How the risk premium for condomless sex differs between women in commercial and transactional sex? Evidence from urban Cameroon.

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Abstract

Female sex workers engaging in commercial sex can receive a premium for engaging in unprotected and other types of risky sex. Women engaging in transactional sex, defined as non-commercial sexual relationships motivated by the implicit assumption sex is exchanged for material support, are thought to share some of the same economic incentives as women in commercial sex, including that of the risk premium. We provide the first quatitative evidence of the risk premium in such relationships. Using a panel of up to six sex acts from an RCT stratified by FSWs and women in transactional sex in Cameroon, we estimate the premium attached to unprotected sex for both groups and investigate possible mechanisms for our findings. Our results show a premium of up to 30% for unprotected sex for FSWs in commercial sex, but a discount of up to 14% for women in transactional sex. We offer two explanations supported by qualitative findings, first, payment in transactional relationships are more complex than commercial relationships. Transactional relationhips they involve investments in trust that isn't a negotiable price, meaning a portion of the value obtained from unprotected sex acts is unobserved and biases our results downwards. Second, women in transactional sex are less aware of their risk of HIV, therefore, failing to negotiate an adequate premium for such sex acts. Since it is estimated the

number of women engaging in transactional sex is greater than FSWs across sub-Saharan Africa and that they have less knowledge and self-awareness about their risk of HIV, women in transactional sex should be considered an "key population" and helps explain the large disparity in HIV incidence in sub-Saharan Africa. Future research is needed into the economics of transactional relationships including the preferences and motivations of male partners in such relationships.

1 Introduction

Despite continued efforts to reduce new HIV infections and transmission, the HIV epidemic continues to be one of the most significant causes of death and disease burden in sub-Saharan Africa (SSA). In 2020, the SSA region accounted for 70% of the AIDS-related deaths and 60% of all new HIV infections UNAIDS (2021a). In 2020, 63% of all new infections in the region were attributed to women, with 67% of these among younger women aged between 15 to 19 years (UNAIDS, 2021a). Within this age group, six in seven new infections are amongst women compared to their male counterparts (UNAIDS 2021a). The gender disparity is greatest amongst young women, where the largest negative externalities exist through healthcare costs and potential onward transmission to children and sexual partners.

Whilst, HIV gender disparities have been linked to increased biological susceptibility exacerbated by STI coinfections (Fleming and Wasserheit 1999; Oster 2005) evidence now points to risk factors associated with poverty and gender inequality in the economy (Lépine, Cust, and Treibich 2023; Cust et al. 2021; Magadi 2011). The key groups most at risk of HIV are women who engage in commercial and transactional sex (Wamoyi et al., 2016, Baral et al., 2012). UNAIDS (2022) considers commercial sex workers a key population and they face 30 times greater risk of being infected with HIV than other women. Sex workers plus other 'key populations', account for 92% of new infections globally, but only 51% in Africa (UNAIDS 2021b; 2022). Women who engage in transactional sex, the *"non-commercial, non-marital sexual relationships motivated by the implicit assumption that sex will be exchanged for material support or other benefits",* are at 50% greater risk than other women in the population (Stoebenau et al. 2016; Joyce Wamoyi et al. 2016). Despite the high risk of infection, women engaging in transactional sex have often been overlooked and less prioritised than FSWs during the planning and implementation of HIV programmes across Africa.

Several studies conducted globally have highlighted the existence of a premium for unprotected sex among FSWs. Gertler et al. (2005) presented a theory of the risk premium for commercial sex workers, which we are testing in this paper. The theory states that condoms will not be used when the clients' willingness to pay for unprotected sex is greater than the FSWs willingness to accept for that risk. Crucially, it relies on the assumption that, on average, men prefer unprotected sex (Randolph et al. 2007) and that this preference outweighs any concerns about future health consequences. Should this not be the case and a client prefers protected sex, or an FSW prefers unprotected sex, there can be a discount provided for unprotected sex, according to this theoretical model.

The literature relatively consistently finds this premium across the world (Quaife et al. 2019; Rao et al. 2003; de la Torre et al. 2010; Adriaenssens and Hendrickx 2012; Muravyev and Talavera 2018; Egger and Lindenblatt 2015; Cunningham and Kendall 2014). Overall, the highest unprotected sex premium estimates reported in low-and-middle-income countries (LMICs) were a 350%, 136% and 81% increase in the price charged by FSWs in the Democratic Republic of

Congo (DRC) (Ntumbanzondo et al. 2006), Kisumu, Kenya (Jakubowski et al. 2016), and Bangladesh (Islam and Smyth 2012), respectively. Lower unprotected sex premium estimates were obtained by Gertler, Shah, and Bertozzi (2005) in Mexico (23%), (Arunachalam and Shah 2013) in Ecuador (13%), and Manda (2013) in Busia, Kenya (24%). The lowest unprotected sex premium estimate in LMICS was (9.3%) reported by Robinson and Yeh (2011), who analysed data obtained from FSWs in Kenya. The authors attributed the low estimates to their inclusion of informal FSWs, possibly women engaging in transactional sex, in their sample and the use of a longer panel of data than in previous studies.

In addition to unprotected sex, some of the studies assessed premium associated with the provision of other risky sex activities. Notably, anal sex, the riskiest type of sex activity, was found to have higher premiums compared to other sex activities. For instance, Robinson and Yeh (2011) reported that FSWs charged two times more for anal sex than unprotected sex, reflecting the positive influence of marginal risk on the price. Similarly, Arunachalam and Shah (2013) found that anal sex premium was 20% higher than unprotected sex premium. For instance, Gertler et al. (2005) found that sex premium doubled if clients had sex with an attractive sex worker while Islam and Smyth (2012) found an 11% beauty premium per transaction. Further, Cunningham and Kendall (2014) found a 31% premium for college-educated FSWs. The studies reported that these factors increased the women's bargaining power. Therefore, the different studies used either an instrumental variable or a fixed effect estimator to control for possible endogeneity bias.

The risk premium is a key mechanism in explaining why women in commercial and transactional sex are at such increased risk of HIV. By obtaining a greater price for sex acts, women are able to earn additional income or support quickly when they need it. For those in poverty or volatile economic circumstances the incentive for risky sex is highest. Evidence shows risk premium motivated risky sex to be used as a consumption smoothing device in the face of economic shocks (Cust et al. 2021). It is also feared that the risk premium could lead to risk disinhibition for PrEP users, which combined with imperfect adhereance and possible increases in HIV-susceptability-amplifying STIs, could increase HIV (Cassell et al. 2006; Eaton and Kalichman 2007; Quaife et al. 2021).

Gertler et al.'s (2005) theory that we are testing in this paper, however, only covers those in commercial sex. Whilst ostensibly women and men engaged in transactional sexual relationships are similar and exposed to the same incentives.

Transactional sex differs from sex work in several aspects; First, while sex work is solely commercial and has more formalised closed exchanges, transactional sex activities are more relationship-oriented, informal and open-ended (Duby et al., 2021, Wamoyi et al., 2016). That is, the terms of exchange in transactional sex are not explicitly discussed; therefore, compensation for sex activities may not be immediate or attached to specific sex acts. Secondly, unlike commercial sex, where compensation is monetary, compensation in transactional sex may be deferred and include other non-monetary means such as social status, services, or gifts as well as non-material benefits such as companionship and emotional support (Wamoyi et al., 2019a).

These make measuring the value attached to each sex act difficult. Thirdly, women engaging in commercial sex often identify as sex workers and to sexual partners as "clients", while those in transactional sex typically do not identify as sex workers and refer to sexual partners as boyfriends or sugar daddies. Motivations within such relationships include emptional intancy as well as income or material support, therefore, the motivations of the male partners are likely to be different to a typical client of a FSW. There is a dearth of literature on the male partners in commercial relationships but even more so for partners of women in transactional sex. Theoretically the characteristics and preferences are likely to be different to how we understand typical clients of FSWs.

However, as with FSWs where the economic incentives for unprotected sex are a key driver in their HIV risk, women in transactional sex are also observed to be at high risk of HIV for similar reasons. Evidence suggests transactional sex is strongly associated with HIV risk (Dunkle et al. 2004; Kilburn et al. 2018; Ranganathan et al. 2016) and points to a number of risk factors, including age-disparate relationships (Ranganathan et al. 2020; Luke 2003; Potgieter et al. 2012; Cockcroft et al. 2010; Luke 2005), violence (Choudhry et al. 2014; Cluver et al. 2011; Jewkes et al. 2006; Okigbo et al. 2014; Zembe et al. 2015), reduced bargaining power (Ranganathan et al. 2017), multiple concurrent partnerships (Moore, Biddlecom, and Zulu 2007; Steffenson et al. 2011; Phillips-Howard et al. 2015; Okigbo et al. 2014) and inconsistent condom use (Luke 2005; Luke et al. 2011) among others (Stoebenau et al. 2016).

This paper has two research aims: First, to discover if there is a risk premium for women engaged in transactional sex and if so how large. Second, to investigate if the risk premium exists and how large it is for women engaged in commercial sex.

To do this, we use data from three waves of an RCT in Cameroon studying the impact of health insurance on HIV through protection against economic shocks. The RCT was stratified with equal proportions between women engaged in commercial sex work and women engaged in transactional sex work. We exploit the panel nature of the data to estimate truly separate risk premiums for women in commercial and transactional sex without the influence of time-invariant confounders. Our findings for women in commercial sex are that up to a 30% premium exists, which is consistent with the existing literature. However, for women in transactional sex the premium is negative, i.e. a discount for unprotected sex. We propose that the non-explicit nature of payments for sex and the role of preferences and trust in transactional relationships explains why unprotected sex increases the chance of receiving nothing explicitly for the sex act. More research is needed to confirm if this is the case.

2   Setting and Data

Data for this paper comes from an RCT titled 'Protecting Women from Economic Shocks to fight HIV in Africa (POWER)'. The study recruited 1,508 adolescents and young women engaging in

commercial and transactional sex from June 2021 to March 2022 in Yaoundé, Cameroon. The data in this analysis includes all 3 waves of the RCT using all baseline plus the control group in waves 2 and 3. Since the intervention was intended to reduce the impacts of incentives of risky behaviours we cannot include those in the treatment group.

HIV prevalence amongst the general population in Cameroon is estimated to be 3%, which is one of the highest HIV prevalence in West and Central Africa (UNAIDS, 2021b). Furthermore, the country bears among the highest gender disparities in HIV in the region, with prevalence among women in the country being twice that of men (CAMPHIA., 2018). The disparity is even wider for younger women aged 15 to 24, as the prevalence is triple that of their male counterparts (CAMPHIA., 2018).

Similarly, commercial and transactional sex have been identified as significant contributors to Cameroon's huge HIV gender disparity. The estimated prevalence among FSWs in Cameroon is 24.3%, significantly higher than the country's national HIV prevalence of 3% (UNAIDS, 2021b). Although selling sex in Cameroon is currently illegal, it is tolerated. It is practised in most urban and tourist areas, with Douala and Yaoundé (the capital) being the main hotspots (Billong et al., 2019). Overall, it is estimated that approximately 2% of adult women in the country engage in commercial sex as their source of income (Billong et al., 2019). Additionally, evidence shows that a high proportion of young women in Cameroon engage in transactional sex, often due to peer pressure, to obtain certain status, connections to build specific social networks, and acquire luxurious items, which predisposes them to higher risks of HIV infection (Chatterji et al., 2005)

2.1 Recruitment and data collection

Identification of participants was done in collaboration with community-based organisations (CBOs) providing services to women engaging in commercial and transactional sex in Yaoundé. Recruitment of participants was done using a respondent-driven chain-referral sampling model akin to a snowball methodology. Through the CBOs networks, initial participants (seeds) were identified and recruited and if willing and able, were given invitation cards containing study contact information to distribute and recruit up to three members in their social network (nodes). The nodes were in turn asked to recruit other three members of their network. The study staff explained the study information and eligibility criteria to the selected seeds and nodes before asking them to invite members. The snowballing technique continued until the intended sample size was achieved.

2.2 Eligibility criteria for participants and ethics approval

Females aged 15 years or older who engaged in transactional or commercial sex, had at least one economically dependent person, tested negative for HIV, and were unmarried were eligible to participate in the study. Due to the sensitivity of the information collected during the study, participants under 21 years were excluded if their parents or guardians did not consent. Additionally, participants were not eligible if they had any conditions, such as mental health

conditions or learning disabilities, that would prevent them from understanding and remembering study information or the inability to make and communicate their decisions based on the information provided.

Ethics committees at the University College London and the National ethics committee in Cameroon provided ethics approval. Participation was voluntary; respondents gave informed written consent and were reimbursed for their transport costs and time.

Data were collected across three waves: Socio-economic surveys were conducted at baseline (month 1) and were used to collect socio-economic and sex work-related details for women engaging in commercial and transactional sex. The surveys were conducted via face-to-face interviews by trained and experienced local interviewers and took approximately 1.5 hours per participant. Information collected from both groups of women included participants' individual characteristics such as age, marital status, education level, number of children and economic dependents, period in sex work or transactional sex, and income earned from the sex transactions. Additionally, information on sexual behaviours and client/sugar daddy characteristics during the respondents' last two sex acts with their last and penultimate clients were collected. This included the amount of revenue exchanged per sex act, type of sex activities (vaginal, oral, or anal sex) performed, duration of sex acts, and condoms use. There were some differences in these questions (e.g. payment type) between commercial and transactional, but the same questions and wording were used where possible.

2.3 Survey, risky sexual behaviours and *Colorbox* method.

The socio-economic survey includes baseline characteristics, as well as detailed information on the previous two sex acts across three waves of data collection totalling six sex acts. We collect data on the characteristics of each sex act, including the types of sex acts that took place, some brief subjective information about clients and, importantly, the price. For women in transactional sex, payment can take many different forms; therefore, we ask them what type of payment was made, if any, and the approximate monetary value this has.

Given the sensitivity bias arising in collecting data on unprotected sex (Lépine, Treibich, and D'Exelle 2020; Lépine and Treibich 2020; Chuang et al. 2021; Treibich and Lépine 2019; Lépine et al. 2020), multiple data collection methods were implemented in this study, direct questioning and the Colourbox method (Lépine, Toh, and Treibich 2024). The direct method involved directly asking questions such as ("Did you use a condom during sex with your client?") as part of the information collected. According to the literature, direct questioning during face-to-face interviews may be prone to misreporting due to possible social desirability bias (Lépine et al., 2020). Literature shows that indirect elicitation methods reduce the under-reporting of sensitive behaviours as they eliminate the respondents' fear of being judged or discovered. A study conducted to compare direct and indirect methods used to collect data on condom use among FSWs in Senegal found a 17% overestimation of condom use if questions were asked directly (Treibich and Lépine, 2019). Therefore, in addition to the direct method, the Colorbox method

(an indirect method) was used in this study to ensure the anonymity of responses given by participants and to improve the accuracy of the information collected. The Colourbox method involved using colour codes and unique, anonymised PIN codes, which were blinded to the interviewers to elicit participants' responses on risky sex activities. However, only condom use and anal sex were elicited using the Colorbox method. Therefore, the direct method estimates were used in the primary analysis, while the *colorbox* method estimates were used to check the validity of the premium estimates for condom use and anal sex. Further details on the design and implementation of the *Colorbox* method are in Appendix A.

2.4 Descriptive statistics

Table 1 gives the summary statistics for the two groups of our sample: women engaging in commercial (n=755) and transactional sex (n=753) in Yaoundé, Cameroon. The final column includes the statistical difference between the two groups, telling us that these two sets of women are very different, with all but the number of economic dependents differing significantly. On average, female sex workers (FSWs) were slightly older than women engaging in transactional sex, with median ages of 28 and 23 years, respectively. Notably, the proportion of women engaging in transactional sex who were below 20 years was significantly higher than the number of FSWs.

On average, FSWs and women in transactional sex reported to have engaged in sex work or transactional sex for 3 years and 2 years, respectively. Most women in transactional sex cited their own choice and family pressure as their reason for engaging in transactional sex, while most FSWs cited encouragement by friends. In both groups, most women reported having sex activities as their only source of income (69% among FSWs and 57% among women in transactional sex). FSWs are more likely to be household heads and, therefore, have a greater burden of earning responsibility, given a greater proportion want to quit sex work but cite income as the main reason why not. Still, a majority of those wishing to quit transactional sex cannot because of the income but to a lesser extent than FSWs. This highlights an important reason for the women's choice to continue engaging in sex activities, confirming previous evidence that most women in commercial sex, but less than half of women in transactional sex in SSA engage for economic reasons (Cust et al., 2021, Wamoyi et al., 2016, Stoebenau et al., 2016).

FSWs have more sex acts (12 vs 3, p-value<0.001) than women in transactional sex and a greater number of clients/sugar daddies per week (7 vs 2, p-value<0.001). This translates to a greater income from sex work, although some of the transactional sex income may not be quantifiable and not captured in this measure accurately. FSWs are generally better educated and aware of their HIV status, therefore feeling more confident and less threatened by HIV. All participants had to be HIV-negative to participate in this trial. Education levels are very different between our groups with women in transactional sex better educated than FSWs. 50% of FSWs have secondary primary cycle education or less, compared to 66% of women in transactional sex that have an education level greater than this.

Table 2 summarises the sex act level characteristics. Contrary to average earnings, the price per sex act was higher for the transactional sex group, but only 60% of transactions had a payment associated with them compared to 100% of commercial sex transactions. Condom use is higher for commercial sex, supporting the idea that FSWs are better educated about the threat of HIV. Transactional sex has a higher proportion of regular clients, reflecting the more intimate and longer-lasting nature of their relationships with their sugar daddies/boyfriends.

Table 1: Descriptive statistics for women in commercial and trasactional sex with differences.

Characteristics	Commercial sex (n=755)		Transactional sex (n=753)		Difference
	obs	Mean (SD)/%	obs	Mean (SD)/%	p-value
Age (years)	749	30.23 (9.15)	752	24.40 (5.95)	< 0.001***
Under 20 years of age	749	10%	752	26%	< 0.001***
Experience in sex work (months)	755	53.09 (50.17)	752	36.37 [37.10]	< 0.001***
Want to quit sex work	752	94%	744	65%	< 0.001***
Sex as main income source reason for not quitting	81	89%	25	52%	< 0.001***
Head of household	754	83%	750	49%	< 0.001***
Economic dependants	755	3 (2)	753	3 (1)	0.2597
Number of children	755	2 (2)	753	2 (1)	< 0.001***
Number of occasional clients / sugar daddy (week)	680	4 (3)	752	1 (1)	< 0.001***
Number of regular clients / sugar daddy (week)	725	3 (3)	753	1 (1)	< 0.001***
Number of sex acts (week)	751	12 (9)	753	3 (2)	< 0.001***
Expenditure on health care	755	18,195 (31,211.2)	753	24,755 (83,712)	<0.05**
Earnings (last 7 days) FCFA	755	25,597 (24,211)	753	15,876 (20,313)	< 0.001***
Health status and AIDS knowledge					
Was sick in the (last 30 days)	755	29%	753	35%	<0.05**
Had HIV Test in the last 12months	754	93%	752	55%	< 0.001***
Does not think frequent condom use can prevent HIV	750	30%	752	58%	<0.05**
Do not feel threatened by HIV	754	66%	752	35%	< 0.001***
Other occupation apart from CS and TS					
No other occupation	755	69%	753	57%	< 0.001***
Marital/relationship status					
Never been married	755	89%	753	97%	< 0.001***
Separated	755	7%	753	2%	< 0.001***
Divorced	755	2%	753	0%	< 0.05**
Widowed	755	2%	753	1%	< 0.05**
Currently have a partner/boyfriend	755	59%	751	73%	< 0.001***
Education level					
Primary	736	15%	747	7%	< 0.001***
Secondary primary cycle	736	35%	747	25%	< 0.001***
Secondary second cycle	736	29%	747	37%	< 0.001***
Superior (post bac)	736	20%	747	29%	< 0.001***

Table 2: Descriptive statistics of the sex acts captured

Sex act characteristics	Commercial sex (n=2,374 sex acts)		Transactional sex (n=2,420 sex acts)		Difference
	obs	Mean (SD)/%	obs	Mean (SD)/%	p-value
Average price per sex act (FCFA)	2095	6,585 (8,842)	1310	11,045 (25,144)	< 0.001***
Received anything for the sex act	2374	100%	2420	60%	< 0.001***
Sex act used condom					
Self-reported	2093	88%	2010	53%	< 0.001***
Colourbox method	1799	87%	1856	53%	< 0.001***
Sex act characteristics					
Vaginal	2096	98%	2009	98%	0.509
Oral sex	2091	15%	2009	16%	0.306
Anal: self-reported	2095	2%	2010	2%	0.778
Anal: *Colourbox*	1507	6%	1506	4%	<0.05**
Client/sugar daddy characteristics					
Age (years)	2066	37. 6 (8.67)	1982	35.4 (9.11)	< 0.001***
Occasional	2096	49%	2000	17%	< 0.001***
Regular	2096	51%	2000	83%	< 0.001***
More handsome than average	2081	12%	1957	18%	< 0.001***
Richer than average	2059	12%	1956	10%	<0.05**
Has a girlfriend/wife	993	68%	1609	56%	< 0.001***
Other activities					
Client/sugar daddy took drugs before activity	2061	41%	1981	30%	< 0.001***
FSWS took drugs before activity	2091	36%	2008	24%	< 0.001***

3 Empirical strategy

Risky sex estimation was done separately for commercial and transactional sex to allow a comparison of both. Data used in the analyses was longitudinal, containing details of two sex acts per participant to a maximum of 6 sex acts across 3 waves.

To estimate risky sex premium, the log of price per sex act paid by clients or sugar daddies (primary outcome) was regressed on risky sex acts (unprotected, vaginal, anal, and oral sex), controlling for the participants' fixed effects and other time-varying factors such as sex act duration and client characteristics and survey wave. For women in transactional sex, if the payment was not cash, we asked them to estimate the monetary value of what they were paid. The participants' fixed effects were included to control for the time-invariant unobserved heterogeneity of the participants that could be correlated with risky sex behaviour.

The estimating equation was expressed as follows.

$$ln(P_{ij}) \ = \ \theta + \beta_1 X_{ij} + \beta_z C_{ij} + \alpha_i + \gamma_j + \ \varepsilon_{ij} \ ; \qquad\qquad \textbf{(1)}$$

Where $ln(P_{ij})$ represents the log of the price paid per sex act to participant i for sex act j, θ is the intercept, X_{ij} is a dummy variable indicating the sex act was unprotected, C_{ij} are a series of sex-act level and client-level characteristics, α_i is the participants' fixed effects, γ_j is the wave number fixed-effect, ε_{ij} is the mean-zero random error. Results tables display changes in logged price given unit changes in explanatory variables. The text we exponentiate the coefficient to find the exact percentage change for the unlogged price.

Table 3: Premium for unprotected sex

	Commercial			Transactional			
If no condom was used	0.264***	0.213**	0.187*	-0.154***	-0.155***	-0.132**	-0.132**
	(0.010)	(0.038)	(0.071)	(0.008)	(0.008)	(0.025)	(0.024)
Sex acts at midline	0.103	0.114	0.214**	0.266***	0.258***	0.143*	0.132*
	(0.301)	(0.249)	(0.039)	(0.000)	(0.000)	(0.054)	(0.075)
Sex acts at endline	-0.024	-0.013	0.049	0.194***	0.194***	0.148**	0.139*
	(0.794)	(0.882)	(0.602)	(0.007)	(0.008)	(0.048)	(0.062)
Penultimate transaction	-0.198***	-0.185***	-0.138***	-0.028	-0.028	-0.031	-0.033
	(0.000)	(0.000)	(0.010)	(0.487)	(0.492)	(0.448)	(0.410)
Sex act characteristics							
Oral sex		0.459***	0.411***		0.041	0.060	0.057
		(0.000)	(0.000)		(0.601)	(0.438)	(0.456)
Anal sex (direct question)		-0.263	-0.297		-0.040	-0.037	-0.040
		(0.301)	(0.259)		(0.836)	(0.846)	(0.833)
Vaginal sex		0.658*	0.694*		0.171	0.500	0.505
		(0.093)	(0.084)		(0.816)	(0.481)	(0.475)
Client characteristics							
Client age			0.018***			0.031***	0.031***
			(0.001)			(0.000)	(0.000)
Client was rich			0.268***			0.034	0.032
			(0.000)			(0.458)	(0.488)
Type of payment							
Received Cash							-0.193*
							(0.076)
Constant	8.286***	7.567***	6.342***	8.907***	8.732***	7.256***	7.439***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,060	2,055	2,002	1,279	1,273	1,228	1,228
R-squared	0.017	0.032	0.059	0.037	0.037	0.114	0.119
Number of women	752	752	744	628	628	617	617
Sex act characteristics	-	X	X	-	X	X	X
Client characteristics	-	-	X	-	-	X	X
Payment type	n/a	n/a	n/a	-	-	-	X

pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4 Results of risky premium

Table 3 shows us the premium attached to unprotected sex for women engaged in commercial and transactional sex . Each model is estimated using the first difference fixed effects at the sex act level. Columns reading left to right add sex-act differing characteristics.

After transforming the coefficients, the premium associated with condomless sex for women in commercial sex lies between 20% and 30%, columns 3 and 1, respectively. These findings are consistent with the literature discussed previously. Key client characteristics of age and perceived wealth are important predictors of price every 10 years, leading to an 18% increase in the price obtained and being perceived as rich as a 30% increase in the price paid.

Most interestingly, however, are the results for women in transactional sex, columns 4-7, where we add the same sex act characteristics, except in the final columns where we add a variable indicating whether cash was received as the payment type. These models tell us that not only is unprotected sex not associated with a premium, but that sugar daddies receive a discount in the amount they pay following unprotected sex. This discount ranges from 14% to 12%, see columns 4 and 6, respectively. The age of sugar daddies, likely highly correlated with wealth or income, is also crucial in determining the price, with a 10-year increase in their age equating to around a 31% increase in the price paid for a sex act.

4.1 Alternative forms of payment for women in transactional sex

One reason women in transactional sex provide a risk discount could be how the payments differ at the sex act level. In other words, it could be that women receive different or preferred types of payment or are more likely to receive payment at all by having unprotected sex. We tested the impact of condom use on the likelihood of receiving different types of payment. Table 4 Column 1 shows unprotected sex reduces the chance of receiving anything by 7.2 ppt. A similar impact, 8.5 ppt, as on receiving cash as the payment. Put another way, protected sex increases the chance of a woman receiving something or of receiving cash directly linked to the sex act. This similarity is because 60% of sex acts received anything, and 55% received cash, making the two outcomes highly correlated. There is a small increase in being paid before the sex act of 3.6 ppt, albeit statistically significant at the 10% only. The implication is that the sex act is more explicitly commercial in nature. There is no statistical association with the remaining payment types because instances were rare, so we lack the statistical power to draw conclusions.

Table 4: Change in liklihood of alternative payment methods following condomless sex acts

	Anything	Cash	Services	Material Support	Paid before
Unprotected sex act	-0.072***	-0.085***	-0.004	0.014	0.036*
	(0.008)	(0.004)	(0.592)	(0.131)	(0.065)
Constant	-0.067	0.064	0.011	-0.096	0.110
	(0.759)	(0.784)	(0.849)	(0.187)	(0.480)
Observations	1,886	1,886	1,886	1,886	1,886
R-squared	0.085	0.096	0.010	0.006	0.033
Number of women	744	744	744	744	744
Sex act characteristics	X	X	X	X	X
Client characteristics	X	X	X	X	X
Payment type	n/a	n/a	n/a	n/a	n/a

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These findings suggest that protected sex might be more akin to commercial relationships and, therefore, more likely to receive cash and more of it, whereas unprotected sex might be reserved for their more regular boyfriends/sugar daddies where they are more invested and therefore demand less payment in general.

4.2 Premium modifiers

We test how the premiums change in response to the womans perceived risk of HIV from the man and the premium attached to unprotected anal sex acts after explicitly testing the difference in premiums between transactional and commercial women.

Table 5: *Premium differences between strata of woman, HIV risk and anal sex.*

	Pooled	Commercial	Transactional	Commercial	Transactional
Commercial strata * unprotected sex	0.367*** (0.005)				
Client risk of HIV * unprotected sex		-0.078* (0.083)	0.015 (0.550)		
Anal sex act * unprotected sex				-0.339 (0.524)	0.431 (0.236)
Unprotected sex premium	-0.160* (0.099)	0.528** (0.018)	-0.194 (0.112)	0.198* (0.060)	-0.138** (0.019)
Client risk of HIV		0.011 (0.635)	-0.042** (0.014)		
Anal sex act				-0.162 (0.632)	-0.261 (0.327)
Constant	6.667*** (0.000)	6.308*** (0.000)	7.394*** (0.000)	6.298*** (0.000)	7.249*** (0.000)
Observations	3,230	2,002	1,228	2,002	1,228
R-squared	0.057	0.061	0.125	0.059	0.116
Number of women	1,361	744	617	744	617
Sex act characteristics	X	X	X	X	X
Client characteristics	X	X	X	X	X
Payment type	-	n/a	-	n/a	-

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As suggested in Table 3, the difference between the premiums is 37% as per Table 5 column 1. Columns 2 and 3 tell us the increased risk of HIV lowers the premium for FSWs by around 8% for every 10% increase in the chance of the client having HIV, contrary to expectations after controlling for the client's age and perceived wealth. For women in transactional sex, there is a small but statistically insignificant increase in the premium with a higher chance of their sugar daddy having HIV.

4.3 Direct questioning

To deal with the threat of social desirability bias, we used condom use questions elicited using the colourbox method. As a robustness check, we repeat the primary premium analysis using direct questioning about condom use. Contrary to literature that finds results very different between directly questioned and indirect elicitation in observation and quasi-experimental analysis (Cust et al. 2023; Lépine, Treibich, and D'Exelle 2020; Chuang et al. 2021), we find very

similar supportive findings, see Table A7 in the Appendix. We also tested all other analyses using direct questioning and found similar findings. Results are available on request.

5 Discussion

In the last decade, research on the economics of sexual exchange has made significant contributions towards understanding the motivation behind women's involvement in unsafe sex practices and has pointed out financial incentives paid for risky sex services as an essential reason. However, these studies have either focused on FSWs exclusively or conflated transactional sex with commercial sex work despite the characterisation of transactional sex as a high-risk activity. This study contributes to the growing body of literature on the economics of sexual exchange in the following areas. First, this is the first study to explicitly estimate risky sex premium among women engaging in transactional sex and the first to compare these directly to commercial sex workers in the same context, minimising overlap of the groups. Secondly, it adds to the research of commercial sex work by providing risky sex premium estimates among FSWs in Cameroon.

The risk premium for unprotected sex found for commercial sex is consistent with previous literature. Specifically, the results show that FSWs in Cameroon are paid up to 30% more per sex act by their clients for providing unprotected sex. Although this premium is more modest than those found in DRC, Kenya and Bangladesh (Ntumbanzondo et al. 2006; Islam and Smyth 2012; Jakubowski et al. 2016), the premium found for FSWs in Cameroon remains consistent with levels found in other LMICs (Gertler, Shah, and Bertozzi 2005; de la Torre et al. 2010; Arunachalam and Shah 2013). Our most interesting finding is that the premium does not exist amongst women in transactional sex. Our analysis shows these women offer up to a 14% discount for providing unprotected sex to their partners. The literature hints at a potential discount for "informal sex workers" in Robinson and Yeh's (2011), possibly women engaged in transactional sex. Their pooled analysis finds only a very small premium of 9.3% compared to 24% and 136% premiums found in Kenya among sex workers in other studies (Jakubowski et al. 2016; Manda 2013). There are several possible explanations for this discount:

First, it could be that there is a preference for protected sex from men in these relationships, i.e. men in transactional relationships are significantly different from previously studied clients of sex workers such that they prefer to have safe sex and, therefore, unprotected sex is demanded less and they offer less in return for such sex acts. Second, the women's choice to have unprotected sex could stem from lack of awareness of risks involved meaning they are not negotiating adequate rational compensation for unprotected sex. Although there have been HIV prevention efforts such as condom promotion and awareness campaigns on safe sex practices, these have focused on key populations such as FSWs. Women who engage in transactional sex may have limited access to these services since they do not consider themselves FSWs (Wamoyi et al., 2019b). For instance, more than half of the women in transactional sex interviewed in this study had not had an HIV test for a period of 12 months while still engaging in transactional sex.

Alarmingly, a significant proportion cited 'not seeing the benefits of testing as they were healthy' as their main reason and 65% of the women stated that they did not feel threatened by the virus.

Third, the premium still exists, but how women receive benefits in transactional relationships is different and not fully observable in our data. We know that such relationships are based more on trust and are often characterised by shared emotional attachment between the partners than the typical FSW client (J Wamoyi et al. 2019; Stoebenau et al. 2016). Therefore, women may be more trusting of their partners and, therefore, less strict in their decisions to engage in risky sex activities, seeing meeting the desires of their partners as proof of trustworthiness and investment in the longevity of the relationship, perhaps maximising long term payoff both materially and emotionally. Some descriptive evidence in support of this is that approximately 50% of the women engaging in transactional sex stated that their main reason for having unprotected sex was trust in their clients.

A key missing variable in the models is knowing whether clients/sugar daddies were the same or different between sex acts of the same woman. This would allow us to estimate a more robust premium that accounts for condoms being used or not with the same client/sugar daddy. Perhaps unfeasible, but with identifiable clients between women, client/sugar daddy fixed effects can be added to the models that will tell us more about how differences in women affect prices and premiums for unprotected sex. Failing that, further accurate information on clients would allow us to explore the differences between them to investigate different preferences and demands for condom use.

In the absence of good data on sugar daddies we examine qualitative data collected within this RCT for evidence. These semi-structured interviews support the hypothesised pathways, particularly the first and third. Interviews were conducted with only women and were not specifically designed to answer the research questions of this paper so we treat their findings with caution, but they help to add depth to our hypotheses. A theme within these answers was that male partners preferred protection to protect their reputation, the implication being the girlfriends we were interviewing were secret and by not using a condom. For example, one respondent said:

"Because most of them are men of principle and it's not good for their image if they gets out that they are with young girls".

A second theme that shone through was the idea that relationships are built on trust. Respondents would often reference protection being used at the beginning of relationships or demanding STI tests are done before unprotected sex can occur and this demand can come from both men and women. For example, one respondent says:

"To avoid illness, you automatically use a condom. Either that or I demand that you go for a check-up first and have all the tests done… They accept".

However, respondents do still state that unprotected sex is used in circumstances when they need quick support, and some are aware that they take additional risks in these circumstances. An example from a respondent:

"My mother was ill… my contribution was 100,000 [CFAF]… I understood that for him to give me money it was give and take; he said he couldn't use a condom, and in the end I agreed to not use a condom, as soon as we finished he gave me the money to pay for my mother's care."

Our results do not rule out the unprotected sex premium for women in transactional relationships, rather, they hint at the complexity and nuance of such relationships and the limitations in our current understanding of them.

Robust policy recommendations are difficult at this stage; however, our findings do support calls to include women engaged in transactional sex to be considered a "key population" in order to receive additional support as FSWs currently do (UNAIDS 2022). The low level of HIV testing and awareness is worrying, and the lack of HIV risk awareness among women in transactional sex could explain our findings, and further education would be beneficial for them to understand the risks. On the other hand, given the high levels of HIV in FSWs in Cameroon (Billong et al. 2019) (albeit not in our sample), education for clients to reduce the number of sex acts that are unprotected.

6 Conclusion and Recommendations

We find a premium of up to 30% attached to unprotected sex for women in commercial sex and a discount of up to 14% for women engaged in transactional sex using a panel of up to six sex acts. We use robust fixed effects models that estimate the price change when condom use changes whilst eliminating time-invariant confounders such as women's risk preferences and other time-invariant characteristics. We find that the theory to date based on commercial sex work is inadequate at predicting premiums for women in transactional sexual relationships. We offer the explanation that transactional relationships are structured differently such that preferences of men for unprotected sex are different, that unprotected sex is both used in times of need as a form of investment into relationships through a show of trust and that women in transactional relationships may be less informed about their own risks.

Future research needs to be done to understand the role of economics in transactional relationships and what is driving high unprotected sex and a discount offered to transactional sex partners. Namely further investigation into the role and preferences of sugar daddies, the role of intangible payoffs for women and HIV and safe sex awareness.

7 References

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8 Acknowledgements

9 Appendix

9.1 Design and implementation of the *Colourbox* method

The *colourbox* method involved use of colours and unique PIN codes to elicit participant's responses on their participation in risky sex with their last and penultimate clients or sugar daddies. Before implementation, the interviewers explained what the *colourbox* method entailed to the participants and conducted a practical training phase to ensure they fully understood the method. In addition, during the explanation phase, the interviewers highlighted that the method ensured anonymity with respect to the interviewers as they did not know and could not decode the PIN codes reported by the participants. However, they informed them that researchers were not blinded and could understand responses given.

Table 6 includes the questions asked to both women engaging commercial and transactional sex, all requiring binary responses.

Table 6: Colourbox method questions

Women engaging in commercial sex	Women engaging in transactional sex
"Are you an active sex worker?"	"Are you engaged in sexual relationships with bent necks for which you receive food, cosmetics, clothing, transport, school fees, a place to sleep, alcohol (material support), non-material support (favours) or money?)"
"Did you use a condom the last time you had sex with your last client?"	"Did you use a condom the last time you had sex with your last sugar daddy?"
"Did you have anal intercourse the last time you had sex with your last client?"	"Did you have anal intercourse the last time you had sex with your last sugar daddy?"
"Did you use a condom the last time you had sex with your penultimate client?"	"Did you use a condom the last time you had sex with your penultimate sugar daddy?"
"Did you have anal intercourse the last time you had sex with your penultimate client?"	"Did you have anal intercourse the last time you had sex with your penultimate sugar daddy?"

During implementation, each participant was provided with a bowl of sealed envelopes containing several coupons that would be used to answer the questions asked. Each coupon contained a coloured box and an adjacent 6-digit PIN code separated by a dotted line (Figure 1). Each code was unique and was only used once among all participants. Once the interviewers read out a question, they followed up with an explanation of what responses the Coloured boxes represented. For instance, if an interviewer asked ("Did you use a condom during sex with your last/penultimate client"), they followed up by stating, ("Black for Yes" and "White for NO").

The interviewer then asked the participant to select the colour representing their response. After selection, they were then asked to tear the coupon at the dotted line, remain with the coloured box and give only the 6-digit PIN code to the interviewer for data entry. For each question, the participants were asked to pick a new coupon. To ensure confidentiality, the interviewers did not know the PIN codes and what responses they represented. Additionally, they turned away from the participants during the process. This process was repeated for all women engaging in commercial and transactional sex until all responses were collected.

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Figure 1: Example of *Colourbox* method coupons

Table A7. Premium estiatmes using direct questionning

	Commercial			Transactional			
If no condom was used	0.337***	0.261**	0.233*	-0.151***	-0.150**	-0.09	-0.088
	-0.004	-0.028	-0.053	-0.01	-0.011	-0.13	-0.139
Sex acts at midline	0.083	0.096	0.199*	0.266***	0.260***	0.150**	0.139*
	-0.405	-0.332	-0.054	0	0	-0.042	-0.06
Sex acts at endline	-0.034	-0.021	0.046	0.197***	0.199***	0.147**	0.138*
	-0.71	-0.819	-0.626	-0.006	-0.006	-0.045	-0.061
Penultimate transaction	-0.198***	-0.185***	-0.138***	-0.018	-0.018	-0.023	-0.025
	0	0	-0.01	-0.661	-0.669	-0.564	-0.54
Sex act characteristics							
Oral sex		0.447***	0.401***		0.036	0.057	0.056
		0	0		-0.646	-0.464	-0.472
Anal sex (direct question)		-0.261	-0.298		-0.022	-0.029	-0.032
		-0.303	-0.258		-0.91	-0.878	-0.864
Vaginal sex		0.673*	0.699*		0.005	0.376	0.384
		-0.086	-0.082		-0.994	-0.596	-0.588
Client characteristics							
Client age			0.018***			0.030***	0.030***
			-0.001			0	0
Client was rich			0.274***			0.035	0.033
			0			-0.447	-0.47
Type of payment							
Received Cash							-0.183*
							-0.092
Constant	8.289***	7.559***	6.350***	8.897***	8.886***	7.391***	7.558***
	0	0	0	0	0	0	0
Observations	2,061	2,056	2,003	1,290	1,284	1,234	1,234
R-squared	0.018	0.032	0.059	0.036	0.036	0.108	0.112
Number of women	753	753	745	632	632	619	619
Sex act characteristics	-	X	X	-	X	X	X
Client characteristics	-	-	X	-	-	X	X
Payment type	n/a	n/a	n/a	-	-	-	X

pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1