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Prostitutes *and* Brides?

By Raj Arunachalam and Manisha Shah*

In a seminal paper, Lena Edlund and Evelyn Korn (2002) introduce a puzzling stylized fact—that prostitution is "low-skilled, labor intensive, female, and well paid''—and offer a provocative explanation: sex workers draw a compensating differential due to the foregone opportunity to "sell'' their fertility in the marriage market. In so doing, they not only provide the first formal model of occupational choice involving prostitution, they also draw an intriguing link between the labor market and the marriage market that holds for only one occupation. When a woman chooses to become a sex worker, she relinquishes the compensation she would otherwise receive in marriage, since taboos prevent prostitutes from marrying. Thus, even in settings where prostitution is legal, it must draw an earnings premium.

Beyond drawing considerable media attention, the richness of the Edlund-Korn model has made it the starting point for economists' discussions of sex work (e.g., Marina Della Giusta, Maria Laura Di Tommaso, and Steinar Strøm forthcoming). An especially attractive feature of the paper is that it generates a number of testable predictions. To date, however, these predictions have resisted empirical testing due to paucity of data on sex workers. We utilize two large-sample datasets on sex workers, collected in Ecuador and Mexico, which we match to national labor survey data.[1] We corroborate the existence of a sizable earnings premium for sex work, but fail to find support for the marriage-based explanation for this premium. Sex workers are actually *more* likely to be married than non-sex workers at younger ages—when the earnings premium for sex work is highest. Furthermore, we find that the premium to male sex work is even larger than that for women. We hypothesize that the earnings premium may be better explained as a compensating differential, akin to that observed in other risky professions.

I. Data

The data used in this study, as well as the methods of collection, are described in detail in Paul Gertler, Shah, and Stefano M. Bertozzi (2005), Shah (2006), and Gertler and Shah (2007). Approximately 3,000 female sex workers from Ecuador and 1,100 from Mexico were interviewed. To compare earnings and marriage rates to non-sex workers, we use data from the 2003 National Employment, Unemployment and Underemployment Survey (ENEMDU) and the 2000 National Urban Employment Survey (ENEU), from Ecuador and Mexico, respectively. We restrict our samples from these surveys to include only working women of the same age and regional categories as our sex workers. The detailed occupational information in the Ecuador survey also allows us to identify a subsample of workers that is arguably most similar to sex workers: domestic workers (maids) and informal sector workers.[2]

II. Empirical Evidence of Earnings Premium

Edlund and Korn (2002) offer ample evidence from around the world that female sex workers enjoy higher earnings than other workers. Our data corroborate this claim, but we find a much lower premium—controlling

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[1] To our knowledge, these are the only large-sample datasets that allow direct comparisons between sex workers and non-sex workers in a setting where sex work is legal.

[2] In focus groups, sex workers typically reported that their most likely job alternative was domestic work; furthermore, the education distribution of domestic workers closely approximates that of sex workers.

TABLE 1—EARNINGS PREMIUM FOR SEX WORK (OLS)

	Ecuador (1)	Ecuador (2)	Ecuador (3)	Ecuador (4)	Ecuador (5)	Ecuador (6)	Mexico (7)	Mexico (8)
	All female	All female	Domestic female	Domestic female	All male	All male	All female	All female
Sex worker(=1)	0.29	−0.46	0.31	−0.35	0.58	0.48	0.28	−1.19
	(0.07)***	(0.23)**	(0.08)***	(0.26)	(0.05)***	(0.06)***	(0.04)***	(0.29)***
Age 12–17(=1)	−0.27	−0.41	−0.07	−0.17	−0.9	−0.94	0.03	−0.18
	(0.2)	(0.26)	(0.23)	(0.32)	(0.08)***	(0.08)***	(0.11)	(0.11)
Age 18–23(=1)	0.18	−0.22	0.34	−0.19	−0.43	−0.44	0.06	−0.19
	(0.1)*	(0.14)	(0.13)***	(0.19)	(0.05)***	(0.05)***	(0.07)	(0.08)**
Age 24–29(=1)	0.05	−0.21	0.2	−0.13	−0.25	−0.26	−0.15	−0.23
	(0.1)	(0.13)	(0.13)	(0.2)	(0.05)***	(0.05)***	(0.07)**	(0.08)***
Age 30–35(=1)	−0.01	−0.02	0.08	0.05	−0.16	−0.16	−0.1	−0.11
	(0.11)	(0.13)	(0.14)	(0.19)	(0.05)***	(0.05)***	(0.07)	(0.08)
Age 36–41(=1)	−0.02	−0.06	0.04	−0.1	−0.16	−0.15	−0.04	0.03
	(0.11)	(0.14)	(0.14)	(0.19)	(0.05)***	(0.05)***	(0.07)	(0.08)
Age 42–47(=1)	−0.002	0.09	0.007	0.11	−0.01	−0.003	−0.08	−0.01
	(0.12)	(0.14)	(0.15)	(0.2)	(0.06)	(0.06)	(0.08)	(0.08)
Sex worker × Age12–17(=1)		0.82		0.59		0.32		2.27
		(0.43)*		(0.48)		(0.51)		(0.36)***
Sex worker × Age18–23(=1)		1.14		1.12		0.19		1.93
		(0.26)***		(0.31)***		(0.48)		(0.3)***
Sex worker × Age 24–29(=1)		0.96		0.89		0.14		1.54
		(0.26)***		(0.31)***		(0.49)		(0.3)***
Sex worker × Age 30–35(=1)		0.59		0.52		0.01		1.33
		(0.26)**		(0.31)*		(0.5)		(0.31)***
Sex worker × Age 36–41(=1)		0.62		0.67		−0.27		0.84
		(0.27)**		(0.32)**		(0.55)		(0.31)***
Sex worker × Age 42–47(=1)		0.21		0.19		−0.4		0.58
		(0.29)		(0.34)		(0.56)		(0.34)*
Constant	3.02	3.16	2.92	3.07	3.26	3.25	7.29	7.36
	(0.15)***	(0.16)***	(0.18)***	(0.18)***	(0.11)***	(0.11)***	(0.07)***	(0.07)***
F statistic	9.04	8.35	7.1	6.25	40.5	29.87	5.99	11.72
Observations	4,654	4,654	3,802	3,802	3,893	3,893	3,280	3,280
Mean log earnings (sex worker)	3.50	3.50	3.50	3.50	3.95	3.95	7.48	7.48
Mean log earnings (non-sex worker)	3.45	3.45	3.21	3.21	3.70	3.70	7.23	7.23

Notes: We report OLS regression results where the dependent variable is log of weekly earnings in US dollars for Ecuador and log of weekly earnings in pesos for Mexico. Other controls not shown in the table but included in all regressions are city level dummies and education dummies (no school, primary, secondary, high school, university and/or more). The omitted age category is "48 and up."

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

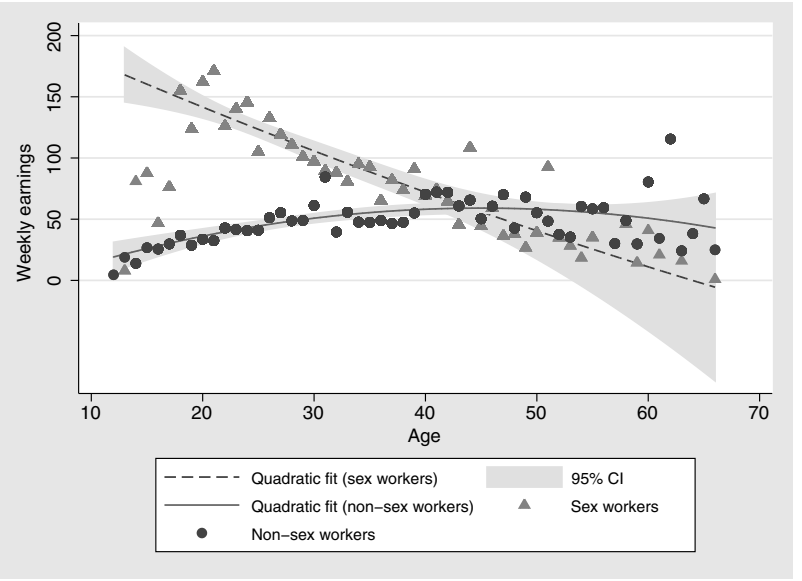

FIGURE 1. WEEKLY EARNINGS OF FEMALE WORKERS IN ECUADOR (US DOLLARS)

for characteristics, we find an earnings premium of 32 to 37 percent in both Ecuador and Mexico. Table 1 reports an OLS regression of log weekly earnings (using log hourly earnings yields qualitatively similar results). In column (1) we include earnings from sex workers and non-sex workers in Ecuador controlling for education and city fixed effects, where the coefficient on the "Sex Worker'' dummy indicates an earnings premium of 33 percent.[3] Column (3) repeats the exercise, where only domestic and informal sector non-sex workers are included. Column (7) displays the result for Mexico with a similar finding.[4]

A central claim in the literature on sex work is that younger women enjoy a greater premium relative to their non–sex worker counterparts in the labor market. Figure 1 plots weekly earnings (in dollars) of sex workers and non-sex workers in Ecuador. Even without controlling for characteristics, we see that young sex workers earn much more than young non-sex workers, but this premium declines with age and disappears around age 40 (the plots are qualitatively similar for the other subsamples but are not shown in this paper). The regression results display the same pattern. Columns (2), (4), and (8) of Table 1 include age categories interacted with the sex worker dummy, for all women in Ecuador, for domestic workers, and for Mexico, respectively. We find that in all cases, the earnings premium to sex work declines with age. In Ecuador, the premium is highest for the 18–23 age category, while for Mexico the premium is highest for the youngest in the sample (age 12–17).

[3] Since the specification is semi-log, the percentage change is approximated by $\exp(\beta)-1$ (Robert Halvorsen and Raymond Palmquist 1980).

[4] In this paper, we do not control for selection into sex work based on unobservable characteristics in any of the regressions. While the data do not allow a clean method of dealing with this issue, in results available from the authors we reproduce columns (1)–(4) and (7)–(8) of Table 1 using a method similar to Lung-Fei Lee (1978). Motivated by the observation that sex work thrives in settings where the sex ratio is highly skewed toward males (Dennis A. Ahlburg and Eric R. Jensen 1998), we include city sex ratio in the selection equation. Using this procedure, the estimated earnings premium in Ecuador is larger (between 40 and 60 percent) and continues to decline with age, while the estimates for Mexico shrink to 2 percent.

Table 2—Percent Married by Age Bracket

Age	Sex workers (Ecuador)	Non-sex workers (Ecuador)	Domestic workers (Ecuador)	Sex workers (Mexico)	Non-sex workers (Mexico)
Age 12–17	33.3	2.0	2.5	10.0	5.3
Age 18–23	28.5	18.0	22.8	15.4	15.0
Age 24–29	32.7	39.1	54.1	26.3	36.3
Age 30–35	29.1	48.7	57.1	21.8	48.8
Age 36–41	26.1	59.6	57.2	18.6	53.8
Age 42–47	23.4	59.8	55.2	13.3	52.1
Age 48 & up	25.3	51.7	53.3	6.3	45.5
All	29.3	44.8	48.4	20.0	39.0
Observations	2,925	1,872	1,020	1,083	2,607

Notes: We report the percent married for sex workers and non-sex workers by age bracket. We include an additional category of "domestic workers." This category comprises women who work as maids or in the informal sector, a subsample of workers that is arguably most similar to sex workers.

III. Prostitutes *and* Brides?

We now turn to the central assumption of the Edlund-Korn hypothesis: that prostitutes cannot marry. Taken literally, this is far from the case; Table 2 indicates that approximately 29 percent of sex workers in Ecuador are married, and in Mexico the figure is 20 percent.[5] When compared with non-sex workers, prostitutes indeed have lower marriage rates, but the difference is not great. On average, approximately 45 percent of non-sex workers in Ecuador are married, and 39 percent in Mexico.

When we examine marriage rates by age category, an even more striking pattern emerges. Figure 2 plots marriage rates by age of sex workers and non-sex workers in Ecuador. Taken together with Figure 1, we see that sex workers are more likely to be married than non-sex workers at younger ages, which is precisely where the earnings premium is the highest. Table 2 displays the same pattern, reporting marriage rates by age brackets.[6]

This central finding holds even as we control for characteristics. Table 3 reports probit regressions where the dependent variable indicates the respondent is married and the reported coefficients are marginal effects. Columns (1) and (5) illustrate that controlling for age, education, and city fixed effects, sex workers are 12 percentage points less likely to be married in Ecuador and 15 percentage points less likely in Mexico. In columns (2) and (6), we interact sex work with age categories, and find again that at younger ages, sex workers are more likely to be married than non-sex workers in both countries. From ages 30 and up, the interaction terms between sex worker and age are not significant in either country. Columns (3) and (4) of Table 3 report the same results for domestic and informal sector workers, where the pattern once again holds.

The earnings regressions in Table 1 and the marriage probits in Table 3 contradict the Edlund-Korn claim that the earnings premium to prostitution is driven by foregone marriage opportunities. Not only are a substantial fraction of sex workers married, but where the earnings premium is at its peak, prostitutes are actually *more* likely to be married than other women.

[5] Other studies have found even higher marriage rates. Data collected by Rakhi Dandona et al. (2006) in 2004 on sex workers from Andhra Pradesh, India, shows that 40.6 percent are married, while 16.8 percent are single; 28.9 percent separated; 1.8 percent divorced; and 11.9 percent widowed (our calculations).

[6] In Latin America, a substantial fraction of couples live in "civil union'' without formally marrying. We code such sex workers as non-married. If we use the more expansive definition, the gap between overall marriage rates of sex workers and non-sex workers disappears in Ecuador (47.5 percent of Ecuadorian sex workers are married or in civil union relationships as compared to 45 percent of non-sex workers) and shrinks in Mexico (26 percent of Mexican sex workers are married or in civil union relationships as compared to 43 percent of non-sex workers), while the pattern of young sex workers being married at higher rates than non-sex workers still holds.

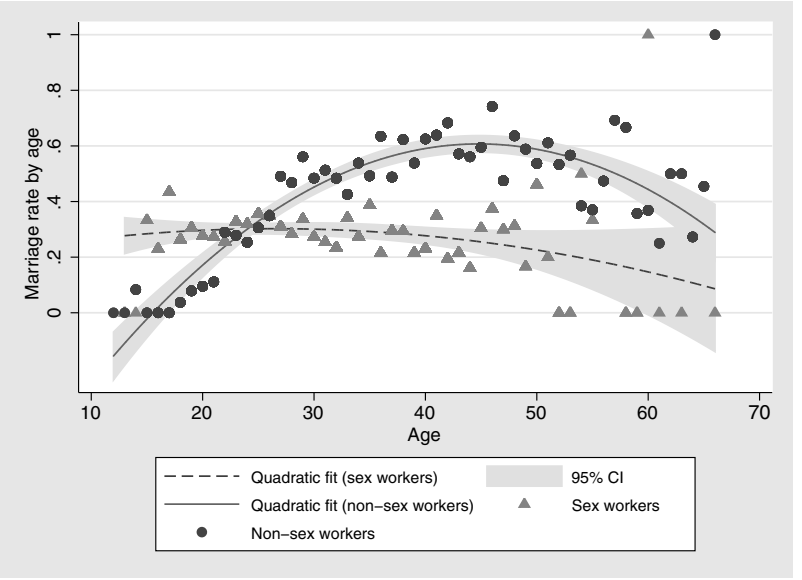

FIGURE 2. MARRIAGE RATES OF FEMALE WORKERS IN ECUADOR

IV. Evidence from Male Sex Workers

The Edlund-Korn account rests on a fundamental biological asymmetry between men and women: the uncertainty of paternity. To secure custodial rights over children, in equilibrium men must compensate women within marriage; thus, women must be compensated to forego marriage for prostitution. As Edlund and Korn point out, this logic implies a testable prediction: male sex workers should not enjoy an earnings premium relative to their counterparts in the labor market. We use an additional dataset of 750 male sex workers (whose clients are almost always men) to test this claim.[7] Columns (5) and (6) of Table 1 report regression results for men's earnings. In column (5), the premium for male sex work is approximately 78 percent, which is twice that of female sex workers.

V. An Alternative Hypothesis

Descriptively, the data seem to contradict the prima facie case for a marriage market explanation for high returns to prostitution. One might envision a dynamic model of marital and occupational choice, perhaps including heterogeneous spousal quality, that might explain sex workers' different pattern of marriage rates in Figure 2. However, such an explanation would not account for the evidence from male sex workers. What, then, explains the earnings premium for sex work? A natural competing explanation is a compensating differential due to risk. In an extension (results available from authors), we focus on one of the several possible sources of the increased risk borne by prostitution: increase in disease burden from sexually transmitted infection. Previous research has demonstrated that sex workers draw a compensating differential when asked to provide relatively risky sex without a condom (Gertler et al., 2005). Using that paper's estimate of sex workers' implied value of life, we show that the average increase in disease burden due to sexually transmitted infections faced by sex workers in Ecuador implies a compensating differential of at least 8 percent of the sample average earnings. While sitting well below the observed earnings premium, this estimate suggests an alternative hypothesis: sex work, like police work or other risky professions, draws hazard pay.

[7] This data was collected during the same period that the female sex worker data was collected in Ecuador, using similar sampling and data collection methodologies.

TABLE 3—ARE SEX WORKERS BRIDES TOO?

	Ecuador (1)	Ecuador (2)	Ecuador (3)	Ecuador (4)	Mexico (5)	Mexico (6)
	All	All	Domestic workers	Domestic workers	All	All
Sex worker(=1)	−0.12 (0.02)***	−0.27 (0.07)***	−0.18 (0.02)***	−0.29 (0.07)***	−0.15 (0.02)***	−0.40 (0.11)***
Age 12–17(=1)	−0.24 (0.03)***	−0.35 (0.01)***	−0.20 (0.04)***	−0.34 (0.01)***	−0.30 (0.02)***	−0.31 (0.01)***
Age 18–23(=1)	−0.14 (0.03)***	−0.32 (0.03)***	−0.08 (0.03)**	−0.28 (0.04)***	−0.23 (0.02)***	−0.29 (0.02)***
Age 24–29(=1)	−0.06 (0.03)**	−0.11 (0.03)***	0.00 (0.03)	0.01 (0.05)	−0.07 (0.03)**	−0.10 (0.03)***
Age 30–35(=1)	−0.05 (0.03)*	−0.02 (0.04)	−0.01 (0.03)	0.04 (0.05)	−0.00 (0.03)	0.01 (0.03)
Age 36–41(=1)	−0.01 (0.03)	0.08 (0.04)**	−0.03 (0.03)	0.03 (0.05)	0.04 (0.03)	0.07 (0.03)**
Age 42–47(=1)	0.01 (0.03)	0.08 (0.04)**	−0.03 (0.04)	0.01 (0.05)	0.04 (0.04)	0.05 (0.04)
Sex worker × Age 12–17(=1)		0.64 (0.03)***		0.65 (0.04)***		0.58 (0.12)***
Sex worker × Age 18–23(=1)		0.41 (0.07)***		0.36 (0.08)***		0.53 (0.15)***
Sex worker × Age 24–29(=1)		0.20 (0.08)***		0.07 (0.08)		0.43 (0.17)**
Sex worker × Age 30–35(=1)		0.06 (0.08)		0.00 (0.08)		0.27 (0.20)
Sex worker × Age 36–41(=1)		−0.07 (0.07)		−0.03 (0.08)		0.17 (0.21)
Sex worker × Age 42–47(=1)		−0.09 (0.07)		−0.03 (0.08)		0.10 (0.22)
χ^2	229.9	379.9	183.9	268.2	397.4	455.6
Observations	4,797	4,797	3,945	3,945	3,690	3,690

Notes: The reported coeffcients are marginal effects from probit regressions where the dependent variable is married(=1). The marginal effects for the dummy variables are discrete changes from 0 to 1. Other control variables not shown but included in all regressions are city level dummies and education dummies (no school, primary, secondary, high school, university and/or more). The omitted age category is "48 and up."

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

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