

## Cost and Demand Effects of Legal Adult Prostitution on Child Sex Trafficking

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### Abstract

We examine the impact of legal adult prostitution on the prevalence of trafficked child sex workers and children engaging in prostitution out of economic necessity. Using a nationwide survey of child sex workers, historically determined locations of legal brothels, and counterfactual simulations, we find that the presence of legal brothels increases the prevalence of trafficked children by 18.8 percent nationwide, primarily because they are camouflaged as legal prostitutes. Rigorous screening procedure within brothels mitigates this increase. However, the inability to exclude non-trafficked children who misreport their age as adults raises their prevalence beyond that of actual brothels, revealing policy tradeoffs.

**Keywords:** gender violence; legalization; worst form of child labor; forced labor; semi-coerced market

**JEL Codes:** I12; J16; J47; K42; O15

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## 1. Introduction

Human trafficking—the recruitment and transportation of individuals most often by force, coercion, or deception, for the purpose of exploitation—violates fundamental human rights and causes lasting physical and psychological harm to victims (Bjorkman Nyqvist et al. 2018; Oram et al. 2012; Tsutsumi et al. 2008).<sup>1</sup> The number of trafficking victims continues to rise globally. In particular, the share of child victims has increased from 13% in 2004 to 38% in 2022, and the majority of child victims are exploited in the commercial sex industry (UNODC 2022; 2024).<sup>2</sup> However, policy interventions to combat child sex trafficking remain poorly understood.

This study fills this gap by examining the impact of legal adult prostitution on the demand for and supply of trafficked child sex workers. The legality of prostitution is relevant for three key reasons. First, the impact is theoretically ambiguous because the prostitution market includes both trafficked (coerced) and non-trafficked (necessity-driven) workers—creating a semi-coerced market (Lee and Persson 2022)—and legality affects the demand for and supply of these workers differently, through changes in the price of adult prostitution, social stigma, and the costs of detecting illegal workers. Second, existing studies suggest favorable impacts of legality on legal sex workers and local neighborhoods, such as the reduction of sexual assaults, diseases, and crime (Bisschop et al. 2017; Cameron et al. 2020; Cunningham and Shah 2018; Gao and Petrova 2022). However, the impact on illegal substitutes, namely child sex workers, remains underexplored. Third, legality varies significantly across and within countries. While nearly 60% of countries fully criminalize prostitution, some countries legalize it in certain areas, such as legal street prostitution zones in European nations (Bisschop et al. 2017; Cho et al. 2013).

To answer this question, we exploit plausibly exogenous variations in the legality in Bangladesh, where adult prostitution is tolerated only in registered brothel areas. These areas were established during the British colonial period near river ports for British traders

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<sup>1</sup> Human trafficking refers to the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person for the purpose of exploitation (the United Nations 2000).

<sup>2</sup> UNODC (2022, p27) estimates that 79% of victims aged 15 to 17 and 66% of those aged 10 to 14 are trafficked for sexual exploitation.

(Gain et al. 2019; Terre des hommes Italia 2005), but their locations are uncorrelated with current regional socio-economic conditions. These features suggest that the locations of brothel areas are plausibly exogenous, conditional on proximity to ports.

Our data come from a nationwide survey of child sex workers conducted by the Bangladesh Bureau of Statistics and the ILO. It covers children working both inside and outside the brothel areas. Since prostitution requires clients, compared to other types of crime, such as sexual assaults, it is easier for the survey team to identify the hotspots where many sex workers concentrate, reducing the possibility of sample selection bias. To further ensure the representativeness of respondents, the survey team concealed their official identity and included local NGOs and sex workers familiar with the study areas. The survey reveals a high prevalence of child sex workers camouflaged in brothel areas, likely due to poor screening by local authorities. We categorize the respondents into potential trafficking victims and non-trafficked child sex workers and analyze their prevalence and mobility.

This approach enables us to obtain more representative data on child sex trafficking than alternative methods, such as analyzing data from rescued or identified victims. Our data indicate that approximately 6,163 trafficked children were exploited as sex workers in Bangladesh at the time of the survey. However, in the same year, Bangladeshi law enforcement officials identified only 251 victims, including victims of non-sexual exploitation and adult victims (US State Department 2009, 75).

Using this setting, we estimate the impact of the presence of legal brothel areas on the demand for child prostitution and the supply of trafficked and non-trafficked children, and conduct three counterfactual simulations: (CF1) no legal brothel areas; (CF2) screening out trafficked and non-trafficked children from the brothels; and (CF2') screening out only trafficked children from the brothels. The goal of simulations is to predict the nationwide prevalence of trafficked and non-trafficked child sex workers in these scenarios. We consider CF1 as a benchmark, as many countries criminalize prostitution (Cho et al. 2013). However, the literature suggests that this may proliferate sexual violence and diseases (Bisschop et al. 2017; Cameron et al. 2020; Cunningham and Shah 2018; Gao and Petrova 2022). This scenario is also controversial because some practitioners and researchers take a stance for women's rights to choose prostitution as an occupation (Amnesty International 2015; Lancet 2015). Therefore, in CF2, we simulate the situation where adult prostitution is permitted in the brothel areas, but children are strictly excluded from the brothels. Although this scenario may avoid the drawbacks of CF1, it may be technically challenging to screen out all children, particularly non-trafficked children who may self-report a false age. Incorporating this feature of semi-

coerced market, we also examine CF2' where only trafficked children are screened out, while non-trafficked children remain to work in the brothel areas. Our structural model, which decomposes various impacts of legality on demand and supply, enables us to simulate these counterfactual scenarios.

The results show that—counter to the existing studies finding favorable impacts of legality—the subdistricts with brothel areas have higher demand for child prostitution and greater supplies of trafficked and non-trafficked children.<sup>3</sup> Furthermore, children in the districts with brothel areas face a higher risk of trafficking victimization. The price elasticity of supply is higher among trafficked children than non-trafficked children. The simulation results demonstrate that the scenario with no brothel areas achieves the lowest prevalence of trafficked children and child sex workers, although this scenario—that illegalizes prostitution—has been criticized in the literature. By contrast, the presence of legal brothel areas with poor screening—as in the actual situation—leads to the highest prevalence because children are camouflaged as legal adult prostitutes. Compared to the former scenario, the latter exhibits an 18.8% higher prevalence of trafficked children and a 10.3% higher prevalence of child sex workers nationwide. Strict screening of children in the brothel areas may also reduce their prevalence. However, if law enforcement officers' screening ability is limited, and they fail to detect non-trafficked children who may self-report a false age, their prevalence would become even higher than the actual situation. These results are robust to the assumptions in our structural model.

This study contributes to the growing literature on economic approaches to human trafficking in three ways. First, previous studies—although limited—examine socio-economic correlates of victimization risk and the flow of victims across countries (i.e., cross-border trafficking), such as the legality of prostitution (Cho et al. 2013; Jakobsson and Kotsadam 2011) and migration patterns (Mahmoud and Trebesch 2010). Although insightful, it is challenging to derive concrete policy implications from these studies, given the lack of knowledge about the theoretical mechanism of victims' flow. This study fills this gap by structurally analyzing the demand and supply of trafficked and non-trafficked children in the prostitution market and estimating the effects of various policy options. Second, a critical issue in human trafficking research is data representativeness. Many studies rely on data from rescued or identified victims, which may be subject to underreporting and sample selection bias. In contrast, our dataset includes victims who continued to be exploited in the prostitution industry. Therefore, we

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<sup>3</sup> A subdistrict is an administrative unit of Bangladesh. As of 2008, Bangladesh consists of 6 divisions which are further divided into 64 districts, and each district has multiple subdistricts.

can gain more representative insights into the prevalence and mobility of trafficked sex workers. Furthermore, since the prostitution industry is the sector that absorbs the largest number of trafficking victims (UNODC 2022, p27), our findings are also relevant to understanding the human trafficking market. Third, it is particularly relevant to study the within-country mobility of victims in Bangladesh, given that 58% of trafficking victims worldwide and 98% in South Asia are trafficked within their own countries (UNODC 2024 p.59), and Bangladesh ranks 13<sup>th</sup> out of 193 countries in human trafficking severity (Global Initiative against Transnational Organized Crimes 2023).<sup>4</sup>

This study also provides new insights into the literature on the prostitution market. Previous studies explain variations in working conditions and labor market outcomes across sex workers (i.e., intensive margins)—such as the effects of unprotected sex and beauty on earnings (Arunachalam and Shah 2013; Gertler et al. 2005; Li et al. 2018; Manian 2024; Shoji and Tsubota 2022). However, entry into the sex industry (i.e., extensive margins) remains largely unexplored, except for studies on the effects of income and demand shocks on adult prostitution (Brodeur et al. 2018; Goehring 2025; Jones and Gong 2021; Robinson and Yeh 2011). In particular, little is known about how legal environments shape the demand for and supply of child sex workers. Therefore, our findings on the impact of legality on the demand and supply of child sex workers are crucial for developing effective policy interventions to combat the exploitation of children in the sex industry. Moreover, it is highly policy-relevant to examine counterfactual policies that regulate the supply of (trafficked) children while maintaining the legality of adult prostitution, given the growing movement to protect the human rights of adult sex workers (Amnesty International 2015; Lancet 2015).

Furthermore, the relationship between the legality of goods/services—such as drugs, alcohol, prostitution, and natural resource extraction—and their illegal substitutes remains a highly debated and policy-relevant issue. It is theoretically ambiguous whether legalization reduces or exacerbates illegal supply, and existing evidence is mixed. On the one hand, the transaction of illegal substitutes is expected to decrease as people switch to legalized goods. Carrieri et al. (2019) find that legalizing light cannabis in Italy reduces illegal drug confiscations. Dinardo et al. (2001) show that raising the minimum legal drinking age shifts consumption from alcohol to marijuana. On the other hand, the

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<sup>4</sup> Exceptionally, Liu et al. (2024) examine the causal impact of the highway network on the prevalence of child trafficking in China. However, their main analyses rely on data from the reports by victims' parents. Therefore, the information on the victims' flow is limited.

consumption of illegal substitutes may increase if they can be camouflaged as legal goods. Wen et al. (2015) demonstrate that legalizing medical marijuana increases recreational marijuana use. Hsiang and Sekar (2019) find that limited legalization of ivory transactions increases the illegal ivory trade from poaching.<sup>5</sup>

This study contributes to this broad literature in two ways. First, it is among the first to provide evidence from a semi-coerced market. Legality may affect illegal suppliers differently in such markets, and therefore, the findings from previous studies may not be generalizable to the context of semi-coerced markets, such as the prostitution and organ removal markets (Lee and Persson 2022). Indeed, we demonstrate that incorporating the gap in screening costs between forced and voluntary suppliers significantly affects the simulation results and, therefore, policy implications. Second, this study examines a developing country with limited government monitoring capacity.<sup>6</sup> In such environments, illegal suppliers may not be detected or removed from the market, and rather benefit from high demand for legal prostitution (Hsiang and Sekar 2019). In line with these conjectures, we show that poor screening in brothel areas accounts for a large share of the effects of legal brothel areas. These results underscore the importance of further research into different goods and services across various countries.

This study also adds novel evidence to the growing literature on the spatial externalities of legalization policies. Prior studies show that the legalization of recreational marijuana in one state increases marijuana possession arrests and consumption in neighboring states by altering marijuana accessibility (Hansen et al. 2020; Hao and Cowan 2020). Other studies document spillover effects of alcohol legalization, including increases in infant mortality and traffic accidents in adjacent states (Jacks et al. 2021; Lovenheim and Slemrod 2010). Knight (2013) examines the flow of guns from states with weaker regulations to those with stricter laws. While this literature primarily emphasizes the mobility of consumers from illegal to legal areas (i.e., drug tourism), we show the (forced) mobility of suppliers.<sup>7</sup> Moreover, our structural estimation using

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<sup>5</sup> For a review of broader socio-economic impacts of legalization, see Anderson and Rees (2023).

<sup>6</sup> Exceptionally, there is evidence from the Brazilian Amazon that illegalizing extraction of Mahogany aggravates the prevalence of violent crimes and modern slavery (Araujo et al. 2024; Chimeli and Boyd 2010; Chimeli and Soares 2017). Hsiang and Sekar (2019) also show that the legalization of exporting ivory stockpiles to China and Japan leads to increases in illegal *production* of ivory (i.e., elephant poaching) in African countries.

<sup>7</sup> Exceptionally, Hinnosaar et al. (2024) demonstrate that legalizing marijuana in one state increases marijuana consumption in geographically distant states with strong social

dyadic data allows us to provide evidence of bidirectional mobility between illegal and legal areas. Taken together, our findings and those of the existing literature underscore the importance of incorporating this complex market structure when evaluating legalization policies.

Finally, this study is most closely related to the following studies that explore the intersection of legality and prostitution market: Bisschop et al. (2017), Cameron et al. (2020), and Cunningham and Shah (2018) explore within-country variations in legality and demonstrate reductions in sexual violence and STDs in legalized areas. Exploiting the staggered timing of legalization and prohibition across Europe, Gao and Petrova (2022) show that legalization reduces rapes, while prohibition has the opposite effect. However, our study has several distinctions from the previous studies. First, previous studies show the *net* impact of legality, while this study identifies its demand and cost effects separately, enabling us to conduct counterfactual simulations. Second, this study provides new evidence on the mobility of trafficked and non-trafficked children and reveals significant spatial externalities at the national level. These findings highlight that policy decisions regarding legality can have far-reaching consequences beyond local jurisdictions. Moreover, the presence of spatial externalities indicates that conventional comparisons between legal and illegal areas may yield biased estimates of the true effects of legality. Third, although previous studies primarily show the preferable impacts of legalization for legalized sex workers and local communities, this study demonstrates the increase in the prevalence of illegal substitutes. Exceptionally, Cho et al. (2013) and Jakobsson and Kotsadam (2011) demonstrate the association between legality and the flow of trafficking victims. However, they examine cross-border trafficking using data from rescued or identified victims and do not distinguish the demand and cost effects of legality. Therefore, prior and present studies should be considered complementary.

The rest of this study is organized as follows: Section 2 discusses the prostitution industry and human trafficking in Bangladesh. Section 3 outlines the dataset and identification strategy. Section 4 presents the conceptual framework, and Section 5 estimates the demand and cost functions. Section 6 presents the results of the counterfactual simulations. Finally, Section 7 concludes the paper.

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connectedness measured via social media, suggesting that individuals in illegal states obtain marijuana through their local illegal markets.

## 2. Context

### 2.1. Sex Trafficking in Bangladesh

This section outlines the process of child sex trafficking. Although we describe the process in Bangladesh, it also aligns with the context in other developing countries (Kara 2010). Trafficking is mostly perpetrated by local gangs who are widespread across the country and often maintain connections with law enforcement agencies, local elites, transportation agencies, hotel management personnel, and brothel owners (ILO 2002).<sup>8</sup>

The first step of child sex trafficking involves the gangs targeting young girls. They lure the girls into trafficking mainly by providing false job offers and fraudulent promises of marriage, while forcible abduction is relatively uncommon. In particular, fraudulent job offers in the ready-made garment industry are common, as these jobs are considered well-paid and accessible to uneducated girls. Given the high prevalence of child marriage and young female workers in the garment factories in Bangladesh, the gangs primarily target young children from impoverished or disaster-affected areas who are seeking marriage and job opportunities outside their hometowns (Bangladesh Institute of Peace and Security Studies 2011; ECPAT International 2011; Gazi et al. 2001; Kara 2010; Poncelet et al. 2010; Singh 2012; UNODC 2008).<sup>9</sup>

In the second step, the gangs transport the trafficked girls to their destinations, including brothel areas. This process involves intermediaries, such as transport workers, hotel staff, and corrupt law enforcement officials (Paul and Hasnath 2000). To exert control over the victims during transit, traffickers employ various forms of abuse, including administering sedatives, physical, sexual, and verbal violence, house arrest, starvation, forced drug and alcohol consumption, and threats (ILO 2002, 30; Kara 2010).

In the final step of trafficking, the trafficked girls are handed over to hotel owners, retired sex workers, and pimps, who then exploit them in the commercial sex industry (ILO 2002, 28).

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<sup>8</sup> In Bangladesh, those who import, export, sell, or hire a woman for sex work are punishable under *the Oppression of Women and Children (Special Enactment) Act, 1995*. *The Suppression of Immoral Traffic Act, 1933*, creates offences for living on the earnings of sex work and procuring a female for sex work. Selling or buying a minor causes even more serious punishment under *the Penal Code, 1860*.

<sup>9</sup> Girls are considered to be suitable for marriage after menarche in rural Bangladesh (Field and Ambrus, 2008). In addition, the ready-made garment industry is one of the most attractive job opportunities for young girls. Heath and Mobarak (2015) argue that “*the long hours and frequent overtime of garment factories are difficult to combine with home or child care responsibilities.*” Therefore, the main targets of human trafficking should be minor girls.

## 2.2. Prostitution Industry in Bangladesh

In Bangladesh, most sex workers are adolescents or young women between the ages of 15 and 18, typically entering the prostitution industry before the age of 12 and retiring by 30 (Islam and Smyth 2016). Given the serious social stigma, children enter the industry only for compelling reasons, and based on their reasons, they are classified into two groups. One is those who are trafficked and coerced into prostitution (trafficked workers), and the other is those who enter the industry due to socio-economic necessity, such as poverty and escape from sexual or physical abuse by family members (non-trafficked workers). Therefore, the prostitution market operates as a semi-coerced market in which trafficked and non-trafficked workers coexist (Lee and Persson 2022). Clients are mainly local men, such as rickshaw drivers, students, and police, who purchase prostitution services during work (Bloem et al. 1999), while clients from afar (i.e., sex tourists) are relatively uncommon.

The legality of prostitution differs depending on the location where sex work is conducted. Article 18(2) of the Constitution states, “the State shall adopt effective measures to prevent prostitution and gambling.” However, the Supreme Court of Bangladesh ruled in 2000 that there is no law expressly prohibiting prostitution. As a result, although not encouraged, prostitution is considered to be legal, as long as sex workers do not solicit in public. Soliciting for prostitution in public is punishable for committing a public nuisance under *the Suppression of Immoral Traffic Act, 1933*, Section 290 of *the Penal Code*, and Section 54 of *the Code of Criminal Procedure, 1898*. Police officers often apply these laws to arrest adult and child sex workers. Buying sex is not illegal.<sup>1 0</sup>

To understand the enforcement of these laws, it is essential to distinguish between two forms of sex work: floating sex work and brothel-based sex work. The first, floating sex work, involves the exchange of sex in locations such as streets, train stations, hotels, and clients’ residences. This form of sex work is punishable because it involves soliciting in public. Second, there are 13 historical brothel areas in Bangladesh, and in these areas, adult sex workers who officially register with the police office are not prohibited as strictly as floating workers. Adults who wish to engage in prostitution in these brothels must submit an affidavit to the local police office to declare that they have no alternative income-earning opportunities, are not underage, and are not coerced into prostitution. However, in practice, many children, including trafficked children, can obtain registration as legal adult prostitutes, because the screening process based on the self-reported

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<sup>1 0</sup> Buying a minor for prostitution is illegal, but it is not strictly enforced in practice.

affidavit is not strict. They are also unlikely to be detected by police because of corruption. Furthermore, the owners of trafficked children force them to take steroid constantly and wear heavy makeup to appear older.

Table 1 lists the brothel areas. Reliable statistics on the number of workers in these areas do not exist because it changes over time, but approximately 300 to 400 women and girls are estimated to work in the average-sized brothel area. This table highlights two intriguing characteristics (Gain et al. 2019; Terre des hommes Italy Foundation 2005). First, most were established during the British colonial period because they initially aimed to entertain British traders. Second, they are primarily located near old river ports developed during the period. We exploit these characteristics to identify the impact of brothel areas at the subdistrict level on the demand and supply of child sex workers, as discussed in the next section.

**Table 1: List of Brothel Areas**

Brothel Name	Establishment	District	Subdistrict
Potuakhali	British colonial	Potuakhali	Potuakhali
Bagerhat	British colonial	Bagerhat	Bagerhat
Baniashanta	1950s	Khulna	Dacope
Phultala	Before independence from Pakistan (1970?)	Khulna	Phultala
Marwari Mandir	British colonial	Jessore	Jessore
Babu Bazar	British colonial	Jessore	Jessore
Jhalai Patti	British colonial	Jessore	Jessore
Puran Bazar	British colonial	Madaripur	Madaripur
Rothkhola / C&B Ghat #	British colonial	Faridpur	Faridpur
Doulatdia	British colonial	Rajbari	Goulanda
Kandapara	British colonial	Tangail	Tangail
Mymensing	British colonial	Mymensing	Mymensing
Ranigonj	British colonial	Jamalpur	Jamalpur

Notes: # Rothkhola brothel was established during the British colonial period. C&B Ghat was built as an annex next to Rothkhola in 1978 by the sex workers in that brothel.

Source: Gain et al. (2019); Terre des hommes Italy Foundation (2005)

### 3. Data and Identification Strategy

#### 3.1. Data on Child Sex Workers

A challenge in the empirical study of human trafficking is ensuring the representativeness of the data. Data derived from officially identified or rescued victims are subject to issues such as underreporting and sample selection. To obtain more representative data on child trafficking, this study uses the *Commercial Sexual Exploitation of Children (CSEC) Pilot*

*Survey* conducted in 2008, a nationally representative survey of sex workers aged 17 or younger. This survey was conducted by the Bangladesh Bureau of Statistics with technical assistance from the ILO. An advantage of the survey is the availability of information about respondents' experiences of trafficking victimization. Therefore, by analyzing data from trafficked child sex workers who continue to be exploited, we can gain more representative insights into the prevalence and mobility of trafficked sex workers.

This survey covers both brothel-based and floating child sex workers and collects information on factors—such as working conditions, reasons for entering sex work, victimization by human trafficking, and home districts. The survey sample was drawn as follows: In the first step, given the concentration of sex workers in urban areas and brothel areas, the survey was conducted in all divisional cities, all class-I cities, and all brothel areas. It also covered randomly selected subdistricts from other areas, such as towns, district headquarters, and other subdistricts. In total, the survey was conducted in 117 subdistricts (nearly one-quarter of all subdistricts) across 59 of 64 districts.

In the second step, a list of all child sex workers was compiled in each study site. There are two potential issues in this step. First, given the informality and social stigma of the profession, it may not be easy to ensure that all child sex workers are included on the list. Second, even if all workers are identified, some may be unwilling to participate in the survey. However, unlike other crimes, such as sexual assault and theft, prostitution requires clients, which makes it easier for the survey team to identify hotspots where sex workers tend to concentrate, mitigating sample selection bias. Furthermore, the survey team concealed their official identity during interviews, and included local NGOs and sex workers familiar with the study areas and participants. Using this approach, the survey team compiled a list of 5,239 child sex workers across these study sites. Then, 1,435 out of 5,239 children were randomly selected, of which 1418 responses were obtained (a response rate of 98.8%). Finally, sampling weights were computed to account for differences in sampling probabilities across and within subdistricts. Adjusting for the weights, the data suggest that approximately 16,506 child sex workers exist in the country.

This survey allows us to estimate the prevalence and flow of trafficked girls. In the first step, we define a respondent as a potential victim of human trafficking if at least one of the following conditions is met: (1) she self-reports as a victim of human trafficking, (2) the primary reason for entering sex work is a “false offer of a job”, “deceived”, or “through a broker”, (3) a broker is the primary person responsible for her engagement in sex work, or (4) she self-reports as a bonded sex worker. This definition aligns with the definition by the U.N. (2000) and is consistent with the local context in Bangladesh. Based on this definition, 468 out of 1418 respondents are considered

potential victims. After adjusting for sampling probabilities, 6163 out of 16506 children (37%) are estimated to be potential victims of trafficking in the country. This proportion is consistent with the findings from the Terre des hommes Italy Foundation (2005, p15). It increases up to 57% among the brothel-based children.

Table 2 presents summary statistics for trafficked and non-trafficked child sex workers. The data reveal that observed worker characteristics—such as age, age at the start of prostitution, education level, and marital status—do not differ significantly across victimization statuses and working location. The unit price of prostitution is also comparable. However, we should be careful in interpreting price data, because trafficked children may not know exactly how much they earn if their earnings are controlled by their owners. Therefore, the price data for trafficked children may contain measurement error. An important distinction between trafficked and non-trafficked children is the distance between their home districts and working districts. Trafficked children are less likely to engage in prostitution in their home districts. It also appears that around half of the children engage in prostitution in their home or adjacent districts, regardless of victimization status and working location.

Finally, we aggregate the survey results to compile two datasets. The first dataset is on the prevalence of child sex workers at the subdistrict level (N=117). This dataset is created by summing the sampling weights of trafficked and non-trafficked children according to their current working subdistricts. This enables us to estimate the total number of children working in each subdistrict.<sup>1 1</sup> We also compute the average unit price of prostitution at the subdistrict level. However, given the potential measurement error related to trafficked workers' self-reported prices, we use the data only from non-trafficked workers.<sup>1 2</sup> The second dataset contains dyadic data on the flow of children between working subdistricts and home districts (N=7,488=117 working subdistricts x 64 home districts). Note that our data only includes information about the home district, not the specific home subdistrict.

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<sup>1 1</sup> In 4 out of 11 subdistricts with brothel areas, the survey was conducted only in the brothel areas, and the data on the number of child sex workers outside the area (i.e., the number of floating workers) are missing. Therefore, we impute them by the median number in the rural subdistricts (0 trafficked and 4 non-trafficked children) to approximate the number of children in the whole subdistrict.

<sup>1 2</sup> In cases where the number of non-trafficked children working in the subdistrict is less than two and the average price is likely to contain serious sampling errors, we alternatively use a predicted price. To predict the average price, we restrict the data to subdistricts where the average price is available, and regress the price on the indicators of subdistrict types (subdistrict with a brothel area, divisional cities, Class-I cities). Subsequently, we use the fitted value to predict the missing price data.

We also use subdistrict-level data on socioeconomic and demographic determinants of child sex trafficking collected mainly from the *2011 District Statistics*, such as length of paved roads, and the numbers of ports, rickshaw drivers, movie theaters, religious schools, and orphanages. The night light intensity per capita as of 2001 is computed from data by Basher et al. (2022) and the 2001 population census.

Table 3 presents summary statistics at the subdistrict level. In our study sites, the average subdistrict has 32.8 trafficked child sex workers and 37.7 non-trafficked child sex workers. The average prostitution price is 99.2 BDT, which aligns with prior studies (Terre des hommes Italia 2005).

**Table 2: Respondent Characteristics**

	Trafficked workers				Non-trafficked workers				
	Brothel		Floating		Brothel		Floating		
	(1)	(2)	(3)	(4)	Mean	S.D.	Mean	S.D.	
Age	15.37	1.34	15.47	1.71	15.52	1.48	15.47	1.60	
Age of starting prostitution	12.42	2.23	13.48	2.09	12.69	2.09	13.30	2.01	
Years of schooling	2.35	2.96	2.53	2.87	2.37	3.12	2.58	2.90	
Never married	0.58	0.50	0.57	0.50	0.69	0.47	0.61	0.49	
Married	0.24	0.43	0.16	0.36	0.14	0.35	0.16	0.36	
Divorced, widowed, separated, abandoned	0.18	0.39	0.27	0.45	0.17	0.38	0.23	0.42	
Unit price of prostitution	89.59	34.20	122.5	93.98	90.40	30.12	100.4	78.52	
Freq. of prostitution per week	35.33	15.16	20.82	13.13	31.98	8.54	15.72	10.77	***
Working in the home district	0.23	0.43	0.37	0.48	0.28	0.46	0.66	0.47	***
Working in the adjacent district	0.24	0.43	0.21	0.41	0.15	0.36	0.10	0.31	***
Distance between home and working districts	90.39	84.56	65.52	69.52	76.14	69.37	36.64	64.37	***
N	78		390		55		895		

The reported statistics are adjusted by the sampling weight. Mean differences across the four columns are tested. \*\*\* p<0.01, \*\* p<0.05, \* p <0.1.

**Table 3: Subdistrict Characteristics**

	Mean	S.D.
<b>Child Prostitution Market</b>		
Trafficked child sex workers	32.77	144.03
Non-trafficked child sex workers	37.74	140.36
Freq. of prostitution per week	231.93	458.32
Unit price of prostitution	99.16	50.71
Brothel area in the subdistrict	0.09	0.29
Brothel area in the same or adjacent district but not in the subdistrict	0.38	0.49
<b>Socio-Economic Characteristics</b>		
The number of ports	1.85	2.01
Night light intensity	-1.04	1.40

Population (10 <sup>3</sup> )	442.6	853.2
Sex ratio	100.56	6.03
Length of paved road (km)	177.99	177.60
Affected households by the 2007 Cyclone (10 <sup>3</sup> )	0.03	0.08
Rickshaw drivers (including auto-rickshaw) (10 <sup>3</sup> )	6.30	18.18
Movie theaters	2.29	4.03
Religious schools	21.19	16.75
Orphanages	9.70	15.49

N=117. The data on ports and cyclone-affected households are at the district level.

### 3.2. The Net Impact of Brothel Areas on Child Sex Workers

Before conducting the structural estimation and counterfactual simulation, this section outlines the identification strategy to evaluate the net impact of the presence of brothel areas on the prevalence of child sex workers.

We exploit the unique feature of the brothel areas to estimate this impact. They were initially established during the British colonial period for British traders and located near early river ports (Gain et al. 2019; Terre des hommes Italy Foundation 2005). However, Bangladesh gained independence from British colonization and Pakistan in 1947 and 1971, respectively. This triggered violence and looting against minorities in Bangladesh, such as Hindus and Muslims who supported the Pakistani regime. As a result, approximately 20 million people were forced to cross the India–Bangladesh border, and a similar number were internally displaced within the national borders during the two partitions (Alexander et al., 2016). Similarly, Muslims in India were also victimized and forced to migrate to Bangladesh. These historical shocks significantly changed the population and religious distribution across the country.<sup>1 3</sup> Furthermore, since independence in 1971, new ports and infrastructure have been constructed, and new industries, such as ready-made garments, have emerged. Microfinance and labor migration have also expanded. These changes played pivotal roles in the socio-economic development of the country (Sawada et al. 2018). In addition, since brothel areas are small, they are unlikely to have contributed to the regional economy since independence. Consequently, the urban areas from the British colonial period do not align with the current urban areas. These arguments suggest that the location of brothel areas is plausibly exogenous, conditional on proximity to ports.

To validate our identification strategy, first, we compare urban population density in 1901 and 2001 as a proxy for urbanization. In line with our argument, the ranking of density has changed during this period. In particular, Mymensingh, Barisal,

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<sup>1 3</sup> For example, between 1951 and 2011, the proportion of Muslims increased from 59% to 81% in Satkhira District located adjacent to the India-Bangladesh border in south-western Bangladesh.

and Faridpur—where brothel areas were established—experienced a remarkable decline in ranking, while Khulna rose in ranking during the period. Second, we provide evidence from regional and individual-level data that their characteristics are balanced between the regions with and without brothel areas, such as the prevalence of child labor, adults’ time allocation for daughters, girls’ educational attainment, and regional socio-economic characteristics (Online Appendix A1.1). Third, we discuss potential threats to identification in Online Appendix A1.2.

Using this plausibly exogenous variation in location, we estimate the following reduced-form model:

$$Y_d = \beta_1 B_d^D + \beta_2 X_d + \varepsilon_d \tag{1}$$

where,  $Y_d$  denotes the log-transformed number of trafficked and non-trafficked child sex workers plus one and the log-transformed unit price in subdistrict  $d$ . While we use the log-transformation to align with our structural model, the results are robust to the use of the Inverse Hyperbolic Sine transformation (not reported in the paper).  $B_d^D$  takes unity if there is a brothel area in  $d$ . Finally,  $X_d$  includes the number of ports and other socio-economic and demographic characteristics that may determine the prevalence of child sex workers in  $d$  through the channels such as residents’ income level, opportunities for entertainment, and religiosity: night light intensity and the number of movie theaters and religious schools.

Columns (1) and (3) in Table 4 show that brothel areas have positive effects on the prevalence of trafficked and non-trafficked children in the subdistricts. The effect size does not change with or without the controls (Table A2). The results also remain robust to the additional control for the existence of brothel areas in neighboring districts, as shown in Columns (2) and (4). These columns also demonstrate that brothels have a small and statistically insignificant effect on adjacent districts, suggesting no spillover effect beyond the subdistrict. Columns (5) and (6) show that the presence of brothel areas does not affect the market price, suggesting that they have positive effects on both the demand for and supply of child sex workers. We test this conjecture with the structural estimations in the following sections. The table also shows that the number of trafficked workers and the price increase with the number of rickshaw drivers, suggesting that this may raise the demand for child prostitution. This is consistent with previous qualitative studies indicating that clients primarily include rickshaw drivers (Bloem et al. 1999).

Finally, we conduct the coefficient stability test proposed by Cinelli and Hazlett

(2020), the entropy balancing regression of Hainmueller (2012), and the leave-one-out test. We also test the robustness to sample restrictions. The results suggest that our findings cannot be explained away by unobserved heterogeneity, specification errors, exclusion of an influential observation, or the selection of control groups (Online Appendix A2.1).

**Table 4: The Impact of Brothel Areas on the Prostitution Market**

	Trafficked workers		Non-trafficked workers		Price	
	(1)	(2)	(3)	(4)	(5)	(6)
Brothel area in d	2.209*** (0.416)	2.154*** (0.431)	1.379*** (0.456)	1.424*** (0.459)	-0.146 (0.110)	-0.173 (0.119)
Brothel in the same/adjacent districts but not in the subdistrict		-0.133 (0.214)		0.109 (0.218)		-0.065 (0.108)
Ports in d	0.024 (0.050)	0.017 (0.053)	-0.001 (0.064)	0.004 (0.063)	-0.055* (0.031)	-0.058* (0.031)
Night light intensity	0.011 (0.105)	-0.001 (0.103)	0.281** (0.132)	0.291** (0.131)	-0.003 (0.051)	-0.009 (0.052)
Population	0.078 (0.227)	0.081 (0.229)	-0.556** (0.268)	-0.558** (0.268)	-0.093 (0.101)	-0.092 (0.101)
Sex ratio	0.016 (0.034)	0.015 (0.034)	-0.016 (0.031)	-0.015 (0.032)	0.003 (0.013)	0.003 (0.013)
Paved road (km) in d	0.003** (0.001)	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)	-0.000 (0.001)	-0.000 (0.001)
Cyclone-affected HHs in d	-0.695 (0.752)	-0.783 (0.736)	-5.725*** (1.071)	-5.654*** (1.091)	1.241** (0.480)	1.199** (0.541)
Rickshaw drivers	0.220*** (0.063)	0.219*** (0.063)	0.029 (0.089)	0.030 (0.088)	0.093*** (0.033)	0.093*** (0.032)
Movie theaters	0.046 (0.062)	0.050 (0.062)	0.128** (0.060)	0.125** (0.061)	0.020 (0.024)	0.023 (0.026)
Religious school	-0.009 (0.008)	-0.009 (0.008)	-0.016 (0.010)	-0.016 (0.010)	-0.000 (0.005)	-0.000 (0.005)
Cyclone-affected HHs in adjacent districts	-0.463 (0.588)	-0.284 (0.655)	4.292*** (0.892)	4.146*** (0.942)	-1.019*** (0.288)	-0.932*** (0.272)
Constant	-3.571 (4.624)	-3.487 (4.630)	9.612** (4.375)	9.544** (4.451)	4.860** (2.135)	4.901** (2.180)
R-squared	0.356	0.359	0.337	0.338	0.227	0.230

OLS coefficients are reported. Standard errors are clustered at the district level. The dependent variables, population, and the number of rickshaw drivers are log-transformed to align with the structural model. The results do not change qualitatively with the use of the Inverse Hyperbolic Sine transformation. The estimation results are adjusted by the sampling weight. N=117. \*\*\* p<0.01, \*\* p<0.05, \* p <0.1.

## 4. Model

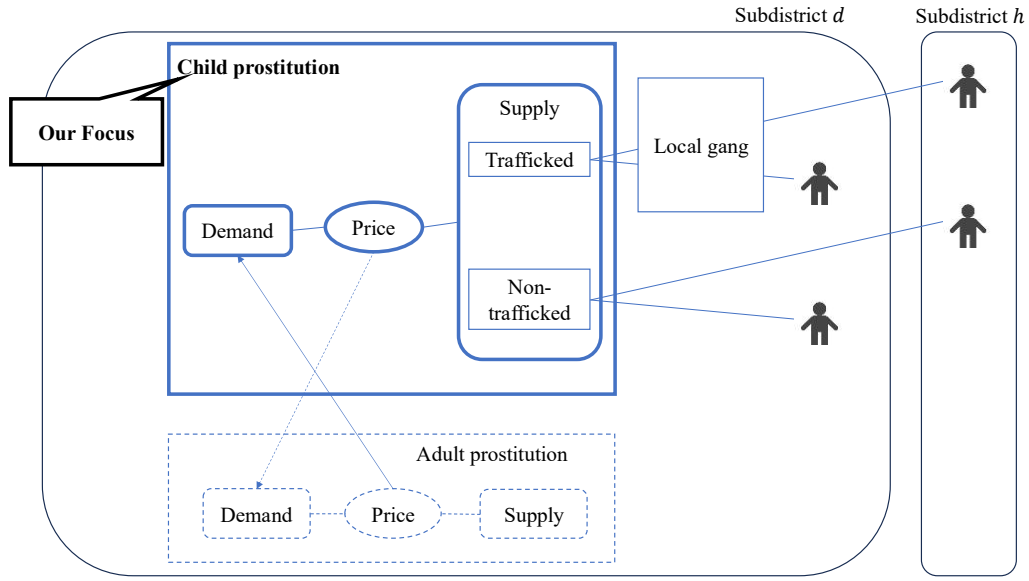
### 4.1. Overview

This section describes a model of the child prostitution market—i.e., demand for child prostitution, supply of trafficked and non-trafficked children, and equilibrium—in Bangladesh. Figure 1 illustrates an overview of our model that incorporates key features of the market. First, the prostitution market consists of adult and child prostitution, and they may or may not be close substitutes in demand. Given this feature, our model allows the demand for child prostitution to be affected by the price of adult prostitution and vice versa. Second, on the supply side, the child prostitution market is a semi-coerced market, where trafficked and non-trafficked children coexist. Hence, we consider different supply functions for them. Third, children engage in prostitution in their home districts or are trafficked/migrated from other districts. Fourth, both types of children are homogeneous in terms of sexual practices and attractiveness (Lee and Persson 2022). Fifth, we consider the markets defined geographically by subdistricts, in the sense that the price of child prostitution is determined to balance the supply and demand for prostitution in each subdistrict.

The first three features are grounded in the discussion in Section 2, and the validity of the fifth feature is discussed and tested in the following subsections. The fourth feature is motivated by the following reasons. First, Shoji and Tsubota (2022) demonstrate that the probability of condom use and the prevalence of sexually transmitted diseases do not differ between the trafficked and non-trafficked children in Bangladesh. Second, existing evidence from developing countries suggests that the beauty premium is significant but small among sex workers due to occupational sorting (Arunachalam and Shah, 2012). The beauty premium is likely to be even smaller in this study, because we consider only young workers, and they engage in prostitution in a dark room with heavy makeup.<sup>1 4</sup> Furthermore, trafficking from other countries is rare in Bangladesh, and most workers engage in prostitution in their home or adjacent districts (Table 2). Finally, highly attractive (profitable) children are trafficked to India and Middle Eastern countries, although the proportion of cross-border trafficking is relatively small. Taken together, individual-level variations in attractiveness attributed to the age, ethnicity, and hometown are likely to be small.

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<sup>1 4</sup> Children are forced to put on heavy makeup so that they appear to be adult workers.



**Figure 1: Model Framework**

#### 4.2. Demand for Child Prostitution

The demand for child prostitution in subdistrict  $d$  is represented by  $D_d(p_d, p_d^{Adult}, B_d^D)$ , where  $p_d$  and  $p_d^{Adult}$  denote the child and adult prostitution prices, respectively, and  $B_d^D$  denotes a binary indicator of the existence of brothel areas in the subdistrict. As with ordinary goods, the demand for child prostitution decreases with its own price ( $\partial D_d / \partial p_d < 0$ ) and increases with the substitute's price ( $\partial D_d / \partial p_d^{Adult} > 0$ ).

While  $p_d^{Adult}$  determines the demand for child prostitution, it is also determined by the equality between the demand and supply of adult prostitution. On the one hand, the demand for adult prostitution,  $D_d^{Adult}(p_d^{Adult}, p_d, B_d^D)$ , decreases with its own price and increases with the substitute's price:  $\partial D_d^{Adult} / \partial p_d^{Adult} < 0$  and  $\partial D_d^{Adult} / \partial p_d > 0$ . On the other hand, the supply of adult prostitution,  $S_d^{Adult}(p_d^{Adult}, B_d^D)$ , increases with the adult price:  $\partial S_d^{Adult} / \partial p_d^{Adult} > 0$ . The equilibrium price of adult prostitution—conditional on the price of child prostitution and the existence of brothel areas—is determined to satisfy  $D_d^{Adult}(p_d^{Adult}, p_d, B_d^D) = S_d^{Adult}(p_d^{Adult}, B_d^D)$ . We denote this equilibrium price as  $p_d^{Adult*}(p_d, B_d^D)$ . Substituting the equilibrium price into the child demand function yields  $D_d(p_d, p_d^{Adult*}(p_d, B_d^D), B_d^D)$ .

This substituted representation of the child demand function suggests that the price of child prostitution,  $p_d$ , affects the demand for child prostitution through two channels: a negative direct effect ( $\partial D_d / \partial p_d < 0$ ) and a positive indirect effect through the change in the equilibrium price of adult prostitution. The second channel indicates

that an increase in the price of child prostitution leads to demand substitution from child prostitution to adult prostitution, which raises the equilibrium price of adult prostitution and then pushes back the demand for child prostitution:  $(\partial D_d / \partial p_d^{Adult}) (\partial p_d^{Adult*} / \partial p_d) > 0$ .

Notably, this demand function implicitly assumes that the demand does not depend on the prices in other subdistricts. In other words, we rule out the possibility of clients buying sex in other subdistricts, i.e., sex tourism. This is reasonable because the price of prostitution is not too high, whereas the transportation cost is high, given the poor infrastructure. In addition, the main clients are local men, such as rickshaw drivers, students, and policemen, who buy sex during work (Bloem et al. 1999). Therefore, sex tourism in other regions is unlikely to be common. The results in Table 4 also align with this assumption. While brothel areas likely have positive effects on the demand for child prostitution in the subdistrict, the presence of brothel areas in adjacent districts does not affect their prevalence or price.

In this demand structure, the existence of brothel areas affects the demand through direct and indirect effects, as summarized in Table 5. Regarding the direct effect, legal brothels may reduce the clients' stigma against buying sex (Giusta et al. 2009; Jacobi and Sovinsky 2016). This *stigma effect* may increase the demand for child prostitution. Therefore, this effect is expected to be positive conditional on the prices constant:  $D_d(p_d, p_d^{Adult}, 0) < D_d(p_d, p_d^{Adult}, 1)$ .

Brothel areas also affect the demand indirectly through the adult prostitution price. Specifically, the presence of brothels raises the demand for and supply of adult prostitution, given the prices constant, due to its legality:  $D_d^{Adult}(p_d^{Adult}, p_d, 0) < D_d^{Adult}(p_d^{Adult}, p_d, 1)$  and  $S_d^{Adult}(p_d^{Adult}, 0) < S_d^{Adult}(p_d^{Adult}, 1)$ . These effects either increase or decrease the equilibrium price of adult prostitution,  $p_d^{Adult*}(p_d, B_d^D)$ , which in turn affects the demand for child prostitution. These effects are collectively referred to as the *adult market effect*, and the sign of this indirect effect is ambiguous.

**Table 5: Potential Impacts of Brothel Areas**

Location of brothel areas	Supply: Trafficked	Supply: Non-trafficked	Demand
Destination	Masking (+)	Masking (+)	Stigma (+) Adult market (+/-)
Home	Procurement-cost (+)	Stigma (+)	

### 4.3. Supply of Trafficked Children

This subsection presents a model of traffickers, defined as a collective term for local gangs and girls' owners. The traffickers traffic children from their home district  $h$  to destination subdistrict  $d$  and force them to work as prostitutes.<sup>15</sup> Given the high prevalence of traffickers in Bangladesh (Global Initiative against Transnational Organized Crimes 2023) and the possibility that each trafficker transports victims to multiple subdistricts, each subdistrict market can be supplied by multiple traffickers. Therefore, we can assume that they are price-takers in the child prostitution market.

The traffickers decide the number of children to traffic from district  $h$  to each subdistrict  $d$  to maximize their profits. Specifically, trafficking incurs variable costs—such as hiring traffickers, transportation, and the risk of arrest—whereas fixed costs are likely negligible because trafficking does not require large facilities or equipment. Assuming that the marginal cost is increasing, the profit-maximizing quantity is such that the marginal cost equals the marginal revenue, which is the child's lifetime earnings from prostitution in the destination market. Note that if the price multiplied by the frequency is less than the marginal cost at zero quantity, the supply will be zero. Therefore, the supply of trafficked children from  $h$  to  $d$ ,  $q_{hd}^T$ , is as follows:

$$q_{hd}^T = \begin{cases} q_{hd}^{T*} & \text{if } MR_{hd}(p_d) \geq MC_{hd}(0, B_h^H, B_d^D) \\ 0 & \text{if } MR_{hd}(p_d) < MC_{hd}(0, B_h^H, B_d^D) \end{cases} \quad (2)$$

where  $MR_{hd}(p_d)$  denotes the marginal revenue;  $MC_{hd}(q_{hd}^T, B_h^H, B_d^D)$  is the marginal cost when the number of trafficked workers is  $q_{hd}^T$ ; and  $B_h^H$  and  $B_d^D$  are the binary indicators for the existence of brothel areas in home district  $h$  and destination subdistrict  $d$ , respectively. Finally,  $q_{hd}^{T*}$  is defined as the quantity at which the marginal cost equals the marginal revenue (i.e.,  $MR_{hd}(p_d) = MC_{hd}(q_{hd}^{T*}, B_h^H, B_d^D)$ ).

The existence of brothels may reduce the marginal costs of trafficking and increase  $q_{hd}^T$  through two channels (Table 5). First, if there is a brothel area in destination  $d$ , illegal child sex workers may be hidden among the legal adult workers in the brothels, reducing traffickers' risk of detection. This effect is referred to as the *masking effect* (Hsiang and Sekar 2019). Second, traffickers settled near the brothel areas may establish corrupt relationships with local elites, such as politicians and police, through their

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<sup>15</sup> In this model,  $h$  refers to the home district rather than the subdistrict, because as mentioned in Section 3.1, our data contain information on children's working subdistrict and home district, but not about their home subdistrict.

activities regarding the brothels. This may reduce traffickers' cost of procuring girls, and therefore, more children are trafficked *from* districts with brothel areas: the *Procurement-cost effect*.

In this model, we assume that the marginal cost for an  $h - d$  pair is independent of the quantity supplied from  $h$  to other destinations (i.e.,  $q_{hd'}^T, d' \neq d$ ). This assumption can be violated, for example, if the search costs for finding victims increase with the total number of victims trafficked from  $h$ . However, the number of trafficking victims is small compared to the total population. Therefore, the search costs are unlikely to be affected by the total number of victims.

#### 4.4. Supply of Non-Trafficked Children

This subsection explains the labor-supply model of non-trafficked children. A child from district  $h$  decides whether to become a child sex worker in a given destination subdistrict  $d$  or to engage in some other activities (e.g., marriage, schooling, and other forms of child labor) to maximize utility. The destination, which may or may not be the same as  $h$ , is assumed to be exogenously given to each child, depending, for example, on geographic proximity to her residence, accessibility by public transportation, and the existence of relatives. Importantly, this assumption suggests that children do not choose *where* to work. This is plausible because children should not be able to gather information about the working conditions of prostitution in multiple subdistricts and choose the best place. In line with this assumption, a large proportion of non-trafficked children in our dataset engage in prostitution in their home or neighboring districts.

Given this assumption, the number of children migrated from  $h$  to  $d$  to engage in prostitution,  $q_{hd}^{NT}$ , is written as:

$$q_{hd}^{NT} = W_{hd} s_{hd}(p_d, B_h^H, B_d^D). \quad (3)$$

where  $W_{hd}$  denotes the number of potential children in  $h$  who decide whether to engage in prostitution in destination  $d$ ;  $s_{hd}(p_d, B_h^H, B_d^D)$  denotes the probability that a child in  $h$  who is given destination  $d$  chooses to work as a child sex worker. Therefore,  $q_{hd}^{NT}$  should not be less than zero. The probability is determined by the price in  $d$ ,  $p_d$ , and the presence of brothel areas in home  $h$ ,  $B_h^H$ , and destination  $d$ ,  $B_d^D$ .

The existence of brothel areas affects non-trafficked children's supply through two channels (Table 5). First, the brothel areas in  $d$  increase the probability of engaging in prostitution through the masking effect. Second, girls who grow up in the environment

of legal adult prostitution may not feel the social stigma against prostitution. Therefore, the existence of brothel areas in home  $h$  also increases the probability through the stigma effect (Giusta et al. 2009).

#### 4.5. Equilibrium

In equilibrium, the prices of child prostitution in each subdistrict are determined to balance the demand for child prostitution and its supply by the trafficked and non-trafficked children:

$$D_d(p_d, p_d^{Adult*}(p_d, B_d), B_d) = \sum_h (n_{hd}^T q_{hd}^T + n_{hd}^{NT} q_{hd}^{NT}).$$

Where  $n_{hd}^T$  and  $n_{hd}^{NT}$  are the trafficked and non-trafficked children's frequency of trading sex per day, respectively. The demand decreases with the price, while the number of trafficked and non-trafficked workers increases. Therefore, if the demand is greater than the supply when the price is zero, the equilibrium exists uniquely.

This model suggests that the equilibrium price in a subdistrict is determined independently of the prices in other subdistricts. Specifically, demand in a subdistrict is not affected by prices in other subdistricts, because clients are unlikely to go to other subdistricts for sex tourism, as discussed in Section 4.2. The supply of trafficked children is also independent of prices in other subdistricts, because the marginal cost of trafficking children from  $h$  to  $d$  does not depend on the total quantities trafficked from  $h$  to other destinations (Section 4.3). Finally, for non-trafficked children's supply, the destination is exogenously given (Section 4.4).

The validity of the model assumptions—related to no sex tourism, independence of marginal costs of trafficking, no destination choice of non-trafficked children, and the usage of the market price at the subdistrict level—are discussed and tested in Online Appendix A3.

### 5. Structural Estimation

#### 5.1. Specification

##### 5.1.1. Demand for Child Prostitution

This subsection specifies the functional form of the structural model, namely, the demand for child sex workers and the supply of trafficked and non-trafficked children. The demand model is specified as follows:

$$D_d(p_d, p_d^{Adult*}(p_d, B_d^D), B_d^D) = (p_d)^{\delta_P} (\exp(B_d^D))^{\delta_B} \prod_k (X_{d,k}^D)^{\delta_k} e_d^D \quad (4)$$

where  $X_{d,k}^D$  represents characteristics of subdistrict  $d$ , which predict the demand for child prostitution, and  $e_d^D$  is an error term. Recall that  $p_d$  is the price of child prostitution, and  $B_d^D$  is the indicator of the existence of brothel areas in  $d$ . Specifically,  $X_{d,k}^D$  includes the night light intensity, population, sex ratio, paved road, damages from a devastating tropical cyclone in 2007, and the number of rickshaw drivers, movie theaters, religious schools, and ports. Rickshaw drivers are the main clients of prostitution in Bangladesh, and therefore increase the demand (Bloem et al. 1999). The night light intensity, population, and sex ratio are also expected to positively affect the demand, while the number of religious schools and households affected by the tropical cyclone may have a negative impact. The impact of movie theaters is ambiguous, as movies may or may not be substitutes for buying sex. Finally, the number of ports is included to control for the location of brothel areas.

The exponent of the price variable,  $\delta_P$ , should be interpreted as the net of the negative direct effect,  $\partial D_d / \partial p_d$ , and the positive indirect effect through the change in the equilibrium price of the adult prostitution price,  $(\partial D_d / \partial p_d^{Adult*})(\partial p_d^{Adult*} / \partial p_d)$ . The exponent of the brothel dummy,  $\delta_B$ , also represents the net of the direct effect (i.e., stigma effect) and the indirect effect through the change in the price of adult prostitution (adult market effect).

By taking the natural logarithm of Equation (4), we obtain the following equation:

$$\log(Q_d) = \delta_P \log p_d + \delta_B B_d^D + \sum_k \delta_k \log X_{d,k}^D + \epsilon_d^D \quad (5)$$

where  $Q_d$  is the clients' frequency of buying sex from trafficked and non-trafficked child sex workers in subdistrict  $d$  per week plus one.<sup>16</sup>  $\epsilon_d^D$  is the natural logarithm of the error term ( $\epsilon_d^D \equiv \log e_d^D$ ).

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<sup>16</sup> Since  $Q_d$  takes zero in only 13% of subdistricts, the log-transformation is unlikely to cause a serious issue. We also estimate the Inverse Hyperbolic Sine transformation for robustness.

### 5.1.2. Supply of Trafficked Children

Next, we specify the supply model for traffickers, which determines the number of children trafficked from  $h$  to  $d$ . The marginal revenue is assumed to be proportional to the unit price of child prostitution:  $MR_{hd}(p_d) = r p_d$ .<sup>17</sup> The marginal cost function is specified as follows:

$$MC_{hd}(q_{hd}^T, B_h^H, B_d^D) = (q_{hd}^T + 1)^{\gamma_Q} (\exp(B_h^H))^{\gamma_{BH}} (\exp(B_d^D))^{\gamma_{BD}} \prod_k (X_{hd,k}^T)^{\gamma_k} e_{hd}^T$$

where  $X_{hd,k}^T$  represents the characteristic of home district  $h$ , destination subdistrict  $d$ , and  $h - d$  pair which predict the marginal cost of trafficking, and  $e_{hd}^T$  is an error term. We assume that  $X_{hd,k}^T \geq 0, \forall k$ ,  $e_{hd}^T \geq 0$ , and  $\gamma_Q > 0$ .

Specifically,  $X_{hd,k}^T$  includes the following characteristics. First, the geographical proximity between  $h$  and  $d$  is included as a proxy for transportation costs. Second, regarding the home district characteristics, we control for the damage from the 2007 tropical cyclone in  $h$  and its interaction terms with the geographical proximity between  $h$  and  $d$ . Cyclone-affected households face credit constraints, and their girls are likely to seek jobs and marriage opportunities outside their hometowns. As a result, it is easier for traffickers to deceive them, reducing the trafficking costs. However, the cyclone might also increase the marginal cost if it disrupts traffickers' activities. The night light intensity in  $h$  can negatively affect the probability of success in trafficking, since parents with higher income have less incentive to send their children for work, while the probability may increase with the number of orphanages. Third, we control for the destination characteristics, such as the night light intensity, paved road, cyclone damage, and population, to capture the transportation cost and detection risk. Finally, we also include the number of ports in  $h$  and  $d$ .

Under this marginal cost function, the quantity at which the marginal cost equals the marginal revenue,  $q_{hd}^{T*}$ , is determined by the following equation:

$$r p_d = (q_{hd}^{T*} + 1)^{\gamma_Q} (\exp(B_h^H))^{\gamma_{BH}} (\exp(B_d^D))^{\gamma_{BD}} \prod_k (X_{hd,k}^T)^{\gamma_k} e_{hd}^T$$

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<sup>17</sup> Suppose that a trafficked child is forced to trade sex  $r^{Child}$  times and  $r^{Adult}$  times while under and over the age of 18, respectively. Also, the price of adult prostitution is less than the price of child prostitution by a factor of  $\rho$ . Then, the marginal revenue is  $r^{Child} p_d + r^{Adult} \rho p_d = (r^{Child} + r^{Adult} \rho) p_d$ . Therefore,  $r$  can be interpreted as  $r^{Child} + r^{Adult} \rho$ .

$$\Leftrightarrow \log(q_{hd}^{T*} + 1) = \frac{1}{\gamma_Q} \log r p_d - \frac{\gamma_{BH}}{\gamma_Q} B_h^H - \frac{\gamma_{BD}}{\gamma_Q} B_d^D - \sum_k \frac{\gamma_k}{\gamma_Q} \log X_{hd,k}^T + \frac{1}{\gamma_Q} \epsilon_{hd}^T \quad (6)$$

where  $\epsilon_{hd}^T$  is the natural logarithm of the error term ( $\epsilon_{hd}^T \equiv \log e_{hd}^T$ ). Using this equation, the supply function of the trafficked children, Equation (2), can be transformed as follows:

$$\log(q_{hd}^T + 1) = \begin{cases} \log(q_{hd}^{T*} + 1) & \text{if } \log(q_{hd}^{T*} + 1) \geq 0 \\ 0 & \text{if } \log(q_{hd}^{T*} + 1) < 0 \end{cases} \quad (7)$$

Note that the condition that  $r p_d \geq MC_{hd}(0, B_h^H, B_d^D)$  is equivalent to the condition that  $\log(q_{hd}^{T*} + 1) \geq 0$ .<sup>18</sup> We estimate the model as a censored model with  $\log(q_{hd}^T + 1) = \max\{0, \log(q_{hd}^{T*} + 1)\}$  where  $\log(q_{hd}^{T*} + 1)$  is given by Equation (6).

### 5.1.3. Supply of Non-Trafficked Children

Finally, we specify the supply function of non-trafficked children, Equation (3), as follows:

$$q_{hd}^{NT} = \begin{cases} q_{hd}^{NT*} & \text{if } q_{hd}^{NT*} \geq 0 \\ 0 & \text{if } q_{hd}^{NT*} < 0 \end{cases}$$

where

$$q_{hd}^{NT*} = (p_d)^{\psi_P} (\exp(B_d^D))^{\psi_{BD}} (\exp(B_h^H))^{\psi_{BH}} \prod_k (X_{hd,k}^{NT})^{\psi_k} e_{hd}^{NT} - 1$$

and  $X_{hd,k}^{NT}$  includes the characteristics of home  $h$ , destination  $d$ , and  $h - d$  pair that may affect the size of the potential work force ( $W_{hd}$ ) and/or the probability of entering the sex industry ( $s_{hd}$ ). It includes the same variables as the marginal cost function of traffickers ( $X_{hd,k}^T$ ). An error term is denoted by  $e_{hd}^{NT}$ . We assume that  $X_{hd,k}^{NT} \geq 0, \forall k$  and  $e_{hd}^{NT} \geq 0$ . We add the last term,  $-1$ , so that  $q_{hd}^{NT}$  is censored at zero, since the number of non-

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<sup>18</sup>  $r p_d \geq MC_{hd}(0, B_h^H, B_d^D) \Leftrightarrow r p_d \geq (\exp(B_h^H))^{\gamma_{LH}} (\exp(B_d^D))^{\gamma_{LD}} \prod_k (X_{hd,k}^T)^{\gamma_k} e_{hd}^T \Leftrightarrow \log r p_d - \gamma_{BH} B_h^H - \gamma_{BD} B_d^D - \sum_k \gamma_k \log X_{hd,k}^T - \epsilon_{hd}^T \geq 0 \Leftrightarrow \gamma_Q \log(q_{hd}^{T*} + 1) \geq 0 \Leftrightarrow \log(q_{hd}^{T*} + 1) \geq 0$ .

trafficked workers from  $h$  to  $d$  is zero for most  $h - d$  pairs in the data.<sup>19</sup>

This equation can be transformed as follows:

$$\log(q_{hd}^{NT} + 1) = \begin{cases} \log(q_{hd}^{NT*} + 1) & \text{if } \log(q_{hd}^{NT*} + 1) \geq 0 \\ 0 & \text{if } \log(q_{hd}^{NT*} + 1) < 0 \end{cases} \quad (8)$$

where

$$\log(q_{hd}^{NT*} + 1) = \psi_P \log p_d + \psi_{BD} B_d^D + \psi_{BH} B_h^H + \sum_k \psi_k \log X_{hd,k}^{NT} + \epsilon_{hd}^{NT} \quad (9)$$

and  $\epsilon_{hd}^{NT}$  is the natural logarithm of the error term ( $\epsilon_{hd}^{NT} \equiv \log e_{hd}^{NT}$ ). We estimate the model as a censored model with  $\log(q_{hd}^{NT} + 1) = \max\{0, \log(q_{hd}^{NT*} + 1)\}$  where  $\log(q_{hd}^{NT*} + 1)$  is given by Equation (9).

## 5.2. Estimation

### 5.2.1. Demand Function

This section estimates the demand function (5). Given the potential endogeneity of price, we use a supply-side shock as the instrumental variable and estimate the 2SLS model. Specifically, we exploit that a devastating tropical cyclone, *Sidr*, attacked the country in 2007, a year prior to the CSEC survey, and caused severe economic losses to households. The timing, paths, and severity of tropical cyclones are random, and the whole area in Bangladesh is prone to tropical cyclones (Shoji and Murata 2017). As discussed in Section 2, disaster-affected households face credit constraints, and their daughters are more willing to seek jobs and marriage opportunities outside their hometowns. This feature lowers the traffickers' costs of deceiving girls. It also increases the labor supply of non-trafficked children from the affected areas. Given that a large proportion of trafficked and non-trafficked children are trafficked or migrate from adjacent districts (Table 2), we use the number of cyclone-affected households in the districts adjacent to the district of  $d$  as the instrumental variable.

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<sup>19</sup> Even if we assume that the last term is  $-a$  ( $a > 0$ ) instead of  $-1$ , such a model can be converted to the model with the last term of  $-1$  by dividing both sides by  $a$ , that is, changing the unit of quantity by a factor of  $a$ . For example, if we set  $a = 10$  or  $1/10$ , we obtain the qualitatively similar estimates.

A threat to identification is the possibility of sex tourism. If clients go to the adjacent districts to buy sex, our instrument will directly lower the demand, violating the exclusion restriction. However, as discussed in Section 4.2 and tested in Online Appendix A3, this is unlikely in our context. In particular, it is unlikely that the cyclone in 2007 would affect demand in neighboring districts in 2008, one year later. Another concern is that our instrument can be correlated with the cyclone damages in the destination subdistrict  $d$ , which directly affects the demand by reducing the clients' income. Therefore, to isolate this effect, our specification controls for the cyclone damage in the district of  $d$ .

Column (1) of Table 6 presents the first-stage results. It shows that the cyclone damages in the adjacent districts have negative impacts on the price in subdistrict  $d$ . Since this column is identical to Column (5) of Table 4, the robustness of the results is discussed in Online Appendix A2.1. Column (2) demonstrates the demand function. A one percent increase in the prostitution price decreases the demand for child prostitution by 6.1%. The demand for child prostitution is 310% higher in the subdistricts with brothel areas, after controlling for the price.<sup>2 0</sup> This primarily captures the stigma and adult market effects in Table 5.

We also estimate the equation using a plausibly exogenous IV model that relaxes the exclusion restriction assumption (Conley et al. 2012), showing that violations of this assumption cannot explain our results. The results are reported in Online Appendix A2.2 with further robustness tests. Finally, while the dependent variables are log-transformed to align with our structural model, the results do not change with the use of the Inverse Hyperbolic Sine transformation (not reported in the paper).

**Table 6: Demand Function**

	Price (1)	Freq. of child prostitution / week (2)
Price		-6.068** (2.424)
Cyclone-affected HHs in adjacent districts	-1.019*** (0.288)	
Brothel area	-0.146 (0.110)	1.411** (0.691)
Ports	-0.055* (0.031)	-0.338 (0.266)
Night light intensity	-0.003 (0.051)	0.376 (0.370)

<sup>2 0</sup> The impact is computed by  $\exp(1.411)-1=3.100$

Population	-0.093 (0.101)	-1.674*** (0.583)
Sex ratio	0.003 (0.013)	-0.033 (0.086)
Paved road (km) in $d$	-0.000 (0.001)	0.004 (0.003)
Cyclone-affected HHs in $d$	1.241** (0.480)	-0.114 (2.831)
Rickshaw drivers	0.093*** (0.033)	0.682** (0.267)
Movie theaters	0.020 (0.024)	0.371** (0.155)
Religious school	-0.000 (0.005)	-0.025 (0.027)
Constant	4.860** (2.135)	50.998*** (14.662)
Kleibergen-Paap Wald F statistic	12.28	
R-squared	0.227	

The 2SLS coefficients are reported. Standard errors are clustered at the district level. The dependent variables, price, population, and the number of rickshaw drivers are log-transformed to align with the structural model. The estimation results are adjusted by the sampling weight.  $N=117$ . \*\*\*  $p<0.01$ , \*\*  $p<0.05$ , \*  $p<0.1$ .

### 5.2.2. Supply Functions

Next, we estimate Equations (7) and (8). As the instrumental variable for the child prostitution price, we use a demand-shifter—the number of rickshaw drivers in destination subdistrict  $d$ . As mentioned in Sections 3.2 and 5.1.1, they are the main clients of prostitution. The results of the reduced-form (Table 4) and the demand function (Table 6) also suggest the positive impact of rickshaw drivers on the demand. In addition, our instrument is unlikely to affect the marginal costs of traffickers and non-trafficked children. Since rickshaw drivers do not work beyond their local subdistricts, traffickers and non-trafficked children do not use rickshaws in  $d$  to traffic/migrate from home  $h$  to destination  $d$ . Even after arriving in  $d$ , traffickers do not use them to avoid the risk of police detection and victims' escape. It is also unlikely that our instrument affects traffickers' costs of finding girls or non-trafficked girls' outside options in home district  $h$ , such as the utility from marriage, schooling, and other forms of child labor.

However, if our instrument is correlated with transportation infrastructure or other socio-economic development in the destination subdistrict, a greater number of drivers may be associated with lower transportation costs of trafficked and non-trafficked girls, which would lead to higher supplies. In particular, Liu et al. (2024) demonstrate the

positive impact of highway networks on the prevalence of child trafficking in China. However, this is unlikely to be severe in Bangladesh, because the highway network was not developed as of 2008, and the average distance children are transported is only about 48km (Table 1). We also control for direct proxies for transportation infrastructure and development (i.e., the length of paved roads, night light intensity, and population in the destination subdistrict) to isolate their effects on the price.

Table 7 presents the results. Column (1) confirms that the price increases with the number of rickshaw drivers in the destination subdistrict. Importantly, the paved road, night light intensity, and population size in subdistrict  $d$  are uncorrelated with the price, suggesting that the transportation infrastructure or socio-economic development of the subdistrict cannot explain the significant coefficient of our instrument.

Columns (2) and (3) demonstrate that the price elasticity of the supply is significantly positive for both equations and is higher for the trafficked children (6.5) than for the non-trafficked children (2.9). This is presumably because traffickers have better access to information about the prostitution price in the subdistrict than non-trafficked children. The table also shows that more children are supplied to the subdistricts with a brothel area, capturing the masking effects. In particular, the impact is larger for the trafficked children. In addition, more children are trafficked *from* the districts with brothel areas. This may be attributed to the procurement-cost effect. The stigma effects for non-trafficked children are not observed in the data, given that the coefficient of brothel areas in the home district is insignificant in Column (3). Finally, both types of supplies increase with geographical proximity.

Finally, as in the demand function estimation, we estimate the *plausibly exogenous IV* model and demonstrate robust patterns (Conley et al. 2012). These results are reported in Online Appendix A2.3, along with additional tests of the validity of our instrument, specifications, the choice of control group, and the reduced-form results.

**Table 7: Supply Function**

	Price (1)	Trafficked workers (2)	Non-trafficked workers (3)
Price		6.516** (2.598)	2.870** (1.336)
Rickshaw drivers in $d$	0.095*** (0.035)		
Same district	0.104*** (0.037)	4.448*** (0.616)	4.576*** (0.523)
Adjacent district	0.102*** (0.030)	0.851* (0.504)	0.888** (0.374)

Distance	0.000** (0.000)	-0.015*** (0.003)	-0.009*** (0.003)
Brothel area in d	-0.128 (0.108)	3.607*** (0.912)	1.834*** (0.391)
Ports in d	-0.064** (0.025)	0.153 (0.246)	-0.009 (0.124)
Night light intensity in d	-0.006 (0.050)	-0.004 (0.339)	-0.167 (0.157)
Population in d	-0.094 (0.114)	0.394 (0.789)	0.174 (0.422)
Sex ratio in d	0.006 (0.011)	0.099 (0.079)	0.078* (0.042)
Paved road (km) in d	-0.000 (0.000)	0.003 (0.003)	0.002 (0.002)
Cyclone-affected HHs in d	-0.059 (0.589)	-2.458 (3.670)	-0.056 (2.228)
Brothel area in h	0.012*** (0.005)	1.075*** (0.346)	0.286 (0.242)
Ports in h	0.001** (0.000)	0.179** (0.087)	0.144*** (0.055)
Cyclone-affected HHs in h	0.023*** (0.008)	-2.975* (1.603)	-1.075 (0.914)
Cyclone-affected HHs in h x same district	-0.124 (0.211)	-4.244 (4.209)	2.967* (1.655)
Cyclone-affected HHs in h x adjacent	-0.681*** (0.224)	5.111** (2.596)	-2.715 (2.868)
Night light intensity in h	-0.007*** (0.003)	-0.508*** (0.175)	-0.073 (0.125)
Orphanages in h	-0.000 (0.000)	-0.001 (0.002)	0.002 (0.002)
Constant	4.468** (1.986)	-50.744*** (15.149)	-27.125*** (8.461)

The coefficients of IV-tobit models are reported in Columns (2) and (3). The dependent variables, price, population, and the number of rickshaw drivers are log-transformed to align with the structural model. Robustness to alternative specifications (IV-Poisson model and the Inverse Hyperbolic Sine Transformation) is tested in Online Appendix A2.3. Standard errors are two-way clustered at the levels of destination subdistrict and home district. N=7488. \*\*\* p<0.01, \*\* p<0.05, \* p <0.1.

## 6. Simulation

### 6.1. Setup

The goal of simulation analyses in this section is to predict the nationwide prevalence of trafficked and non-trafficked child sex workers under three counterfactual scenarios.<sup>2 1</sup>

<sup>2 1</sup> Welfare analysis is beyond the scope of this study due to data limitations.

The first scenario, CF1, represents a situation in which there were no brothels in Bangladesh. This scenario is relevant, given that 60% of countries completely illegalize prostitution (Chow et al. 2013). However, it remains controversial because previous studies indicate negative consequences of criminalizing prostitution (Bisschop et al. 2017; Cameron et al. 2020; Cunningham and Shah 2018; Gao and Petrova 2022). It also conflicts with the recent trend advocating for women's rights to choose prostitution as an occupation (Amnesty International 2015; Lancet 2015).

Therefore, we consider the second scenario, CF2, where adult prostitution remains tolerated in the brothel areas but trafficked and non-trafficked children are strictly screened out of the areas. Therefore, children in the subdistricts with brothel areas engage in prostitution only outside the brothels, such as on the street, as illegal floating workers. This policy could be implemented through various means, such as stringent screening during interviews of affidavit, regular monitoring by NGOs in brothel areas, and harsher punishment of corrupt law enforcement officers.

While CF2 may be effective in avoiding the drawbacks of CF1, it may be technically challenging to screen out children, particularly non-trafficked children. Although trafficked children may honestly report their age and express their unwillingness to engage in prostitution, non-trafficked children who decide to enter the industry out of necessity have an incentive to bribe or submit an affidavit with a false age. This issue may be particularly crucial, given the unavailability of official age certificates for the poor. As a result, law enforcement officers may be able to detect only trafficked children, even if they aim to screen out all child sex workers. Therefore, we also consider an alternative scenario, where they can screen out trafficked children but not non-trafficked children (CF2').

Notably, the gap between the observed prevalence in the real situation and CF1 should not be interpreted as the impact of *closing* the brothel areas. Brothel-based workers are evicted from the brothel areas following the closure, but they cannot return home or take a decent job, given the social stigma against prostitutes. As a result, the evicted children may switch from brothel-based to floating workers, but our simulation does not incorporate this possibility. Instead, CF1 predicts the situation where the children do not enter the prostitution industry. Thus, the transition from CF1 to reality can be interpreted as the effect of *establishing* brothel areas. Similarly, the transition from CF1 to CF2 (or CF2') can also be interpreted as the effects of establishing brothel areas with different screening abilities.

Theoretically, CF1 eliminates all effects of brothel areas on the demand and supply, that is, all effects listed in Table 5. This scenario is empirically manipulated by

setting all dummy variables for the presence of brothels to zero in the demand and supply functions and simulating the number of child sex workers in equilibrium.

In CF2, since neither trafficked nor non-trafficked children can work in the brothel areas, the masking effects on the supplies of both children are removed, while the procurement-cost, adult market, and stigma effects remain. This is approximated by setting to zero the dummy variables for brothels in the destination subdistrict ( $B_d^D$ ) in the supply functions for both trafficked and non-trafficked children, while leaving the other brothel-related dummies unchanged.

Finally, in CF2', only trafficked children are excluded from the brothel areas, and therefore, only the masking effects on their supply are eliminated.<sup>2 2</sup> This scenario is simulated by setting to zero only the dummy variable for brothels in the destination subdistrict in the supply function for trafficked children.

To simulate results for each scenario, we exploit our model's feature that the equilibrium price in a subdistrict is determined independently of prices in other subdistricts (Section 4.5). Specifically, equilibrium is computed numerically for each market (subdistrict), as the solution to the simultaneous equations of the supply and demand functions using the "fminsearch" command of MATLAB. To align the dependent variables in the demand (frequency of prostitution traded per week) and supply (number of child sex workers) functions, we multiply the mean frequency of prostitution per worker by the supply of children. The residuals from the estimated equations are used as the error terms. Finally, to calculate the number of trafficked and non-trafficked children at the national level, we impute the number of children in the subdistricts excluded from the survey by using the number in selected subdistricts and their sampling weights.

## 6.2. Results

Table 8 presents the simulation results for subdistricts with and without brothel areas. Column (4) shows that, in reality, 965 child sex workers are observed to engage in prostitution in the 11 subdistricts with brothel areas. Of these, 462 are trafficked and 503 are non-trafficked children. However, if brothel areas had not existed in these subdistricts (CF1), there would have been only 5 and 75 children who would engage in the floating sex work, respectively (Column (1)), because the demand and supply of both types of workers would have declined. These results suggest that establishing such brothel areas significantly increases the trafficked and non-trafficked children in these subdistricts by

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<sup>2 2</sup> CF2 and CF2' may also affect adult workers' supply, if they include many trafficking victims. However, this effect should be limited, if any, as discussed in Section 2.

457 and 428, respectively. The larger gap among trafficked children is attributed to the larger coefficient of  $B_d^D$  in their supply function, likely capturing the masking effect on their supply. Furthermore, Panel B shows that the presence of brothel areas significantly increases trafficked child sex workers even in the subdistricts with no brothel areas through the procurement-cost effects.

Column (2) presents the simulation results for CF2 where children are excluded from the brothel areas. In subdistricts with brothel areas, 42 trafficked children and 144 non-trafficked children engage in prostitution outside the areas as floating workers. These numbers are substantially lower than the real situation with poor screening ability, while they are still higher than the CF1 result. The average price in subdistricts with brothels is higher in CF2 (119.3) than in CF1 (110.1). This is because, although both demand and supply are higher in CF2 than in CF1, the upward pressure on price from higher demand outweighs the downward pressure on price from higher supply. In subdistricts without brothel areas, the estimated numbers of trafficked and non-trafficked children are identical to the real situation. This is because the procurement-cost and stigma effects in the supply functions remain in this scenario.

Column (3) of Table 8 demonstrates the CF2' results. As with CF2, the results for the subdistricts with no brothel areas are identical to the actual situation. By contrast, intriguing patterns are observed in the subdistricts with brothel areas. Only 7 trafficked children are estimated to engage in prostitution, which is comparable with CF1. However, this scenario leads to even more non-trafficked children than would occur in the actual situation of poor screening. These results are driven by the change in child prostitution prices. Exclusion of trafficked children from the brothel areas reduces their supply and has positive effects on the price. This, in turn, attracts more non-trafficked children into the prostitution industry.

Table 9 presents the nationwide prevalence of child sex workers across scenarios, by summing up the numbers in both panels of Table 8. It shows that the presence of brothel areas with poor screening—as in the actual situation—leads to the worst prevalence of trafficked children (6163 children) and total child sex workers (16506 children). Compared to the result of CF1 where their prevalence is the lowest, establishing such brothel areas exacerbates the number of trafficked children by 18.8% and child sex workers by 10.3% nationwide. However, CF1—which illegalizes prostitution—has serious drawbacks as discussed in the literature. Alternatively, CF2 achieves a second-best result. However, it is still higher than CF1, and detecting non-trafficked children may be technically challenging in practice. Failure to detect them leads to the result of CF2'. In this scenario, while the prevalence of trafficked children and child sex workers are

10.0% and 8.0% higher than CF1, respectively, these are remarkably lower than the actual situation with poor screening. However, notably, the prevalence of non-trafficked children becomes even higher than it would occur with poor screening because of the increase in prostitution prices.<sup>2 3</sup> These results reveal a tradeoff among policy options.

**Table 8: Simulation Results by Subdistrict Type**

	CF1 No brothels (1)	CF2 Brothels with screening out T & NT (2)	CF2' Brothels with screening out T (3)	Actual Brothels with poor screening (4)
<b>Panel A: With brothels</b>				
Trafficked	5 (0, 63)	42 ** (3, 261)	7 * (0, 75)	462 **
Non-trafficked	75 (35, 153)	144 * (62, 308)	616 ** (540, 731)	503 **
Total child sex workers	80 (43, 174)	186 ** (102, 446)	623 ** (555, 758)	965 **
Price	110.1 (96.4, 130.2)	119.3 (106.0, 144.2)	96.4 ** (93.7, 103.5)	89.0 **
<b>Panel B: Without brothels</b>				
Trafficked	5185 (4927, 5532)	5701 **	5701 **	5701 **
Non-trafficked	9703 (9439, 10023)	9840	9840	9840
Total child sex workers	14887 (14572, 15278)	15541 **	15541 **	15541 **
Price	94.6 (94.0, 95.6)	93.6 **	93.6 **	93.6 **

The numbers in parentheses represent the 5th and 95th percentiles obtained from simulations repeated 1,000 times by generating parameter values based on the variance-covariance matrices of the model parameter estimates. Note that 30 of the 1,000 iterations are excluded before calculating the percentiles because at least one of the price coefficients has the unexpected sign (i.e., positive for demand or negative for supply). \* and \*\* indicate that the difference from CF1 is significant at the 90 and 95 percent level, respectively.

<sup>2 3</sup> CF2 may also remove the procurement-cost effects, if it affects traffickers' search costs and their connection with local elites. Therefore, for robustness we also conduct simulations that incorporate this possibility, by setting the indicators of brothel areas in the home district to zero in the supply functions. The results do not differ qualitatively (Table A12).

**Table 9: Simulation Results of Nationwide Prevalence**

	CF1	CF2		CF2'		Actual	
	No brothels	Brothels with screening out T & NT		Brothels with screening out T		Brothels with poor screening	
	(1)	(2)		(3)		(4)	
Trafficked	5190	5743	10.7%**	5709	10.0%**	6163	18.8%**
Non-trafficked	9778	9983	2.1%**	10455	6.9%**	10343	5.8%**
Total child sex workers	14967	15727	5.1%**	16164	8.0%**	16506	10.3%**

\* and \*\* indicate that the difference from CF1 is significant at the 90 and 95 percent level, respectively.

Finally, Online Appendix A4 tests the validity of our simulation models. Specifically, we compare the simulation results to the results of reduced-form estimations and demonstrate that the predicted impact of the presence of brothel areas is consistent between both methods, suggesting that our simulation results do not rely on the assumptions of the structural model.

## 7. Conclusion

Exploiting nationally representative survey data on child sex workers and variations in historically determined locations of legal brothels in Bangladesh, we estimate the impact of legal adult prostitution on the demand for and supply of trafficked and non-trafficked child sex workers. The estimation results show that the subdistricts with legal brothel areas experience higher demand for and supply of both types of children. The price elasticity of supply is higher for trafficked children than for non-trafficked children. Furthermore, more children are trafficked from districts with brothels than from districts without. We believe that these results are generalizable, given that the structures of prostitution and trafficking markets and corrupt law enforcement authority in Bangladesh are similar to other developing countries, except for the legality of adult prostitution (Arunachalam and Shah 2013; Gertler et al. 2005; Kara 2010; Lim 1998; Manian 2024).

The results of counterfactual simulations show that the scenario with no brothel areas (i.e., illegalizing prostitution) achieves the lowest prevalence of trafficked children and child sex workers. Compared to this scenario, the presence of brothel areas with poor screening ability in rural districts exacerbates it nationally by 18.8% and 10.3%, respectively. Strict screening of children in these areas achieves a lower prevalence of child sex workers than the actual situation. However, if law enforcement officers' screening ability is limited and they fail to detect non-trafficked children who may self-report a false age, their prevalence would become even higher than the actual situation.

These findings highlight policy tradeoffs. If the policy goal is the reduction of child sex trafficking or sexual exploitation of children alone, illegalizing prostitution is

the most effective measure. However, it would conflict with the recent trend advocating for women's rights to choose prostitution as an occupation (Amnesty International 2015; Lancet 2015). The literature also highlights several potential negative consequences of such a policy (Bisschop et al. 2017; Cameron et al. 2020; Cunningham and Shah 2018; Gao and Petrova 2022). Permitting adult prostitution only in brothel areas and strictly screening out children can be another policy option, because it avoids the drawbacks of illegalization and achieves a comparable result on the prevalence of child sex trafficking and child sex work. However, it may be technically challenging to detect non-trafficked children who may self-report a false age. If law enforcement officers can detect only trafficked children, it would attract a larger number of non-trafficked children into the prostitution industry. Therefore, it is essential to develop a scheme to strictly detect both trafficked and non-trafficked children at a low cost in the brothel areas.

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## Online Appendix

### A1. Validity of Identification Strategy

#### A1.1. Balancing Tests

To test the validity of our identification strategy, we conduct two sets of balancing tests. In the first test, we examine the sample selection attributed to the location of brothel areas by regressing observed characteristics of the sample subdistricts on the binary indicator of whether a subdistrict contains a brothel area and the number of ports in the district. Table A2 shows that the subdistrict characteristics are uncorrelated with the presence of brothel areas. The table also demonstrates that the prevalence of trafficked and non-trafficked child sex workers is higher in the subdistricts with brothel areas.

The second test examines the sample selection attributed to supply-side (girls) characteristics. Since the supply of trafficked and non-trafficked children is determined by parents' poverty and maltreatment of their daughters, we use the 2006 Multiple Indicator Cluster Survey, a nationally representative survey that contains the information about the experience of child labor, whether parents spent time on the education of pre-school children, educational attainment, and asset holdings.<sup>2 4</sup> Given that many children work in their home or adjacent districts, we examine whether these outcomes are balanced between the respondents who reside in the districts with brothel areas or adjacent districts and those residing far away from the areas. Table A3 shows that these outcomes are comparable regardless of their proximity to brothel areas.

These results suggest that the sample selection is unlikely to be serious, if any.

#### A1.2. Potential Threat to Identification

Although Section 3.2 discusses the exogeneity of proximity to brothel areas for citizens, a remaining threat is the unobserved heterogeneity driven by the brothel areas that were closed before 2008. This affects the identification of the causal impact in two ways. First, it leads to the sample selection of the remaining 13 brothel areas, if unobserved determinants of closure are associated with the demand and supply of child sex workers. Second, even if the closure is a random event, the sex workers evicted from the closed brothels may continue to trade sex as floating workers, increasing the supply of sex workers in their neighboring subdistricts.

However, these issues are unlikely to be severe. First, we confirmed in Online

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<sup>2 4</sup> MICS contains data on whether adults in the household spent time for pre-school children in the past three days, such as reading books, telling stories, singing songs, playing, and spending time for naming, counting, or drawing things. The second outcome takes unity if no one spent time for any of these activities.

Appendix A1.1 that the individuals and regional characteristics are uncorrelated with proximity to existing brothel areas.

Second, closure is a rare event, mainly because land owners of brothels have strong connections with local elites, including law enforcement authorities. Gain et al. (2019) report that closure and eviction occurred in only three districts—Dhaka, Narayanganj, and Magura—between the 1971 independence and 2008. Most brothels continue their business despite the rapid socio-economic changes during this period.

Third, there is no systematic pattern among closed brothels regarding the reasons for closure, instigators of the eviction movement, and the location and size of brothels (Gain et al. 2019). Notably, none of the closures were led by the national government or by nationwide citizen movements against the brothels. Specifically, the brothels in Dhaka, such as Kandupatti, were located at the center of the capital city. Therefore, the landowners had an incentive to redevelop the area to achieve even higher profits rather than continue the brothel, leading to its closure in 1997. By contrast, since the other brothel areas are located in rural subdistricts, it is difficult to gain higher profits than by running the brothels. Narayanganj district, adjacent to Dhaka, used to have the Tanbazar brothel, one of the largest brothel areas in the country. It was owned by 13 landlords, of whom 2 were members of the then main opposition political party (Bangladesh Nationalist Party, BNP). They had troubles with Shamin Osman, a local member of the then-party in power (Awami League) and one of the most influential individuals in the district. He organized a committee against the brothel with local religious and political leaders, and the police forcibly closed the brothel in 1999. Finally, Natun Bazar was a small-scale brothel area located in the district city of Magura. The brothel area was constructed on government land. The district administration requested the sex workers to vacate the brothel in April 2002, given that it was a source of many social problems. Magura Judge Court issued an order against compelling the sex workers to leave. However, in December 2002, the district administration violated the order and forcibly demolished the structure by bulldozers on the ground of unlawful occupation of the government land. These arguments suggest that these three areas were closed by different instigators for different reasons irrelevant to the remaining 13 areas. Hence, the closure of these brothel areas is an idiosyncratic shock and unlikely to cause a serious sample selection problem.

Third, the impact of the outflow of evicted workers on the prostitution market is likely limited, because we study the prostitution market around 10 years after the closure. Many evicted workers should have retired by that time, given their early retirement age. Furthermore, the brothel in Magura was relatively small, and therefore, the influence of

evicted workers may be even more negligible. Although the brothel in Narayanganj was large, many workers were forcibly transported to the government's shelter homes for rehabilitation, reducing the outflow of evicted workers.

Finally, we conduct robustness tests and confirm that these issues cannot explain away our main results in Online Appendix A2.

## **A2. Robustness Tests**

### **A2.1. Reduced-Form Estimation**

**Coefficient Stability Test:** To assess the severity of potential sample selection attributed to the closed brothel areas, we conduct the coefficient stability test proposed by Cinelli and Hazlett (2020). In line with Imbens (2003) and Oster (2019), this analysis provides, relative to observed benchmark predictors, how strongly unobserved confounders need to be associated with the outcome and treatment variables to make the coefficient of interest zero. However, a distinction of their method is that they evaluate it in terms of partial  $R^2$  values, enabling us to assess the sensitivity to multiple confounders acting together, possibly non-linearly. We consider the partial  $R^2$  of two variables for the benchmark predictors—one variable most strongly correlated with the presence of brothel areas (night light intensity) and another variable most strongly correlated with the dependent variables (the number of rickshaw drivers for the model of trafficked children and the number of cyclone-affected households in the adjacent districts for the model of non-trafficked children). Note that the correlation between night light intensity and the presence of brothel areas is small and statistically insignificant. Since this test is not applicable to the weighted least squares model, we conduct the test for the non-weighted OLS results, given that the coefficients of brothel areas are comparable with and without adjusting for the sampling weights (Table A4). Figures A1 and A2 show that the coefficient of the brothel area remains positive, even if unobserved confounders explain the variation of residuals in the brothels and prevalence of children three times as much as the benchmark predictors.

**Entropy Balancing Regression:** We conduct the entropy balancing regression (Hainmueller 2012). This method estimates a weighted least squares model in which the weight is computed to balance the observed characteristics between the subdistricts with and without brothel areas. Specifically, the observations are weighted by one for the subdistricts with brothel areas, and the weight for the other subdistricts is computed by the entropy balancing method. The results are qualitatively similar to the main results (Table A4).

**Leave-One-Out Test:** We conduct the leave-one-out test by excluding each observation of the subdistrict with a brothel area from the sample. The results in Figure A3 confirm that the coefficients for the presence of brothel areas do not differ significantly from the baseline specification.

**Sample Restriction:** In the odd-numbered columns of Table A5, we exclude divisional cities and class-I cities from the sample, given that the brothel areas are typically located in rural subdistricts. In the even-numbered columns, we exclude all subdistricts in Dhaka, Narayanganj, and Magura districts, because there used to be brothel areas in these districts. Some of the evicted sex workers may still engage in floating sex work in these districts. The results do not change qualitatively.

## A2.2. Demand Function

**Plausibly Exogenous IV:** 2SLS assumes zero correlation between the instrument and the error term in the second-stage equation. In other words,  $\gamma=0$  is required in the following equation:

$$\log(Q_d) = \delta_P \log p_d + \delta_B B_d^D + \sum_k \delta_k \log X_{d,k}^D + \gamma IV_d + \epsilon_d^D$$

However, this may not hold strictly if the instrument (cyclone damage in the adjacent districts) is correlated with the unobserved error term. Therefore, we estimate the *plausibly exogenous IV* model of Conley et al. (2012). This model allows  $\gamma$  to be nonzero, but it requires information on the support of  $\gamma$ ,  $[\gamma_{\min}, \gamma_{\max}]$ . If the support is known, regressing  $\log(Q_d) - \gamma_0 IV_d$  using the 2SLS for all  $\gamma_0 \in [\gamma_{\min}, \gamma_{\max}]$  provides the bounds of  $\delta_P$ . This study assumes that the effect of our instrument on  $\log(Q_d)$  through the price change is comparable to or larger than the effect through the other channels. More specifically, we allow  $\gamma_{\max}$  to take 50 percent of the total effect of cyclone damage on  $\log(Q_d)$ . Since the reduced-form coefficient of cyclone damage is 6.18 ( $p < 0.001$ ) (not reported in the paper), we set  $\gamma_0 \in [0, 3.09]$ . The results show that the bound of  $\delta_P$  (the 95% confidence intervals) ranges between -10.21 and -0.26 (not reported in the paper).

**Sample Restriction:** As in Online Appendix 2.1 (Table A5), we exclude the observations if the subdistrict is divisional/Class-I cities or there used to be a brothel area in the district. Table A6 shows that the price elasticity and the effect size of the brothel area do not differ qualitatively from the full sample results in Table 6.

### A2.3. Supply Function

**Plausibly Exogenous IV:** Since the plausibly exogenous IV model of Conley et al. (2012) is not applicable to a censored outcome, we alternatively examine the linear probability model using the binary indicator for a positive level of  $q_{hd}$ . Setting  $\gamma_0 \in [\gamma_{\min}, \gamma_{\max}]$  analogously with the demand function (i.e., 50% of reduced-form coefficient of instrument), the results show that the bound is between 0.013 and 0.072 for the supply of trafficked children and between 0.008 and 0.070 for that of non-trafficked children (not reported in the paper).

**Sample Restriction:** We re-estimate the supply function using restricted samples as in Online Appendices 2.1 (Table A5) and 2.2 (Table A6). In Table A7, we exclude the observations if the destination subdistrict is divisional/Class-I cities (Columns (1) and (5)), if there used to be a brothel area in the destination district (Columns (2) and (6)), and if there used to be a brothel area in the home district (Columns (3) and (7)).

In addition, our instrument may be correlated with the socio-economic conditions of the home district, if the home and destination are located closely, leading to the potential violation of the exclusion restriction. Therefore, in Columns (4) and (8) of Table A7 we exclude the dyads from the sample, if the home and destination are in the same or adjacent district.

**Specification Errors:** First, the positive coefficient of brothel areas in the home district in Column (2) of Table 7 may capture the impact of geographical proximity to the destinations with high demand, rather than the procurement-cost effect. To examine this possibility, we additionally control for its interaction terms with the proximity between the home and destination. If it is attributed to the proximity, the victims should work mainly in the same district. Column (2) of Table A8 shows that the coefficients of interaction terms are negative and insignificant, while the coefficient without the interaction terms remains positive, ruling out the explanation by geographical proximity.

Second, our main specifications estimate the IV-Tobit model with the log-transformed dependent variables. Columns (3) and (6) use the Inverse Hyperbolic Sine Transformation, and Columns (4) and (7) estimate the IV-Poisson model. The results do not change qualitatively.

**Reduced Form:** Table A9 shows the reduced-form results, confirming that the observed patterns align with the IV results.

### **A3. Validity of Model Assumptions**

#### **A.3.1. No Sex Tourism**

Our model assumes away the possibility of clients from other subdistricts (i.e., sex tourism). As discussed in Section 4.2, this assumption is reasonable. Our main results also align with this assumption, because, while brothel areas have positive effects on the demand in the subdistrict (Table 6), they do not affect the prevalence of child sex workers or the price in the adjacent districts (Table 4).

In this section we provide additional evidence. We estimate the demand function with an additional control for the average number of rickshaw drivers in the districts other than  $d$ , where the average is weighted by the inverse of the logarithm of distance from  $d$ . Since this variable approximates the magnitude of potential demand from outside the district, our assumption predicts that this coefficient should be statistically insignificant. Column (1) of Table A10 shows that more rickshaw drivers in their neighboring districts do not lead to a higher frequency of child prostitution, aligning with our assumption.

#### **A.3.2. Independent Marginal Cost of Trafficking**

We assume that the traffickers' marginal cost of trafficking children from  $h$  to  $d$  is independent of the total number of children trafficked from  $h$  to other destinations (Section 4.3). If this assumption holds, the supply of trafficked children from  $h$  to  $d$  is uncorrelated with the demand in the other districts. Therefore, in the supply function of trafficked children, we additionally control for the average number of rickshaw drivers in the districts other than  $h$  or  $d$ , where the average is weighted by the inverse of the logarithm of distance from  $h$ . In line with our assumption, Column (2) of Table A10 shows that the demand in the other districts does not negatively affect the supply of trafficked children to  $d$ .

#### **A.3.3. No Destination Choice of Non-Trafficked Children**

We assume that non-trafficked children cannot choose *where* to engage in prostitution based on its profitability, but they only determine *whether* they work in an exogenously determined destination or not (Section 4.4). It predicts that the supply of non-trafficked children from district  $h$  to destination  $d$  should be uncorrelated with the magnitude of demand in the other districts. To test this, as in the supply function of trafficked children, we additionally control for the weighted average number of rickshaw drivers in the supply function of non-trafficked children. Column (3) of Table A10 shows that the demand in the other districts is uncorrelated with the number of non-trafficked children migrated from  $h$  to  $d$ , supporting our assumption.

### **A3.4. Market Price at the Subdistrict Level**

Our model considers that within-subdistrict variation in the price of child prostitution is negligible. Although we already discussed the plausibility of this assumption in Table 2 and Section 4.1, we provide additional supporting evidence. In Table A11, we use the individual-level data to regress the price of prostitution on the subdistrict fixed effects and individual characteristics. Column (1) shows that the subdistrict fixed effects alone can explain around half of the variations in the price across workers. In Columns (2) to (4) we additionally control for individual characteristics, such as age and marital status. Although some coefficients are statistically significant, the explanatory power does not change with these additional controls.

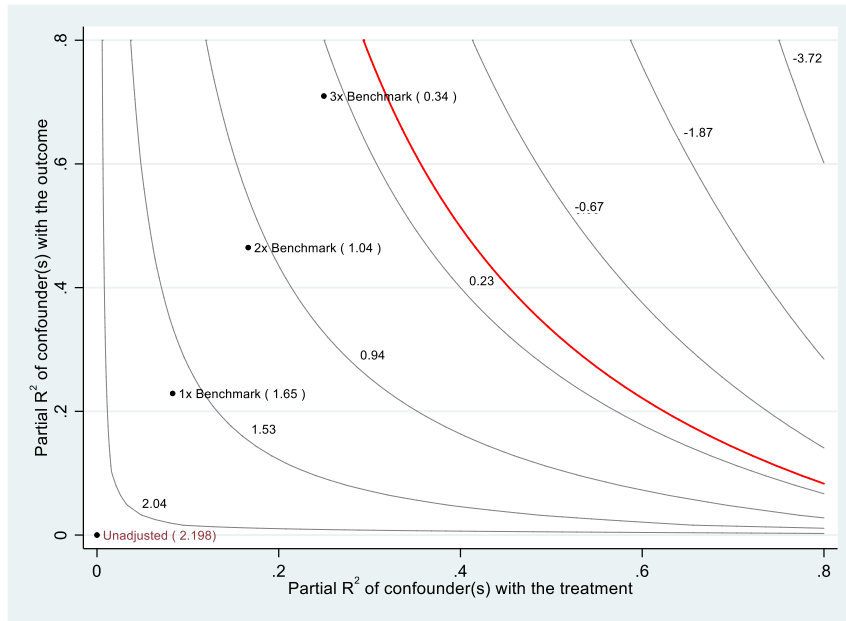
### **A4: Comparisons of Reduced-Form and Structural Results**

This section assesses the validity of our structural model by comparing the results of the simulation analysis (Table 8) with those of the reduced-form estimation presented in Tables 4 and A9. In the reduced-form estimations, the estimated effects of brothel areas capture the net effects of brothels on both supply and demand, while the structural analysis requires more assumptions about the structure of the market. Therefore, if our main results do not rely on these assumptions, the estimated net effects of the brothels should be comparable between them.

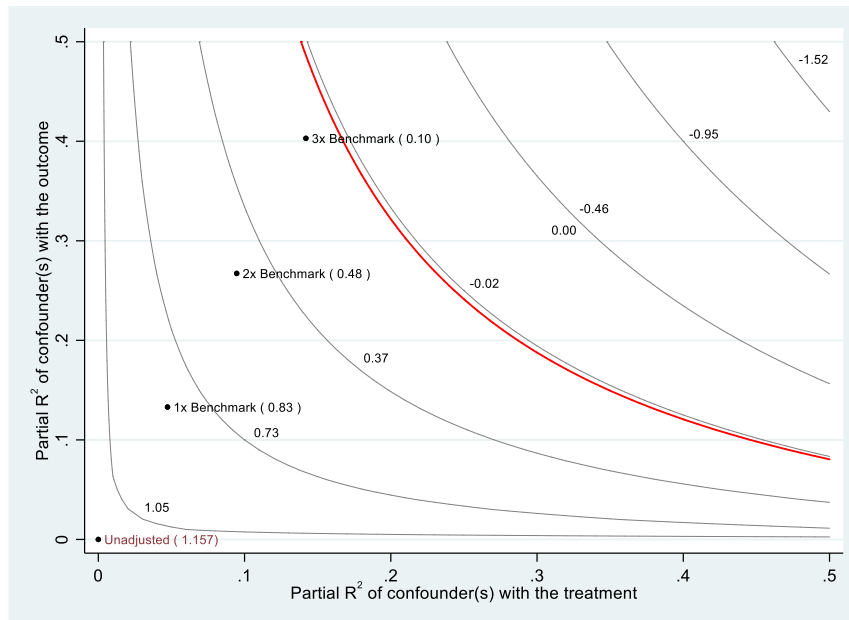
Panel A of Table A13 demonstrates the impact on the prevalence of child sex workers in the subdistricts with brothel areas. The reduced-form results in Table 4 predict that if there were no brothel areas, the number of trafficked and non-trafficked children would be 90.8% and 82.2% less than the observed data, respectively, and the price would be 9.2% higher. These are comparable with the figures predicted by the gap between the observed data and CF1 (98.9%, 85.1%, and 23.8%).

Panel B shows the impact on children's flow from a district to the subdistricts with brothel areas. The reduced-form dyadic regression results in Table A4 predict that the flows of trafficked and non-trafficked children would be 95.6% and 77.3% less than the observed data, respectively, while the corresponding figures in the simulation results are 98.9% and 85.1%. Finally, Panel C compares the impact on the outflow from the districts with brothel areas. Again, these are comparable. These results suggest that our results in the structural models are unlikely to rely on the set of assumptions.

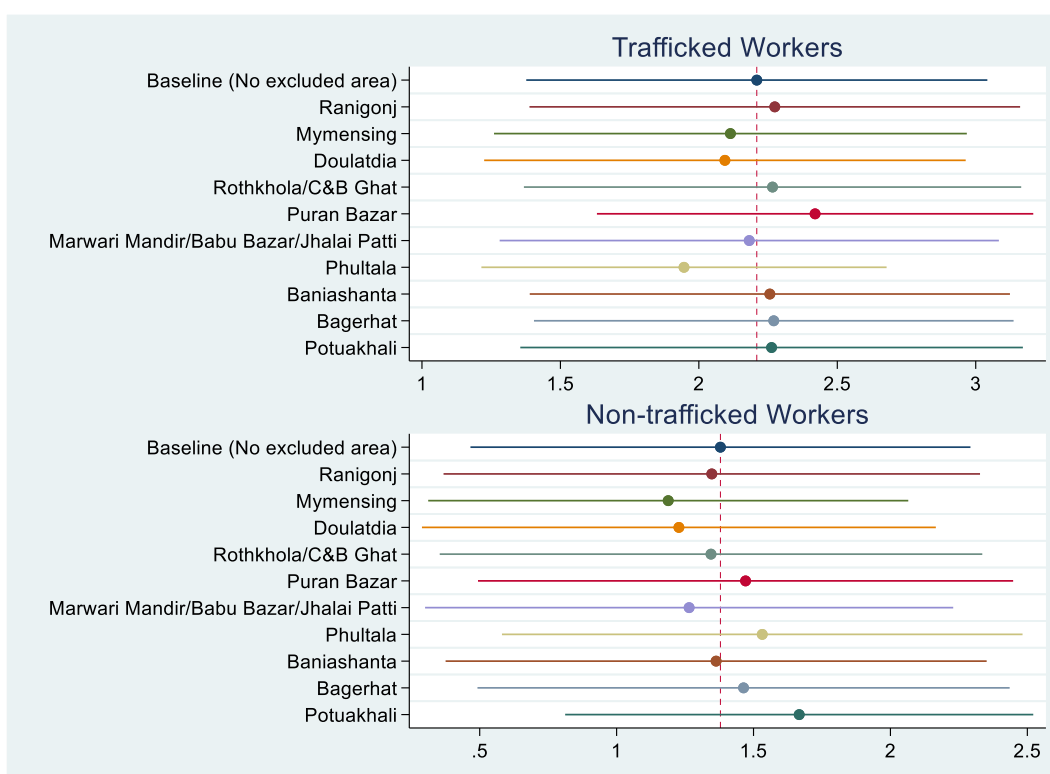
## Appendix Figures and Tables



**Figure A1: Sensitivity Contour Plots of Point Estimates in the Partial R<sup>2</sup> Scale (Prevalence of Trafficked Children and Presence of Brothel Area)**



**Figure A2: Sensitivity Contour Plots of Point Estimates in the Partial R<sup>2</sup> Scale (Prevalence of Non-Trafficked Children and Presence of Brothel Area)**



The OLS coefficients of brothel areas and 95% confidence intervals are reported.

**Figure A3: Leave-One-Out Test**

**Table A1: Urban Population Density as of 1901 and 2001**

Region	# Brothel area	1901	Ranking	2001	Ranking	Growth
Dhaka	1	10.5	1	975.9	1	91.5
Pabna	0	8.5	2	156.4	6	17.5
Mymensingh	2	8.0	3	150.5	7	17.7
Comilla	0	7.4	4	166.8	3	21.4
Faridpur	4	6.8	5	95.4	14	12.9
Kushtia	0	4.4	6	137.7	9	30.2
Barisal	1	4.4	7	113.5	13	24.8
Chittagong	0	3.7	8	527.2	2	140.0
Rajshahi	0	3.3	9	158.7	5	47.5
Jessore	3	3.2	10	121.1	11	36.7
Rangpur	0	3.0	11	120.9	12	39.2
Bogra	0	2.8	12	121.5	10	41.8
Khulna	3	2.4	13	164.1	4	66.9
Sylhet	0	2.0	14	78.6	16	38.1
Dinajpur	0	1.9	15	80.7	15	40.4
Noakhali	0	1.5	16	140.2	8	95.2

The administrative units follow the former districts as of 1947. Chittagong Hill Tracts is not included due to the uniqueness of historical background.

Table A2: Balancing Test: Subdistrict Data

	Coef.	S.E.	R-squared
<b>Prostitution Industry</b>			
Trafficked child sex workers	2.652***	(0.921)	0.072
Non-trafficked child sex workers	1.845*	(1.060)	0.030
Unit price of prostitution	-0.001	(0.418)	0.083
<b>Socio-Economic Characteristics</b>			
Night light intensity	1.350	(1.112)	0.059
Population	0.260	(0.468)	0.003
Sex ratio	1.155	(4.274)	0.032
Paved road (km)	20.886	(93.227)	0.010
Affected households by the 2007 Cyclone (x10 <sup>3</sup> )	0.070	(0.067)	0.011
Rickshaw drivers	1.861	(1.511)	0.015
Movie theaters	1.028	(1.644)	0.004
Religious schools	3.063	(12.257)	0.073
Orphanages	1.293	(7.707)	0.011

The OLS coefficients of subdistricts with a brothel area are reported. The number of sex workers, price, population, and the number of rickshaw drivers are log-transformed. All specifications control for the number of ports in the district. The estimation results are adjusted by the sampling weight. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A3: Balancing Test: the 2006 MICS

		1 if residing in the districts with brothel areas or adjacent districts		
		Coef.	S.E.	Obs.
<hr/>				
Panel A: Girls				
(1)	Experience of child labor (aged 5 to 14)	-0.003	(0.003)	35,632
(2)	Completing primary school (aged 14 to 17)	0.007	(0.006)	12,359
(3)	Completing primary school (aged 18 to 25)	-0.006	(0.005)	20,397
(4)	Time allocation for pre-school children	0.002	(0.003)	16,866
<hr/>				
Panel B: Boys				
(5)	Experience of child labor (aged 5 to 14)	-0.003	(0.004)	36,654
(6)	Completing primary school (aged 14 to 17)	0.030***	(0.008)	11,452
(7)	Completing primary school (aged 18 to 25)	0.003	(0.006)	18,936
(8)	Time allocation for pre-school children	-0.000	(0.003)	17,844
<hr/>				
Panel C: Households				
(9)	Household head completing primary school	0.001	(0.004)	62,318
(10)	Radio	-0.001	(0.004)	62,463
(11)	TV	0.004	(0.004)	62,463
(12)	Mobile phone	-0.001	(0.003)	62,463
(13)	Electricity	-0.004	(0.004)	62,463

The data on child labor were collected from those aged 5 to 14. Outcomes (2), (3), (6), and (7) restrict the sample to the age groups relevant in the supply of child sex workers. The OLS coefficients are reported. All specifications control for the number of ports in the district. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A4: The Impact of Brothel Areas on Prostitution Market (OLS, Entropy Balancing)

	Trafficked workers		Non-trafficked workers		Price	
	OLS (1)	EB (2)	OLS (3)	EB (4)	OLS (5)	EB (6)
Brothel area	2.198*** (0.442)	2.192*** (0.311)	1.157*** (0.351)	1.023*** (0.234)	-0.173* (0.103)	-0.202** (0.081)
Ports	0.018 (0.051)	0.110 (0.070)	0.007 (0.059)	-0.010 (0.060)	-0.046* (0.025)	-0.042* (0.021)
Night light intensity	-0.259* (0.135)	-0.515*** (0.156)	0.042 (0.156)	-0.023 (0.191)	0.010 (0.036)	0.132** (0.062)
Population	0.396 (0.309)	0.263 (0.440)	0.260 (0.369)	0.157 (0.418)	-0.141 (0.092)	-0.071 (0.136)
Sex ratio	0.085** (0.034)	0.107*** (0.035)	0.048* (0.028)	0.034 (0.024)	0.006 (0.010)	-0.003 (0.013)
Paved road (km)	0.002** (0.001)	0.002 (0.002)	0.002** (0.001)	-0.000 (0.002)	-0.000 (0.000)	-0.000 (0.001)
Cyclone-affected HHs	-2.272 (1.599)	-2.640* (1.497)	-5.292*** (1.179)	-3.112** (1.359)	0.766** (0.328)	0.201 (0.328)
Rickshaw drivers	0.350*** (0.071)	0.147 (0.174)	0.179* (0.095)	0.188 (0.121)	0.110*** (0.029)	0.058 (0.052)
Movie theaters	-0.041 (0.052)	-0.047 (0.080)	0.037 (0.050)	0.029 (0.060)	0.014 (0.018)	0.004 (0.025)
Religious schools	-0.011 (0.009)	-0.014 (0.009)	-0.020* (0.010)	-0.024** (0.009)	-0.001 (0.003)	-0.013*** (0.004)
Cyclone-affected HHs in adjacent districts	0.617 (0.994)	0.482 (0.995)	3.445*** (0.927)	0.069 (1.092)	-0.723*** (0.243)	0.001 (0.268)
Constant	-15.184*** (5.247)	-14.011** (5.524)	-7.495 (5.708)	-3.863 (5.091)	5.058*** (1.683)	5.692** (2.267)
R-squared	0.615		0.493		0.250	

OLS coefficients are reported. Standard errors clustered at the district level are in parentheses. The dependent variables, population, and the number of rickshaw drivers are log-transformed to align with the structural model. The estimation results in the even-numbered columns are adjusted by the entropy balancing weight. N=117. \*\*\* p<0.01, \*\* p<0.05, \* p <0.1.

Table A5: The Impact of Brothel Areas on Prostitution Market (Sample Restriction)

	Trafficked workers		Non-trafficked workers		Price	
	(1)	(2)	(3)	(4)	(5)	(6)
Brothel area	2.192*** (0.651)	2.183*** (0.421)	0.625 (0.590)	1.359*** (0.470)	-0.088 (0.138)	-0.096 (0.112)
Ports	0.016 (0.052)	0.026 (0.053)	-0.015 (0.063)	0.004 (0.066)	-0.058* (0.033)	-0.069** (0.030)
Night light intensity	0.069 (0.105)	0.006 (0.112)	0.349*** (0.127)	0.291** (0.139)	-0.003 (0.056)	-0.036 (0.046)
Population	-0.058 (0.259)	0.020 (0.238)	-0.799*** (0.238)	-0.641** (0.269)	-0.100 (0.112)	-0.039 (0.099)
Sex ratio	-0.006 (0.040)	0.011 (0.038)	-0.046 (0.035)	-0.022 (0.034)	0.002 (0.015)	0.012 (0.012)
Paved road (km)	0.003** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.005*** (0.001)	-0.000 (0.001)	-0.001 (0.001)
Cyclone-affected HHs	-0.661 (0.699)	-0.741 (0.818)	-5.838*** (1.104)	-5.729*** (1.100)	1.254** (0.511)	1.184** (0.475)
Rickshaw drivers	0.185*** (0.065)	0.233*** (0.062)	-0.018 (0.093)	0.036 (0.093)	0.090** (0.035)	0.082** (0.036)
Movie theaters	0.042 (0.082)	0.064 (0.083)	0.105 (0.081)	0.152* (0.083)	0.025 (0.038)	0.002 (0.030)
Religious schools	-0.008 (0.008)	-0.011 (0.008)	-0.013 (0.010)	-0.016 (0.011)	-0.000 (0.005)	0.002 (0.004)
Cyclone-affected HHs in adjacent districts	-0.642 (0.549)	-0.510 (0.600)	4.277*** (0.888)	4.256*** (0.911)	-1.050*** (0.298)	-0.977*** (0.298)
Constant	0.609 (5.846)	-2.457 (5.088)	15.902*** (4.562)	11.153** (4.585)	5.088** (2.471)	3.405* (1.943)
Observations	90	111	90	111	90	111
Excluded sample	Cities	Closed brothels in the district	Cities	Closed brothels in the district	Cities	Closed brothels in the district
R-squared	0.260	0.335	0.334	0.328	0.226	0.250

OLS coefficients are reported. Standard errors clustered at the district level are in parentheses. The dependent variables, population, and the number of rickshaw drivers are log-transformed. The estimation results are adjusted by the sampling weight. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A6: Robustness Tests for Demand Function (Sample Restriction)

	(1)	(2)
Price	-5.760** (2.305)	-6.125** (2.647)
Brothel area in d	1.104* (0.649)	1.576** (0.664)
Ports in d	-0.347 (0.267)	-0.409 (0.315)
Night light intensity	0.433 (0.360)	0.177 (0.373)
Population	-2.088*** (0.642)	-1.580*** (0.582)
Sex ratio	-0.069 (0.092)	0.017 (0.103)
Paved road (km)	0.005 (0.004)	0.004 (0.004)
Cyclone-affected HHs	-0.430 (2.769)	-0.165 (2.853)
Rickshaw drivers	0.585** (0.250)	0.637** (0.266)
Movie theaters	0.475** (0.220)	0.398* (0.234)
Religious schools	-0.020 (0.027)	-0.013 (0.030)
Constant	58.655*** (16.348)	45.077*** (12.832)
Observations	90	111
Excluded sample	Cities	Closed brothels in the district
Kleibergen-Paap Wald F statistic	12.22	10.39

The coefficients are reported. Standard errors are clustered at the district level. The dependent variables, price, population, and the number of rickshaw drivers are log-transformed. The estimation results are adjusted by the sampling weight. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A7: Robustness Tests for Supply Function (Sample Restriction)

	Trafficked workers				Non-trafficked workers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Price	6.096** (2.792)	8.328** (3.592)	6.602** (2.619)	9.102** (3.688)	2.059* (1.195)	3.645* (1.893)	2.883** (1.355)	4.542** (2.038)
Same district	3.898*** (0.646)	4.441*** (0.665)	4.439*** (0.675)		4.394*** (0.536)	4.616*** (0.553)	4.552*** (0.553)	
Adjacent district	0.746 (0.520)	0.870 (0.556)	0.852 (0.527)		0.958** (0.434)	0.944** (0.386)	0.906** (0.386)	
Distance	-0.017*** (0.004)	-0.016*** (0.004)	-0.015*** (0.003)	-0.023*** (0.007)	-0.008*** (0.003)	-0.009*** (0.003)	-0.010*** (0.003)	-0.015*** (0.004)
Brothel area in d	4.983*** (1.239)	3.753*** (1.082)	3.665*** (0.907)	5.856*** (1.382)	1.663*** (0.495)	1.905*** (0.442)	1.880*** (0.413)	2.738*** (0.758)
Ports in d	0.124 (0.281)	0.351 (0.316)	0.143 (0.251)	-0.047 (0.414)	-0.061 (0.124)	0.060 (0.163)	0.000 (0.124)	-0.075 (0.243)
Night light intensity in d	0.221 (0.400)	0.007 (0.419)	-0.002 (0.344)	-0.321 (0.471)	-0.001 (0.165)	-0.133 (0.207)	-0.174 (0.160)	-0.394* (0.232)
Population in d	-0.043 (0.764)	0.028 (0.912)	0.387 (0.799)	0.481 (1.304)	-0.435 (0.290)	-0.078 (0.488)	0.195 (0.426)	1.052* (0.609)
Sex ratio in d	0.089 (0.105)	0.066 (0.102)	0.096 (0.081)	0.181 (0.117)	0.020 (0.045)	0.050 (0.056)	0.082* (0.044)	0.146** (0.061)
Paved road (km) in d	0.005 (0.003)	0.007 (0.005)	0.003 (0.003)	0.004 (0.005)	0.002 (0.002)	0.004* (0.002)	0.002 (0.002)	-0.001 (0.002)
Cyclone-affected HHs in d	-6.768 (4.222)	-2.429 (4.332)	-2.558 (3.749)	-1.410 (4.865)	-0.053 (1.849)	-0.067 (2.511)	-0.661 (2.457)	1.766 (2.907)
Brothel area in h	1.076*** (0.377)	1.048*** (0.371)	1.048*** (0.341)	2.627*** (0.930)	0.235 (0.242)	0.259 (0.250)	0.279 (0.244)	0.573 (0.387)
Ports in h	0.185 (0.115)	0.169* (0.095)	0.183** (0.085)	0.327 (0.222)	0.139** (0.057)	0.145*** (0.056)	0.147*** (0.056)	0.236*** (0.086)
Cyclone-affected HHs in h	-9.065	-3.930**	-3.236*	-6.056*	-2.230*	-1.206	-1.015	-1.800

	(5.893)	(1.915)	(1.663)	(3.359)	(1.246)	(0.992)	(0.921)	(1.640)
Cyclone-affected HHs in $h$ x same district	4.791 (7.900)	-3.391 (4.716)	-3.991 (4.406)		3.329** (1.465)	3.113* (1.651)	3.743* (2.042)	
Cyclone-affected HHs in $h$ x adjacent	8.806 (5.448)	6.450** (3.277)	5.252* (2.696)		-5.436 (4.012)	-2.486 (3.216)	-2.528 (2.786)	
Night light intensity in $h$	-0.706*** (0.240)	-0.494*** (0.184)	-0.518*** (0.174)	-1.207* (0.676)	-0.084 (0.144)	-0.050 (0.134)	-0.053 (0.125)	0.104 (0.224)
Orphanages in $h$	-0.003 (0.003)	-0.001 (0.003)	0.000 (0.003)	0.010* (0.006)	0.002 (0.002)	0.002 (0.002)	0.001 (0.003)	0.007*** (0.002)
Constant	-41.777** (20.894)	-51.910*** (18.280)	-50.918*** (15.464)	-77.088*** (24.175)	-9.821 (8.305)	-25.096** (10.866)	-27.849*** (8.827)	-54.540*** (12.295)
Observations	5,760	7,104	7,137	6,885	5,760	7,104	7,137	6,885
Excluded sample	Subdistrict $d$ is city	Closed brothels in the district of $d$	Closed brothels in district $h$	$h$ and $d$ in the same or adjacent district	Subdistrict $d$ is city	Closed brothels in the district of $d$	Closed brothels in district $h$	$h$ and $d$ in the same or adjacent district

The coefficients of IV-tobit models are reported. Standard errors are two-way clustered at the levels of destination subdistrict and home district. The dependent variables, price, and population are log-transformed. The estimation results are adjusted by the sampling weight.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A8: Robustness of Supply Function to Specification Errors

Transformation of Dep. Var.: Model:	Price	Trafficked workers			Non-trafficked workers		
	Log	Log	IHS	Log	Log	IHS	Log
	Linear	IV-Tobit	IV-Tobit	IV-Poisson	IV-Tobit	IV-Tobit	IV-Poisson
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(Price)		6.544** (2.601)	8.101** (3.232)	2.858*** (0.470)	2.875** (1.332)	3.571** (1.662)	1.424*** (0.471)
Log(Rickshaw drivers) in d	0.095*** (0.036)						
Same district	0.099** (0.048)	4.611*** (0.677)	5.550*** (0.757)	2.562*** (0.412)	4.651*** (0.520)	5.696*** (0.643)	3.196*** (0.346)
Adjacent district	0.126*** (0.041)	1.106* (0.610)	1.063* (0.625)	0.604 (0.395)	0.827** (0.405)	1.111** (0.469)	0.897*** (0.299)
Distance	0.000** (0.000)	-0.015*** (0.004)	-0.019*** (0.004)	-0.012*** (0.002)	-0.009*** (0.003)	-0.012*** (0.003)	-0.011*** (0.002)
Brothel area in d	-0.127 (0.111)	3.712*** (0.923)	4.491*** (1.133)	1.894*** (0.380)	1.857*** (0.390)	2.282*** (0.485)	1.274*** (0.239)
Ports in d	-0.064** (0.026)	0.153 (0.249)	0.190 (0.306)	-0.054 (0.083)	-0.013 (0.122)	-0.011 (0.154)	-0.101* (0.059)
Night light intensity in d	-0.006 (0.050)	-0.016 (0.342)	0.003 (0.421)	-0.003 (0.104)	-0.168 (0.156)	-0.205 (0.196)	-0.003 (0.073)
Log(Population) in d	-0.094 (0.115)	0.392 (0.794)	0.469 (0.976)	0.981*** (0.278)	0.184 (0.420)	0.210 (0.521)	0.236 (0.278)
Sex ratio in d	0.006 (0.012)	0.098 (0.079)	0.121 (0.098)	0.065*** (0.024)	0.079* (0.042)	0.096* (0.052)	0.054*** (0.018)
Paved road (km) in d	-0.000 (0.001)	0.003 (0.003)	0.003 (0.004)	-0.000 (0.001)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)
Cyclone-affected HHs in d	-0.057 (0.589)	-2.506 (3.696)	-3.075 (4.564)	-0.738 (1.269)	-0.080 (2.217)	-0.080 (2.773)	-1.002 (1.285)
Brothel area in h	0.022**	1.494***	1.336***	0.681**	0.345	0.358	-0.013

	(0.009)	(0.578)	(0.427)	(0.293)	(0.297)	(0.300)	(0.166)
Brothel area in h x same district	0.074	-0.778			-0.715		
	(0.097)	(1.092)			(0.561)		
Brothel area in h x adjacent	-0.149*	-1.427			0.388		
	(0.079)	(1.122)			(0.642)		
Ports in h	0.001	0.180**	0.222**	0.172***	0.146**	0.179***	0.161***
	(0.001)	(0.089)	(0.108)	(0.059)	(0.057)	(0.068)	(0.045)
Cyclone-affected HHs in h	0.019	-3.278*	-3.700*	-0.667	-1.118	-1.359	-0.030
	(0.021)	(1.765)	(2.004)	(1.122)	(0.933)	(1.131)	(0.890)
Cyclone-affected HHs in h x same district	-0.216	-3.721	-5.293	-0.488	3.767**	3.797*	2.207
	(0.448)	(4.249)	(5.211)	(2.196)	(1.575)	(2.041)	(1.647)
Cyclone-affected HHs in h x adjacent	-0.652***	5.974**	6.340*	4.034**	-2.827	-3.459	-2.169
	(0.243)	(2.840)	(3.243)	(1.940)	(2.752)	(3.584)	(3.121)
Night light intensity in h	-0.008**	-0.517***	-0.637***	-0.329**	-0.075	-0.098	-0.152
	(0.003)	(0.175)	(0.220)	(0.153)	(0.126)	(0.157)	(0.126)
Orphanages in h	-0.000	-0.001	-0.001	-0.002	0.002	0.002	-0.001
	(0.000)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)
Constant	4.470**	-50.962***	-62.629***	-37.891***	-27.369***	-33.596***	-19.071***
	(1.985)	(15.148)	(18.682)	(5.888)	(8.466)	(10.457)	(4.846)

Standard errors are two-way clustered at the levels of destination subdistrict and home district in the linear and IV-Tobit models. IHS stands for the Inverse Hyperbolic Sine Transformation. Robust standard errors are reported in the IV-Poisson models. The estimation results are adjusted by the sampling weight. N=7488. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A9: Reduced-Form Dyadic Regression Results

Transformation of Dep. Var.: 1[workers>0]	Trafficked workers			Non-trafficked workers		
	1[workers>0]	Log	IHS	1[workers>0]	Log	IHS
	(1)	(2)	(3)	(4)	(5)	(6)
Same district	0.371*** (0.054)	5.262*** (0.601)	6.560*** (0.734)	0.714*** (0.052)	4.867*** (0.489)	6.059*** (0.598)
Adjacent district	0.027*** (0.009)	1.564*** (0.424)	1.949*** (0.523)	0.053*** (0.016)	1.199*** (0.360)	1.499*** (0.450)
Distance	-0.000 (0.000)	-0.012*** (0.003)	-0.015*** (0.004)	-0.000** (0.000)	-0.008*** (0.002)	-0.010*** (0.003)
Brothel area in d	0.061*** (0.017)	2.909*** (0.744)	3.623*** (0.922)	0.040*** (0.012)	1.371*** (0.298)	1.709*** (0.369)
Ports in d	-0.000 (0.001)	-0.209 (0.143)	-0.260 (0.177)	-0.001 (0.001)	-0.157** (0.069)	-0.196** (0.086)
Night light intensity in d	-0.002 (0.002)	-0.129 (0.235)	-0.152 (0.290)	-0.004* (0.002)	-0.122 (0.146)	-0.152 (0.181)
Log(Population) in d	-0.002 (0.005)	-0.050 (0.648)	-0.085 (0.800)	-0.006 (0.005)	-0.018 (0.367)	-0.026 (0.454)
Sex ratio in d	0.001** (0.000)	0.145*** (0.052)	0.178*** (0.064)	0.001** (0.001)	0.073** (0.034)	0.090** (0.041)
Paved road (km) in d	0.000*** (0.000)	0.005** (0.002)	0.006** (0.003)	0.000*** (0.000)	0.002 (0.001)	0.002 (0.002)
Cyclone-affected HHs in d	0.004 (0.016)	-3.167 (2.865)	-3.956 (3.549)	0.005 (0.017)	-0.281 (1.755)	-0.352 (2.188)
Log(Rickshaw drivers) in d	0.004*** (0.001)	0.663*** (0.117)	0.824*** (0.145)	0.003*** (0.001)	0.251*** (0.064)	0.314*** (0.079)
Movie theaters in d	0.005** (0.002)	-0.091 (0.089)	-0.113 (0.110)	0.006*** (0.002)	0.052 (0.056)	0.063 (0.070)
Religious school in d	-0.000	-0.026* (0.012)	-0.032* (0.015)	-0.000	-0.020* (0.010)	-0.025* (0.012)

	(0.000)	(0.015)	(0.019)	(0.000)	(0.012)	(0.015)
Brothel area in h	0.008***	1.204***	1.496***	0.006	0.310	0.389
	(0.002)	(0.333)	(0.413)	(0.004)	(0.228)	(0.282)
Ports in h	0.000	0.178*	0.220*	0.001	0.143***	0.179***
	(0.001)	(0.089)	(0.112)	(0.001)	(0.050)	(0.062)
Cyclone-affected HHs in h	-0.010**	-3.037*	-3.776*	-0.008	-1.069	-1.351
	(0.004)	(1.668)	(2.084)	(0.007)	(0.885)	(1.098)
Cyclone-affected HHs x same district	-0.702**	-5.652	-7.040	0.987***	2.909	3.721
	(0.345)	(5.097)	(6.331)	(0.275)	(1.985)	(2.463)
Cyclone-affected HHs x adjacent	-0.025	0.786	0.961	-0.133**	-4.833*	-6.104*
	(0.029)	(1.654)	(2.063)	(0.050)	(2.723)	(3.422)
Night light intensity in h	-0.002*	-0.536***	-0.672***	-0.001	-0.088	-0.117
	(0.001)	(0.166)	(0.209)	(0.001)	(0.116)	(0.144)
Orphanages in h	0.000	-0.001	-0.001	0.000	0.002	0.002
	(0.000)	(0.003)	(0.003)	(0.000)	(0.001)	(0.002)
Constant	-0.137	-25.082**	-30.742**	-0.091	-12.739*	-15.806*
	(0.082)	(11.374)	(13.939)	(0.095)	(7.051)	(8.668)
R-squared	0.230			0.451		

OLS coefficients are reported in Columns (1) and (4). Tobit coefficients are reported in the other columns. IHS stands for the Inverse Hyperbolic Sine Transformation. Standard errors are two-way clustered at the levels of destination subdistrict and home district. The estimation results are adjusted by the sampling weight. N=7488. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A10: Tests for Model Assumptions

	Freq. of child prostitution / week (1)	Trafficked workers (2)	Non-trafficked workers (3)
Price	-6.14** (2.44)	6.92** (2.76)	3.00** (1.45)
Weighted average of rickshaw drivers in districts other than <i>d</i>	5.24 (13.68)		
Weighted average of rickshaw drivers in districts other than <i>h</i> or <i>d</i>		8.51 (7.81)	0.78 (4.37)
Observations	117	7,488	7,488

Column (1) reports the 2SLS, and (2) and (3) report the IV-tobit coefficients, respectively. Standard errors in Column (1) are clustered at the district level, and Columns (2) and (3) are two-way clustered at the levels of destination subdistrict and home district, respectively. The dependent variables, price, and weighted number of rickshaw drivers are log-transformed. The estimation results are adjusted by the sampling weight. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A11: Price of Child Prostitution

	(1)	(2)	(3)	(4)
Age			-0.531 (1.748)	-0.833 (1.451)
Age of starting prostitution			3.233*** (0.884)	3.634*** (0.942)
Years of schooling			2.784** (1.163)	2.774** (1.142)
Never married			-0.793 (8.158)	-1.146 (7.678)
Married			8.997* (5.034)	9.240* (5.169)
Working in the home district		17.303 (17.247)		16.587 (16.260)
Working in the adjacent district		-1.219 (11.841)		-2.925 (11.727)
Distance between home and working districts		0.014 (0.083)		-0.002 (0.079)
Subdistrict FE	Yes	Yes	Yes	Yes
R-squared	0.458	0.462	0.472	0.477

The OLS coefficients are reported. Standard errors are clustered at the subdistrict level. The estimation results are adjusted by the sampling weight. N=1413. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A12: Simulation Results: Removing Procurement-Cost Effects in CF2 and CF2'

	CF1	CF2		CF2'		Actual	
	No brothels	Brothels with screening out T & NT		Brothels with screening out T		Brothels with poor screening	
<b>A. By subdistrict type</b>							
<i>With brothels</i>							
Trafficked	5 (0, 63)	20 (0, 189)	*	2 (0, 41)	**	462	**
Non-trafficked	75 (35, 153)	151 (66, 332)	**	617 (543, 736)	**	503	**
Total child sex workers	80 (43, 174)	170 (90, 427)	**	620 (551, 748)	**	965	**
Price	110.1 (96.4, 130.2)	120.9 (107.5, 148.3)	**	96.5 (93.8, 104.1)	**	89.0	**
<i>Without brothels</i>							
Trafficked	5185 (4927, 5532)	5121 (4909, 5413)	**	5121 (4909, 5413)	**	5,701	**
Non-trafficked	9703 (9439, 10023)	9969 (9874, 10093)	*	9969 (9874, 10093)	*	9,840	**
Total child sex workers	14887 (14572, 15278)	15091 (14904, 15368)	*	15091 (14904, 15368)	*	15541	**
Price	94.6 (94.0, 95.6)	94.0 (93.8, 94.4)	**	94.0 (93.8, 94.4)	**	93.6	**
<b>B. Total</b>							
Trafficked	5190 (4942, 5561)	5141 (4923, 5554)	**	5124 (4916, 5435)	**	6,163	**
Non-trafficked	9778 (9504, 10104)	10120 (9965, 10391)	**	10587 (10425, 10825)	**	10,343	**
Total child sex workers	14967 (14651, 15389)	15261 (15038, 15735)	**	15710 (15479, 16072)	**	16506	**
Price	94.8 (94.1, 95.9)	94.4 (94.0, 95.1)	**	94.1 (93.8, 94.5)	**	93.5	**

The numbers in parentheses represent the 5th and 95th percentiles obtained from simulations repeated 1,000 times by generating parameter values based on the variance-covariance matrices of the model parameter estimates. Note that 30 of the 1,000 iterations are excluded before calculating the percentiles because at least one of the price coefficients has the unexpected sign (i.e., positive for demand or negative for supply). \* and \*\* indicate that the difference from CF1 is significant at the 90 and 95 percent level, respectively.

Table A13: Comparison between the Reduced-Form and Structural Model Analyses

	Reduced-form estimation			Simulation		
	Coef. of the brothel dummy	S.E.	Net effects	Actual	CF1	Net effects
Panel A: Impact on the prevalence of child sex workers						
Trafficked	2.39	0.40	<b>-90.8%</b> (-95.2%, -82.2%)	42.0	0.5	<b>-98.9%</b> (-100.0%, -86.4%)
Non-trafficked	1.72	0.48	<b>-82.2%</b> (-91.9%, -60.7%)	45.8	6.8	<b>-85.1%</b> (-93.1%, -69.6%)
Price	-0.09	0.10	<b>9.2%</b> (-7.4%, 28.7%)	89.0	110.1	<b>23.8%</b> (8.4%, 46.4%)
Panel B: Impact on children's flow from each district to the subdistricts with brothel areas						
Trafficked	3.11	0.81	<b>-95.6%</b> (-98.8%, -83.2%)	0.66	0.007	<b>-98.9%</b> (-100.0%, -86.4%)
Non-trafficked	1.48	0.35	<b>-77.3%</b> (-87.2%, -59.6%)	0.72	0.11	<b>-85.1%</b> (-93.1%, -69.6%)
Panel C: Impact on children's flow from the districts with brothel areas to each district						
Trafficked	1.22	0.39	<b>-70.3%</b> (-84.4%, -43.5%)	0.98	0.25	<b>-74.6%</b> (-86.5%, -53.3%)
Non-trafficked	0.34	0.23	<b>-29.1%</b> (-51.8%, 4.2%)	1.21	0.72	<b>-40.3%</b> (-53.8%, -22.8%)

Notes: Panel A compares the impact for the subdistricts with brothel areas based on the results of Tables 4 and 8. Panels B and C compare the results based on Tables A9 and 8. Since the dependent variables of the reduced-form estimations are  $\ln(\#workers)$  and  $\ln(price)$ , the effect of brothels is calculated as  $1/\exp(\text{the coefficient}) - 1$ . The numbers in parentheses in the simulation results represent the 5th and 95th percentiles obtained from simulations repeated 1,000 times by generating parameter values based on the variance-covariance matrices of the model parameter estimates. Note that 30 of the 1,000 iterations are excluded before calculating the percentiles because at least one of the price coefficients has the unexpected sign (i.e., positive for demand or negative for supply).