hypothesis that all coefficients are equal to 0 ($F = 1.30$, $p = 0.2125$, $R^2 = 0.1083$).

to respondent perceptions of and experiences with authorities, and five health behavior variables. Balance is particularly important for all of these variables as they could each influence sex worker requests for HIV/AIDS tests. Respondents who are less educated may have less knowledge about HIV/AIDS and therefore perceive the opportunity to get tested differently from those with higher levels of education. As noted earlier, sex workers who work in the lowest tier of prostitution (i.e., whose socioeconomic status is lowest) are the least likely to get tested and the most likely to need it. With respect to perceptions of and experiences with the authorities, individuals who are less trusting, who have previously been arrested for prostitution, or who think that selling sex is legal may react differently to the provision of an incentive to get an HIV test at a state-run hospital. Health variables that could affect a sex worker's willingness to get an HIV test include their general awareness of AIDS and STDs, previous HIV testing and health checkup behavior, and length of time in the sex industry. Table 3 provides the results of these covariate balance tests.

These results reveal statistically significant differences between covariates for three variables: tier of prostitution ($p < 0.05$), knowledge of AIDS ($p < 0.05$), and previous health checkup ($p < 0.10$). In addition, there is a substantive (but statistically

insignificant) imbalance on another covariate: self-reports of previous AIDS tests.²¹ However, regressing the treatment variable on all fourteen covariates fails to reject the null hypothesis that all coefficients are equal to 0 ($F = 1.30$, $p = 0.2125$, $R^2 = 0.1083$).

The difference in knowledge of AIDS, while significant, is not of substantive concern, as it is extremely high in both groups: 96 percent for those assigned to the small incentive and 100 percent for those assigned to the large one. The balance that exists in knowledge of STDs, a variable similar to knowledge of AIDS, helps confirm this interpretation of the AIDS knowledge imbalance.

The difference in *tiers* across treatment assignment is large and significant. This is a possible confounder: as discussed above, low-tier sex workers are less likely to seek HIV/AIDS testing. However, I execute analyses of the treatment assignment *within tier* in order to estimate a separate treatment effect for lower-tier and middle-tier participants (see Figure 4).

The greatest concern for confounding is related to the difference in self-reported previous AIDS tests across treatment groups. Although the difference in means is statistically insignificant, the substantive difference is moderately large (21 versus 30 percent). Of course, self-reported behavior does not necessarily represent actual behavior, but, even setting this aside, it is likely that participants who have previously had an HIV/AIDS test have a higher propensity to get another HIV/AIDS test, potentially biasing estimates of the effect of the incentive. To mitigate this concern, I provide analyses in which I estimate the effect of the incentives only among those who have previously had an HIV/AIDS test and only among those who have not (see Figure 5). Appendix II also presents regressions that control for these covariates.

C. EFFECTS OF THE TREATMENTS ON THE DEMAND FOR AN HIV TEST

Of the participants who were assigned a small incentive, 51 percent obtained an HIV test. Of those who were assigned a large incentive, 93 percent obtained an HIV test. Figure 3 illustrates this difference in testing rates, which is significant at $p < .001$.

The treatment effect is extremely large. A total of 51 percent of study participants who received a token incentive worth \$1 requested an HIV test.²² The large incentive, the equivalent of \$15, caused a forty-two percentage point increase in the demand for an HIV test, such that 93 percent of those assigned to receive the large incentive requested the test.²³ Given the study design, what is unambiguous is the value of a larger incentive relative to a small one. A set of bed sheets worth \$15 prompted over 90 percent of participants to get tested compared to the 51 percent rate among those receiving the token incentive worth \$1—a more than 80 percent increase. Since the control group also received an incentive, the forty-two percentage point increase could be considered a lower bound on the effectiveness of the larger incentive—the increase might have been greater if the control group had received no incentive at all. As noted earlier, \$15 represents the amount that the study participants might receive from one transaction. Their monthly income ranges from ¥1,000 to ¥3,000 (about \$150 to \$475), so the incentive amounts to 3 to 10 percent of their monthly earnings. At the same time, these are lower- and middle-class migrant women who, if they were not working in the sex industry, would most likely find employment in factories or in the service industry as waitresses, where their monthly earnings would be closer to \$45 to \$75 (Magnani and Zhu 2012). Viewed from this baseline, the incentive is much larger and may have been more valuable to the women as a result: it amounts to one-fifth to one-third of the monthly earnings of others in their social class.

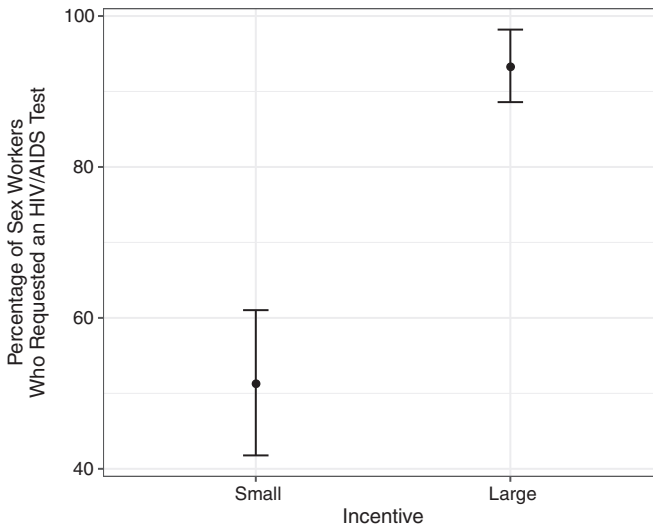


Figure 3. Large Incentive Had Important Effect on Demand for HIV/AIDS Test.

The magnitude of this effect is comparable to the effect observed in previous studies using incentives to encourage an individual to request health interventions. In Thornton's 2008 study of the general population in Malawi, 34 percent of respondents in the control group sought to learn their HIV results, a rate that is sixteen percentage points lower than the rate observed in the sex workers in this study (51 percent). The incentives in the Thornton study ranged from zero to \$3. The average incentive was for \$1.01, the equivalent of about one day's wage. That amount is comparable to the value of the \$15 large incentive in my study, as it corresponds to about 3 percent of a sex worker's monthly earnings. Thornton found a forty-three percentage point difference in demand for test results between those who received no incentive and those who received some incentive, which is close to the forty-two percentage point difference in the case of sex workers in China. Even the smallest incentive in the Thornton study—one-tenth of a day's wage—doubled the demand for HIV test results. Similarly, the Ngatia (2016) study found that a bag of sugar increased the likelihood of getting tested by 50.71 percent and that each additional dollar increased the likelihood of getting tested by 5.73 percent. Banerjee et al. (2010) found that demand for immunizations more than doubled, to 38 percent, for individuals assigned to receive lentils and thalis following a request for a vaccine. These effects are all close to the forty-two percentage point difference that I found between sex workers who received the small incentive and those who received the larger one.²⁴ While the analyses reported thus far compare outcomes across the two randomly assigned conditions without controlling for any observational covariates, Appendix III presents analyses with covariates included, demonstrating that these results are robust to specification. In addition, as shown in Appendix III, the findings are also robust using a nonparametric Pearson's Chi-squared test.

D. WHO RESPONDS TO INCENTIVES?

On average, individuals who received the large incentive were much more likely to get an HIV test, but the effect could differ for subgroups. I turn next to exploring the characteristics of sex workers who are more or less likely to respond to incentives.

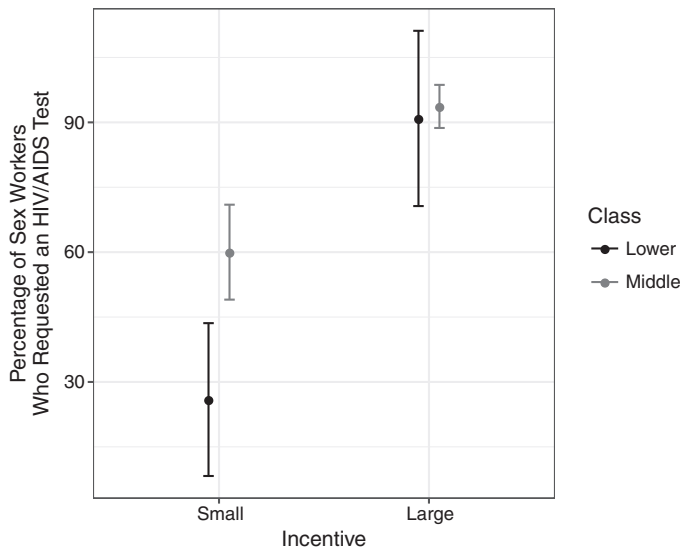


Figure 4. Large Incentive Brought Low-Tier Sex Worker Testing Levels up to Those of Middle-Tier Sex Workers.

As I discuss earlier, there are strong substantive reasons to focus on class as a predictor of willingness to get an HIV/AIDS test. Previous research highlights the disconnect between higher needs for HIV/AIDS testing among low-tier sex workers and lower demand for testing within that subset of the population (Boittin 2015; Hong et al. 2012; Yi et al. 2010; Choi and Holroyd 2007; Global Fund 2006); I therefore focus on class-based responses to the incentive. On one level, it might be expected that women in the lowest tiers of the sex industry would respond more to the large incentive than their higher-class colleagues, given the higher relative worth of the \$15 incentive for low-tier sex workers, but in fact it is precisely the streetwalkers and women in low-class brothels who are most resistant to seeking out voluntary HIV tests, a consideration suggesting that they might not respond as well to the large incentive. Figure 4 presents the data on HIV test demand based on whether the respondent works in a low- or middle-class venue. The results suggest that the large incentive is highly effective at increasing testing rates for women working in both the low and middle tiers of the sex industry, despite a pattern of overall lower testing rates among low-tier sex workers.

Among sex workers assigned to receive the small incentive, middle-tier sex workers were thirty-four percentage points more likely to request an HIV/AIDS test than their low-tier counterparts ($p < .01$): 26 percent of low-tier sex workers got tested, while 60 percent of middle-tier sex workers did so. The large incentive then brought low-tier sex workers' testing levels to those of middle-class workers: 91 percent of low-tier sex workers assigned to the large incentive received an HIV test, while 94 percent of their middle-tier colleagues did so. The three percentage point difference between low- and middle-tier sex workers who received the large incentive is not statistically significant.

The large incentive was effective at increasing the demand for HIV testing among both low- and middle-tier sex workers. In both groups, more than 90 percent of those assigned to the incentive worth \$15 requested an HIV test. Yet the large incentive had a particularly powerful impact on women in the low tier: it more than tripled their demand for an HIV test, with 26 percent of respondents assigned to the small incentive requesting an HIV test and 91 percent of respondents assigned to the large incentive requesting one. By contrast,

for women in the middle tier, the large incentive increased demand for an HIV test by thirty-four percentage points, from 60 percent to 94 percent. In comparing those who received the large incentive with those who received the small incentive by tier of prostitution, the difference is statistically significant at $p < .05$.²⁵ The difference in treatment effect was roughly twice as large for the low-tier sex workers, boosting their testing rate by an additional thirty-one points ($p < .05$). Importantly, as the right-hand side of Figure 4 shows, this differential treatment effect eliminates the thirty-four-point disparity in testing rates we observed when the incentive was small. These results are robust to specification and the inclusion of control variables, including whether or not the respondents self-reported having previously received an HIV/AIDS test and whether or not they had gotten a health checkup in the previous year (see Appendix II). Thus, it appears that any greater aversion to HIV testing associated with low-tier sex workers can easily be overcome with an incentive worth \$15. This within-tier analysis shows that the statistically significant differences in tiers across treatment assignment do not serve as a confounder of study results: tier-based differences in response to incentives persisted despite this treatment assignment imbalance.

E. RESULTS IN RELATION TO SELF-REPORTED RATES OF PREVIOUS HIV TESTING

As noted earlier, respondents who self-reported having previously received an HIV/AIDS test were more likely to be assigned to receive the large incentive. Assuming self-reporting accurately reflects actual behavior, this difference could serve to bias estimates of the effect of the incentive: a sex worker who has already gotten an HIV/AIDS test in the past may be more likely to request one again. In order to address this concern, I examined treatment effects according to whether or not the respondents self-reported having previously gotten an HIV/AIDS test. Figure 5 presents the results of this analysis.

Respondents who self-reported having previously gotten an HIV/AIDS test were more responsive to the small incentive than those who did not self-report previous testing: 64 percent of those who self-reported got tested, versus 49 percent of those who did not. The large incentive had a strong impact on both of these groups, with a twenty-seven percentage point increase in testing for those who self-reported having gotten

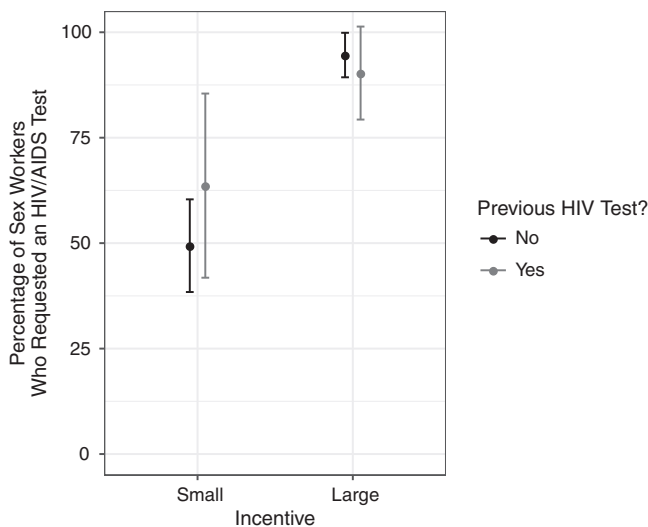


Figure 5. Large Incentive Increased Demand for HIV/AIDS Testing Both for Respondents Who Did and Did Not Report Previous HIV/AIDS Test.

tested (increasing to 90 percent of respondents) and a forty-five percentage point increase for those who did not self-report having gotten tested (increasing to 95 percent of respondents).²⁶ These results show that incentives have a strong impact regardless of whether or not the respondent had previously gotten an HIV/AIDS test.

F. RESULTS CONDITIONAL ON RESPONDENT KNOWLEDGE OF THE ILLEGALITY OF SEX WORK

The sex worker testimonies shared earlier underscore that fear of arrest is an obstacle to HIV/AIDS testing. Yet not all sex workers are aware that engaging in prostitution is actually against the law. An analysis that focuses on the differential impact of the large incentive on sex workers according to whether or not they are aware that sex work is illegal sheds additional light on the question of whether or not incentives are a useful way of encouraging behavioral change among criminalized populations. Figure 6 shows the demand for HIV testing according to whether or not respondents knew that prostitution is against the law. It demonstrates that the large incentive effectively increased HIV/AIDS testing rates among respondents who knew they were breaking the law.

Respondents who knew that prostitution is against the law were less responsive to the small incentive than those who thought that it was legal: 49 percent of sex workers who correctly identified prostitution as illegal got tested when assigned to receive the small incentive, compared with 54 percent of those who thought they were engaging in legal behavior. That said, this difference is not statistically significant. Both groups were extremely receptive to the large incentive. It increased the demand for an HIV/AIDS test by forty-eight percentage points (from 49 to 97 percent) for respondents who were aware that prostitution is against the law. The larger incentive had a smaller impact on respondents who thought that they were engaging in a legal activity, increasing their demand for an HIV/AIDS test by thirty-one percentage points, from 54 to 85 percent. Substantively, the large incentive had a greater impact on respondents who knew that they were breaking the law (forty-eight percentage points versus thirty-one percentage points). That said, this difference is not statistically significant.²⁷

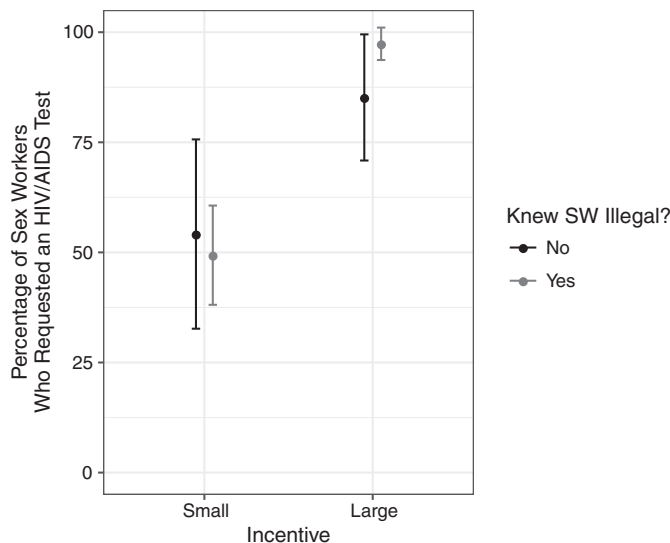


Figure 6. Large Incentive Increased Demand for HIV/AIDS Testing Regardless of Sex Worker Knowledge That Prostitution Is Illegal.

VI. IMPLICATIONS AND CONCLUSION

The implications of this study are significant. It shows that a real opportunity exists to increase HIV testing among marginalized populations such as sex workers in authoritarian regimes. It also suggests that it is possible to increase testing for those most in need (i.e., those who are working in the lowest tiers of prostitution) and that incentives are effective regardless of whether or not sex workers are aware that prostitution is against the law. The obstacles frequently cited as working against a sex worker's willingness to request an HIV test include psychological costs tied to learning one's HIV status and possible stigma if a positive result becomes public, as well as monetary costs tied to time and travel for testing. In addition to these barriers, which sex workers share with the general population, as individuals engaged in illegal behaviors, they also face additional concerns that requesting an HIV test would increase their likelihood of punishment for violating the law. Yet the results of this study show that an incentive worth \$15 is an extremely effective tool for overcoming these stated concerns. Importantly, this dollar amount is small enough for such an intervention to be carried out on a large scale. In 2008, the Gates Foundation launched a five-year, \$50 million HIV/AIDS prevention project in China. While it was not focused on female sex workers, an important component of the project involved providing cash incentives worth about \$15 to other populations at high risk of HIV/AIDS to get an HIV test, such as men who have sex with men (MSM) (Jacobs 2009). The fact that this type of organization is devoting significant resources toward incentives to increase HIV/AIDS testing for individuals at high risk of HIV/AIDS shows that there are real possibilities for the results of this study to be used for a larger public policy intervention.

As mentioned in the introduction, the two policies generally discussed to address the issue of low levels of HIV/AIDS testing among sex workers are (1) the decriminalization or legalization of prostitution and (2) the outsourcing of HIV/AIDS testing from state institutions to community organizations. Within China, scholars and policymakers who have called for the former approach include Li Yinhe, a prominent public intellectual and sociologist on issues of sexuality and women's studies (Li 2013); Pan Suiming, a sociologist and leading researcher on prostitution in China (Pan 2008); Chi Susheng, a National People's Congress (NPC) deputy from the northeastern province of Heilongjiang who drafted an NPC proposal to legalize consensual adult prostitution (Dayang Wang 2012); and Zhou Ruijin, one of the chief voices of reform within the Chinese Communist Party (CCP), the former editor of China's *Liberation Daily*, and former deputy editor-in-chief of the *People's Daily*, which is the official mouthpiece of the CCP (Zhou 2006). Advocates of the latter include officials working in China's health agencies (Ren et al. 2015; Rou et al. 2010) and Wan Yanhai, one of China's leading civil society activists on HIV/AIDS in China (Wan et al. 2010). Major public health organizations, such as the World Health Organization and UNAIDS, advocate for the decriminalization of prostitution as necessary to meaningfully reduce barriers to HIV testing (World Health Organization, UNFPA, and UNAIDS 2012; UNAIDS 2009), and they channel important resources toward advancing this goal. However, although such regulatory changes may increase HIV testing and reduce the prevalence of HIV, they are extremely difficult to implement. The proposal advanced here presents an immediate, previously overlooked alternative, one that is much needed given the urgency of stemming the spread of HIV and the role of sex workers and their clients as vectors of the disease. Mine is not the first study to find that a modest incentive successfully increases the demand for an HIV/AIDS test (Ngatia 2016; Thornton 2008), but it is the first to do so in the context of an authoritarian country and an illegal population that is at a particularly high risk of HIV/AIDS.

The challenges of carrying out a randomized-controlled trial in such an environment with this population were significant, some of which need to be considered with respect to the external validity of the study. First, sex workers were not sampled randomly, and I have no data on nonstudy participants. I would expect systematic exclusion of two types of female sex workers who may be at higher risk of HIV: those engaged in the worst forms of forced prostitution, who are completely deprived of any freedom of movement; and those who, while free to take part in the study, self-selected out because their fears of disease or arrest were so great that they were not even willing to step forward and participate in the pretest survey and treatment assignment process. The effects of the incentive on these women would likely not have been as strong as on those who participated in the study. Second, as discussed earlier, a local community organization (as opposed to the state) carried out the study. This could increase the demand for an HIV test, as sex workers might feel greater trust toward a civil society organization than a government agency (Kaufman 2011).²⁸ If the entire program had been carried out directly through a state institution (for example, if state hospital workers had recruited participants), then sex workers might have been more distrustful and hesitant to participate in the initial pretest survey. The role of the community organization should therefore be taken into consideration in future replications of the study.²⁹ Third, as discussed throughout the article, there is no pure control group. While the small incentive is only worth \$1 and was chosen (with the assistance of a sex worker focus group) to be clearly symbolic, it is still different from a pure control. Reference to self-reported previous HIV/AIDS testing, while suggestive, does not allow for a causal statement on the effect of the small incentive versus no incentive at all. Fourth, I am unable to establish the causal mechanism by which this intervention functions to increase demand for HIV tests. While I have underscored the various barriers that sex workers face and highlighted a tier-based response pattern that I chose to examine based on my overall research and knowledge of prostitution in China, I am unable to conclusively show the way in which the incentive works to change behavior.

In addition, it is important to keep in mind that two nonincentive, protocol-related factors could have played a role in the decision of all sex worker study participants to request an HIV test. First, the pretest questionnaire, administered immediately prior to treatment assignment, included questions about prior HIV testing, knowledge of HIV/AIDS, self-assessed likelihood of having HIV/AIDS, and prevention practices. Such questions could serve either to increase the salience of HIV, resulting in overall higher testing rates for all study participants, or to increase anxiety around HIV, reducing testing demand. Second, the invitation to participate in an organized study could have increased the demand for HIV testing.

In addition to considering replicating this study among other illegal populations in authoritarian settings, this study's results may also be relevant to altering the behavior of marginalized individuals in different political regime types. Indeed, if an incentive for such groups is effective in the harder case of an authoritarian regime, there is reason to believe it could also be impactful in more open societies. Research in the United States shows that individuals who have broken the law (such as illegal immigrants, victims of cross-border human trafficking, or intravenous drug users) often shrink away from any involvement with the state and avoid key institutions that could provide them with access to health, education, or other social services (Weaver and Lerman 2010; Goffman 2009; Rose and Clear 1998). Incentives in these cases could similarly help encourage more engagement with agencies and organizations that are in a position to provide much-needed services to these populations, benefiting not only the members of these populations in particular but also society at large.

NOTES

1. Such a policy change might represent a long-term solution, but it often encounters significant resistance from actors within the state and civil society.
2. This approach can be highly effective in some environments. However, it requires the existence of a robust civil society and a state that is willing to entrust such responsibility to social organizations. It also requires that lawbreakers distinguish between state and nonstate actors and trust the latter to protect their anonymity.
3. While male-to-male, male-to-female, and female-to-female commercial sex also occur in China, this study focuses on female commercial sex for male clients.
4. Thornton's study also varies the distance of the HIV results center, and she measures behavioral change following an HIV-positive result based on the number of condoms purchased following the provision of the results to the participant.
5. Ngatia also found that when a social contact was randomly assigned to receive a low incentive, this decreased the likelihood of a person getting tested. She argues that this is tied to the stigma suffered by the social contact, who, by requesting a test while only receiving a small incentive, is implicitly acknowledging being at risk of infection. With each additional dollar that the social contact receives, this negative effect is reduced by 2.8 percent.
6. Ngatia justifies this decision by explaining that "since the advent and wide rollout of rapid HIV-testing where test results are ready forty-five minutes after testing, the decision to get tested at all might be more relevant in today's context" (Ngatia 2016, 9).
7. Sex Worker Interview August 24, 2009 csw5.
8. Sex Worker Interview August 16, 2009 csw5. This quote and the previous one do not come from participants in the field experiment described in this article; they come instead from sex workers interviewed at a different time and in a different place in China.
9. If their HIV-positive status were kept confidential, sex workers could choose to not disclose it and continue to engage in prostitution. However, it is a crime to knowingly infect someone with HIV in China. In addition, as discussed in the footnote below, sex workers are likely to assume that their HIV status would not be kept confidential.
10. Sex worker interview August 16, 2009 csw1, Beijing.
11. Sex worker interview August 24, 2009 csw2, Beijing.
12. Sex worker interview August 24, 2009 csw5, Beijing.
13. Sex worker interview August 25, 2009 csw1, Beijing. These quotes do not come from participants in the field experiment described in this article; they come instead from sex workers interviewed at a different time and in a different place.
14. These data come from the China Statistical Yearbook, Offense Cases against Public Order Handled by Public Security Organs, under the category of "Prostitution or Soliciting Prostitutes." <http://www.stats.gov.cn/english/statisticaldata/annualdata/> (accessed October 10, 2018).
15. This was convenience sampling. Staff spread news that they were recruiting sex workers to participate in a study through word of mouth. They shared the information with sex workers who stopped by the community center and asked them to spread the word to their acquaintances. They also went to sex work venues and public spaces in the district to recruit participants.
16. The hospital testing facilities kept special hours for this study and, on those days and times, would not have accepted patients who did not have a card from us. The card also entitled each participant to a free breast and pelvic exam. These were not part of the experiment. Rather, they were provided as a general service to each sex worker. The breast and pelvic exams are widely available for free in unregistered clinics where sex workers usually go for birth control or abortions as a way to attract them as patients. These unregulated, illegal clinics are unable to obtain the equipment and supplies necessary to provide HIV tests for their patients. Focus group discussions in preparation for the experiment and open-ended interviews with participants afterward both suggest that these two exams would not have been a significant factor in a sex worker's decision to go to the hospital for an HIV test. Nevertheless, they should be noted for future replications of this design. Study participants could choose to get any combination of the three tests, but would only receive an incentive if they got the HIV test. Only one experiment participant who went to the hospital declined the HIV test. Since the outcome variable is whether or not the respondent received an HIV/AIDS test, this person is included as not having gotten the test. The others requested all three services.

17. It takes about twenty minutes to walk from the red light district to the hospital. It takes five minutes and costs ¥1 (15 cents) to take the bus. The taxi ride takes about three minutes and costs ¥10 (\$1.50).
18. Cheating at any stage of this process is unlikely. Cards could not be easily replicated—each had three distinct markings that would have required forging my handwriting (my signature in the bottom left-hand corner), that of one of my research assistants (the “Merry Christmas” inscription on the top of the card), and obtaining a sticker not readily available in China (not shown, on the other side of the card). Similarly, it is highly unlikely that a sex worker in the clinic would have been able to obtain the hospital form without getting the test. It is possible that participants could have given their card to someone else to receive the tests and the incentive. That said, the research assistants who administered the baseline survey and treatments were also present at the hospital, and they generally reported seeing the same individuals.
19. In fall 2015, the one-child policy was changed to a two-child policy for all married couples.
20. For the same reasons that they are less likely to get an HIV test, discussed above, lower-tier sex workers are also more difficult to access. This explains the greater proportion of middle-tier sex workers in the sample.
21. Just by random chance, we would expect one of these to turn up significant at $p < 0.05$.
22. In terms of numbers of participants, 55 of the 107 respondents assigned to the small incentive got tested.
23. In terms of numbers of participants, 99 of the 106 respondents assigned to the large incentive got tested.
24. The analyses reported thus far compare outcomes across the two randomly assigned conditions without controlling for any observational covariates. Appendix II presents analyses with covariates included and demonstrates that these results are robust to specification.
25. Regressing the treatment on whether or not participants request an HIV test and including an interaction with tier of prostitution yields a p -value of .037.
26. Due to rounding, the twenty-seven percentage point increase adds up to 90 rather than 91 percent, and the forty-five percentage point increase adds up to 95 rather than 94 percent.
27. It is reasonable to think that the lack of statistical significance could be tied to the small sample size, as these confidence intervals would shrink if the study were carried out with a larger sample.
28. Precisely because distrust of state institutions is prevalent within communities of marginalized individuals, public health organizations recommend that trained peer educators, rather than state actors, conduct outreach among individuals such as sex workers and intravenous drug users (Kaufman 2011; Dennis 2003). It is also important not to overstate the possible role of the community organization in this study. It was a small organization, located in an inconspicuous room in a building in the district, with only two full-time staff members. It actively sought to maintain a low profile in order to avoid any unnecessary interactions with the local authorities. In contrast, it is situated in a red light district that is home to tens of thousands of sex workers. This is a migrant population that is extremely mobile. While some women maintain residence in the area for years, more often women will work there for a few months before moving to another district, city, or region. The size and mobility of this population means that the community organization is constantly interacting with new sex workers who are unaware of their existence and work. In addition, the concept of civil society is not well understood in China, especially among individuals who are less educated and worldly. This background underscores how some study participants may have heard of the community organization prior to study recruitment, while others may not have. Some might have been quickly drawn in by the knowledge that they were interacting with members of a civil society organization, while the distinction between the state and civil society may not have been as clear to others.
29. One way to effectively gauge the role of the community organization would be for a future study to randomize whether enumerators identified themselves with the state or with a civil society organization.

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APPENDIX I: COMPARISON OF SEX WORKER SURVEY DEMOGRAPHICS

Given the difficulty of access to sex workers in China, there are a very limited number of carefully conducted, rigorous surveys of this population. None of these surveys have representative samples, either nationally or locally, which complicates attempts to discuss with confidence how my sample compares to the overall population. In Table 4, I compare some of the basic characteristics of study participants with those of two other studies of Chinese sex workers. The first is a 2001 survey that Horizon Market Research conducted in collaboration with Futures Group Europe, which surveyed a total of 811 female sex workers in the provinces of Sichuan and Yunnan. The second, carried out by the United Nations Population Fund (UNFPA) from 2006 to 2008, surveyed a total of 2,040 sex workers in the provinces of Jilin, Gansu, Guizhou, Hainan, and Xinjiang. These are the two largest surveys of Chinese sex workers of reliable quality.

Table 4. Comparisons of Demographics across Sex Worker Surveys

| Variable | 2009 Survey (Beijing) | 2001 Survey (Sichuan and Yunnan) | 2006–2008 Survey (Jilin, Gansu, Guizhou, Hainan, Xinjiang) |
|---|--------------------------|-------------------------------------|---|
| <i>Respondent Characteristics</i> | | | |
| Age (mean) | 32 years | 22 years | 27 years |
| Married (%) | 63 | 29 | 36 |
| Completed Mandatory 9 Years of Schooling (Graduated from Middle School) (%) | 78 | 82 | 57 |
| <i>Sex Work Experience</i> | | | |
| Number of Years Selling Sex (mean) | 3 | 2.5 | N/A |
| Middle-Tier Brothel Work (%) | 82 | N/A | 49 |
| Lower-Tier Brothel Work (%) | 18 | N/A | 51 |
| Price of Most Recent Transaction (Mean) | ¥548 | ¥175 | N/A |
| <i>Health Knowledge and Practices</i> | | | |
| Has Heard of STDs (%) | 92 | 94 | N/A |
| Has Heard of AIDS (%) | 98 | 97 | N/A |
| Previously Had an AIDS Test (%) | 25 | 11 | N/A |

APPENDIX II: RESULTS OF EXPERIMENT UNDER DIFFERENT ORDINARY LEAST SQUARES
MODEL SPECIFICATIONS

| DV: HIV/AIDS Test | | | |
|--|--------------------|--------------------|-------------------|
| | (1) | (2) | (3) |
| Large Incentive | 0.34*** (0.06) | 0.32*** (0.06) | 0.35*** (0.07) |
| Low-Tier Venue | -0.34*** (0.09) | -0.34*** (0.09) | -0.34** (0.12) |
| Large Incentive X Low-Tier Venue | 0.31* (0.18) | 0.31* (0.22) | 0.18 (0.04) |
| Previous AIDS Test | | 0.03 (0.06) | 0.04 (0.07) |
| Previous Health Checkup | | -0.02 (0.06) | -0.06 (0.07) |
| From Rural Area | | | -0.03 (0.07) |
| Completed Mandatory 9 Years of Schooling | | | -0.11 (0.08) |
| Months Selling Sex | | | 0.00 (0.00) |
| Age | | | 0.01 (0.02) |
| Married | | | -0.05 (0.07) |
| Price Last Client | | | 0.00 (0.00) |
| Age Started Selling Sex | | | 0.01 (0.02) |
| Constant | 0.60*** (0.04) | 0.61*** (0.06) | -18.88 (35.20) |
| R ² | 0.28 | 0.27 | 0.27 |
| SER | 0.38 | 0.39 | 0.39 |
| N | 213 | 209 | 174 |

Note: Standard errors are reported in parentheses.

*= $p < .05$.

**= $p < .01$.

***= $p < .001$.

APPENDIX III: RESULTS OF EXPERIMENT USING NONPARAMETRIC TEST

| | Small Incentive | Large Incentive | Total |
|---------------------------|-----------------|-----------------|--------------|
| Did Not Get HIV/AIDS Test | 52 (48.60%) | 7 (6.60%) | 59 (27.70%) |
| Got HIV/AIDS Test | 55 (51.40%) | 99 (93.40%) | 154 (72.30%) |
| Total | 107 (100%) | 106 (100%) | 213 (100%) |

Pearson $\chi^2(1) = 46.8898$. Pr = 0.000.