
Risk-Coping through Sexual Networks

Evidence from Client Transfers in Kenya

Jonathan Robinson
Ethan Yeh

ABSTRACT

Why do women engage in transactional sex? While much of the explanation is that sex-for-money pays more than other jobs, we use a unique panel data set constructed from 192 self-reported diaries of sex workers in Western Kenya to show that women who supply transactional sex develop relationships with regular clients, and that these clients send transfers in response to negative income shocks. Regular clients are the primary source of interperson insurance that women receive, and women report in a separate survey that client transfers are an important reason that they participate in the market.

I. Introduction

It has long been argued that transactional sex (sex for money) is one of the main drivers of HIV, particularly in Sub-Saharan Africa (UNAIDS 2002;

Jonathan Robinson is an assistant professor in the Department of Economics, University of California, Santa Cruz. Ethan Yeh is an economist at the World Bank. This project would not have been possible without the support and assistance of the Strengthening STD/HIV Control Project in Kenya and the University of Nairobi Institute for Tropical and Infectious Disease. The authors are grateful to Chester Morris, Benson Estambale, and Frank Plummer for their help in setting up the project. The authors have benefitted greatly from discussions with Pascaline Dupas and seminar participants at the UCSC junior faculty working group and the World Bank. They would also like to thank three anonymous referees for valuable comments. The authors are grateful to Sarah Green, Eva Kaplan, Nathaniel Wamkoya, and especially Carolynne Kemunto and Violet Kanyanga for coordinating the project. They also thank all the peer educators in Busia, Kenya for their assistance throughout, and María Pía Basurto, George Davis, and Sefira Fialkoff for research assistance. This project was supported by grants from the Princeton University Industrial Relations Section, the UCSF-UCB Exploratory Center in Behavioral Economic Epidemiology, the UCB Center for African Studies, the UCB Institute of Business and Economic Research, and the UCB Center for International and Development Economics Research. The views expressed here do not necessarily reflect those of the World Bank or its member countries. The data used in this article can be obtained beginning June 2012 through May 2015 from Jonathan Robinson, Department of Economics, University of California, Santa Cruz, Santa Cruz, CA 95064, jmrtwo@ucsc.edu.

[Submitted July 2010; accepted January 2011]

ISSN 022-166X E-ISSN 1548-8004 © 2012 by the Board of Regents of the University of Wisconsin System

Plummer et al. 1991). While it is clear that the number of women who earn some income from sex is substantial (Vandepitte et al. 2006; Morison et al. 2001), it is difficult to estimate how large the transactional sex market is. This is because many women supply transactional sex only occasionally (for example, as a supplement to another job) and do not self-identify as sex workers. Moreover, transactional sex can be present in many different types of relationships, including marriage (see Swidler and Watkins 2007 for evidence from Malawi), so that the line between sex workers and other women in sexual relationships can often be unclear.¹ When women who supply sex more informally are counted in, the size of the market can be surprisingly large: For example, in Busia, Kenya (the area in which this study takes place), we estimate that 12.5 percent of the population of adult women engage in sex-for-money transactions (Robinson and Yeh 2011).²

Why do so many women engage in transactional sex? The primary reason is almost certainly that sex work pays much better than other available jobs (Gertler, Shah, and Bertozzi 2005; Rao et al. 2003; Robinson and Yeh 2011), especially in poor countries in which people are close to subsistence. However, while the level difference in average income is clearly important, another key consideration is the variability of consumption. In Africa, as in much of the developing world, shocks are common, formal safety nets are often missing, and insurance through informal systems of gifts and loans is rarely, if ever, complete (Townsend 1994). Consequently, individuals often resort to other methods of reducing vulnerability, some of which can be quite costly. For instance, people may choose less profitable but less risky investments (Morduch 1995) or sell productive assets in bad times (Rosenzweig and Wolpin 1993).

In this paper, we explore whether transactional sex provides interpersonal insurance in addition to a higher income level, and whether such insurance affects the decision of women to enter (or continue) in transactional sex. In particular, we are interested in the insurance that sex workers receive from “regular” clients. Regular clients differ from “casual” clients in that they tend to have longer-term relationships with a particular woman. Over time, women who supply transactional sex typically develop relationships with one or more such regulars, and these relationships can extend beyond just sex. For instance, some regulars are thought of as akin to boyfriends or lovers, and it is not unheard of for women to marry regular clients.

We examine whether regular clients become part of a woman’s risk-coping network and provide insurance through transfers when negative shocks occur. To do this, we utilize a unique panel data set constructed from 192 daily sex worker “diaries.” The diaries were essentially preprinted questionnaires that were filled by the women on a daily basis. In the diaries, women recorded each transaction that they had with a client, including all of the sexual activities performed, the price paid, whether a condom was used, and whether the client was a regular or a casual. They

1. For more on the informal sex market, see Caldwell et al. (1989), Luke (2006), Schoepf (2004), Hunter (2002), and Wojcicki (2002).

2. Busia has an unusually large number of sex workers, as it is a known “hotspot” for commercial sex due to its location on the main trucking route from Nairobi, Kenya to Kampala, Uganda. Thus, while commercial sex is prevalent in many parts of Kenya, the 12.5 percent figure is likely much higher than average.

also recorded any shocks that they experienced, their income, expenditures, and, most important for this paper, the transfers they had given to or received from other individuals.

To measure this, we asked women to record all the transfers they received from other people, whether from regular clients or from anybody else (usually friends or relatives). For transfers from regulars, women separately recorded whether the transfer was in cash, for rent, for other household expenses such as school fees, or whether the transfer was in-kind (such as a gift of food or clothes).³ To emphasize to women that this variable was to measure transfers (rather than payment for sex), they were instructed to record only gifts that were not tied to sex. In addition, this information was collected on a page of the diaries which asked about all the other flows they received that day: transfers to/from friends and relatives, bank loans, Rotating Savings and Credit Association (ROSCA) payouts, and other sources of income (such as full-time work outside of sex work or irregular sources of income like the sale of produce or animal products). In total, the data set includes 19,041 transactions over 12,526 sex worker days.

We find substantial evidence that client transfers serve a risk-coping purpose. Transfers from regulars increase by 67–71 percent on the days around own illness, and by 124–125 percent on the days around the death of a friend or relative. Transfers also increase in response to health shocks caused by sexually transmitted infections, and on days in which sex workers are asked for gifts or loans from friends or family members. In relation to the sizes of the shocks, the amount of insurance provided is sizeable. Overall, transfers from regular clients are the primary source of interperson income support that women receive (dwarfing that provided by friends or relatives).

A potential concern with our approach is that transfers and the price for sexual activities were self-reported by women, so that it might be possible that large payments in crisis periods would be considered transfers rather than as part of the price. We view this as unlikely in that women were explicitly instructed to record only those gifts that were not tied to sex as transfers. In addition, the price for a sexual encounter was recorded on the same diary page as details of the sexual encounter (in particular the sexual activities performed), while the transfers were recorded on a separate page which asked about other sources of inflows and outflows (so that women would likely record the price on the appropriate page). However, we carefully check this possibility by examining whether transfers respond to the sexual activities performed that day or to other measures of participation in the sex market. As we discuss further in the discussion of the results, we find no evidence for this alternative.

The results suggest that the insurance provided by clients may (on the margin) induce women to enter or remain in the transactional sex market (at least in this part of Kenya). In Kenya, the alternative for young women is typically to marry (or cohabitate). To motivate our empirical approach, we lay out a simple conceptual framework in which women may either get married and earn a relatively low income

3. It was extremely rare for women to report transfers to regular clients. Thus, the insurance relationship documented here provides benefits for the sex worker only.

but receive relatively full insurance from their spouses, or enter transactional sex to receive a higher income and rely upon regular clients for insurance. At the margin, the decision will depend on: (i) the level and risk associated with each type of income; (ii) the stigma, reputation, and other costs of engaging in sex work; and (iii) the insurance that each choice provides against unexpected income shocks. As the amount of insurance provided by clients increases, transactional sex will become relatively more attractive and the number of women who choose to enter the market will rise.

To test this directly, we would like to have a data set on a broad cross-section of women, and examine whether those facing the most risk (or those who are least able to cope with shocks) are most likely to enter the market. We cannot do this, however, as our data set includes only sex workers. To provide some descriptive evidence on this issue, we conducted a survey with a separate sample of 99 sex workers in which we asked women to list their reasons for entering or staying in the transactional market and for seeing regular clients. Though only suggestive, a substantial fraction of women report that access to client transfers are an important reason for continuing sex work, and between 87 and 98 percent of women report that they see regular clients in part to access transfers. In addition, 98 percent of women report that regular clients are either their primary or secondary source of support in times of need, which supports the diary results.

This study contributes to a literature that documents how underlying exposure to risk affects ex ante decision making in developing countries. Other studies have focused on topics such as migration (Rosenzweig and Stark 1989) or crop choice (Morduch 1995). Though the specific topic of this paper has received relatively little attention in economics, several sociological and anthropological studies have suggested that women have multiple partners or develop sexual networks for financial support and income security (Swidler and Watkins 2007; Schoepf 2004; Hunter 2002). Potentially, our results have important public health consequences, especially for the spread of HIV/AIDS, since sex workers regularly have unprotected sex with clients.⁴

This paper represents only one way in which income risk affects the decisions of women engaging in transactional sex. In other related papers using the same sample of women, we show evidence that women are imperfectly insured against risk and that they substitute to more dangerous but better compensated sexual activities in response to a variety of income shocks (in order to make up for the income shortfall). This was true in the case of a large, aggregate shock caused by the 2007–08 post-election crisis in Kenya (Dupas and Robinson 2010a; Dupas and Robinson 2010b) as well as with relative small shocks of short-term household illness (Robinson and Yeh 2011). The latter uses the same data set as in this paper.

These previous results suggest that client transfers are insufficient to compensate for all underlying income risk (and indeed, in this paper we find that client transfers make up only part of the shortfall from shocks). However, while client transfers do not completely insure women, the transfers are still substantial: We estimate that clients provide 25–26 percent of the shortfall from own illness, and about 19 percent

4. See Supplementary Table 1, posted at people.ucsc.edu/jmrtwo.

for funeral expenses. While this leaves much of the risk uninsured, this support still dwarfs support from friends and relatives. Without such insurance, it is likely that women would respond more aggressively to these larger shocks by increasing labor supply.

Overall, our research strongly suggests that the provision of more formal risk-coping mechanisms (such as health insurance or access to formal savings accounts) would have important effects on the decisions that sex workers make—from the entry decision to the day-to-day decision of whether to use a condom or not. While this is only one study in one part of Kenya, such issues may well be relevant in other developing countries in which shocks are common and formal safety nets are missing.

The rest of this paper is structured as follows. Section II lays out a conceptual framework for the decision to engage in transactional sex, Section III describes the data, and Section IV presents background information on the women in our sample. Section V presents our main results, and Section VI considers some alternative interpretations. Section VII provides descriptive evidence on the role that transfers play in entry into this market, and Section VIII concludes.

II. Conceptual Framework

In this section, we present a simple conceptual framework to motivate our empirical work. We assume that a woman (indexed by i) can either enter the transactional market to earn a certain income $y_i^s(t)$ at time t , or she can get married.⁵ We assume that $\frac{dy_i^s(t)}{dt} < 0$ to capture that earnings from transactional sex are declining with age.

The woman's marriage prospects are determined by the marriage market. Men vary in quality: if a woman marries a man at time t_m , the quality of her husband is indexed by $h(t_m)$. If a woman marries, she earns a certain income $y_i^m(h(t_m))$ in every period (which is a combination of support from her husband and other income, for instance from the farm or a small business). To fix ideas, we do not model this income as varying with age: if a woman marries, her income is constant thereafter. For simplicity, we assume that women either work entirely in transactional sex or get married and earn income from other sources (and so do not model the intensity of work within either sector).⁶

Women are also subject to mean zero, unexpected income shocks Z_{it} . We assume that the distribution of these shocks does not change with age, and does not differ

5. We do not explicitly consider women who remain single but who do not enter transactional sex (for instance, women who work for a wage), but this could be incorporated into our framework.

6. We do not consider women who simultaneously work in both sectors, as we are interested largely on the extensive margin of transactional sex. In reality, most women who supply transactional sex also receive income from sources other than sex work. Modeling this aspect of the market would not qualitatively change our results.

between women that work in transactional sex and other women.⁷ If women get married, they are relatively well insured against these shocks by their husbands. In particular, they receive $\lambda_i^h(Z_{it})$ in transfers when shocks occur (where the indexing by h indicates that some men may provide better insurance than others). If women enter the transactional sex market, they get some insurance from regular clients, which we denote by $\tau_i(Z_{it})$ (where the indexing by i indicates that women may differ in their ability to elicit support from regulars, for instance if they are particularly attractive). For simplicity, we assume that savings technologies are completely unavailable, so that consumption equals income in every period.⁸

If a woman engages in transactional sex in any period, she incurs a fixed cost p_{if} . For every period she continues to remain in transactional sex, she also incurs a marginal cost p_{im} .⁹ Given this, consumption in any period can be written as

$$(1) \quad c_{it} = D_{it}^s(y_i^s(t) + \tau_i(Z_{it})) + (1 - D_{it}^s)(y_i^m(h(t_m)) + \lambda_i^h(Z_{it})) - Z_{it}$$

where D_{it}^s is an indicator equal to one if a woman engages in transactional sex. To try to approximate the marriage market in Kenya, we assume that while a woman is married, she cannot enter the transactional sex market.¹⁰ However, women who enter the transactional sex market can leave to marry.¹¹ However, to match the (at least anecdotal) institutional context in Kenya, we assume that the quality of partners available to sex workers is declining in the length of time she participates in the market. Formally, this assumption is that $\frac{\partial h_i^m(t_m)}{\partial t_m} < 0$ (similarly, we assume that such men provide less insurance). These assumptions preclude the possibility that some women may enter sex work because they expect to find better partners later.¹²

Simplifying notation such that $\lambda_i^h(Z_{it})$ can be written as λ_i^h (and $\tau_i(Z_{it})$ as τ_i), we can write out a woman's lifetime utility from entering sex work at time 0 and getting married at any later date t_m as

$$(2) \quad U_i(t_m) = -p_{if} + E_t \sum_{t=0}^{t_m-1} \delta^t [u(y_i^s(t) - Z_{it}(1 - \tau_i)) - p_{im}] \\ + E_t \sum_{t=t_m}^T \delta^t u(y_i^m(h(t_m)) - Z_{it}(1 - \lambda_i^h(t_m)))$$

7. If entering transactional sex increased the frequency or severity of shocks, it would tend to increase the threshold income premium to enter the sex market (and so depress entry on the margin). We thank a referee for raising this point.

8. While this is clearly an oversimplification, access to formal savings is in fact quite rare in this part of Kenya (Dupas and Robinson 2009). This is true also of sex workers specifically (Robinson and Yeh 2011). Both of these previous studies suggest that informal savings balances are very low (too small to cope with most shocks), so it is not completely implausible to assume that savings levels are close to zero.

9. These costs could be thought of as stigma costs as in Della Giusta, Di Tommaso and Strom (2008).

10. While this is not true in all cases, the majority of sex workers are unmarried so we think this is a reasonable simplifying assumption in this context.

11. Many women in this sample report that it is likely that they will marry after entering sex work (Robinson and Yeh 2011), and other research has shown that sex workers in Ecuador and Mexico are as likely to marry as other women (Arunachalam and Shah 2008).

12. This setup differs from the model of Edlund and Korn (2002), which is based on the idea that sex workers cannot marry and so must be compensated for their lost marriage market possibilities. While sex work may preclude marriage in some settings, it does not do so in Kenya so we choose to model it in this way.

for any $t_m \neq 0$. If the woman does not enter sex work at all and gets married in period 0, her utility is

$$(3) \quad U_i(0) = E_t \sum_{t=0}^T \delta^t u(y_i^m(h(0)) - Z_{it}(1 - \lambda_i^{h(0)}))$$

To decide whether to enter sex work in period 0, the woman finds the t_m which maximizes (2), and compares her expected utility from entering sex work and marrying at date t_m to her expected utility under (3). Defining t_m^{+*} as the t_m which maximizes (2), in other words, the date on which a woman would eventually leave to marry if she were to enter sex work, the condition for entry is that

$$(4) \quad p_{if} \leq E_t \sum_{t=0}^{t_m^{+*} - 1} \delta^t [u(y_i^s(t) - Z_{it}(1 - \tau_i)) - p_{im} - u(y_i^m(h(0)) - Z_{it}(1 - \lambda_i^{h(0)}))] \\ + \sum_{t=t_m^{+*}}^T \delta^t [u(y_i^m(h(t_m^{+*})) - Z_{it}(1 - \lambda_i^{h(t_m^{+*})})) - u(y_i^m(h(0)) - Z_{it}(1 - \lambda_i^{h(0)}))]$$

A. Entry

Equation 4 suggests that there will be a threshold cost level p_{if}^* below which women will participate in the market. The threshold will be decreasing (and entry will be increasing) in income from sex work and will be increasing in income in marriage. Clearly, this income difference will likely be the main driver of entry. However, another prediction of this simple setup is that if a large shock occurs, and if δ is relatively low or if marginal utility is very high (for instance, because the shocks bring women close to a subsistence level of consumption), we will observe women entering sex work in response to shocks themselves (and indeed, we do find some evidence in support of this in Table 7).

In this paper, our primary interest is to explore whether the threshold (and thus the number of women in the market) is increasing in transfers available from clients. The larger the insurance provided by regular clients, the relatively more attractive sex work becomes. Thus, while any of the other factors mentioned above could encourage women to enter the market, on the margin, the insurance that clients provide will induce some women to enter who otherwise would not.

B. Continuation and Exit

Once women have begun supplying transactional sex, the incentive to continue is relatively high since the fixed cost has been incurred and because we model partner quality as declining in experience in transactional sex. However, some exit is still likely to occur. First, women may naturally exit because they get older and their earnings from sex work have declined to the point that leaving the market brings higher utility.¹³ Second, some women will have entered because they incurred severe

13. Some of these women will exit into marriage, while others will likely be too old to marry. For those who do not remarry, we could fit them into our framework by assuming that they earn some fixed base income and receive no income support.

negative shocks in a previous period, and so they may exit because their marriage market possibilities are generally high but they were induced into the market by short-term shocks. Lastly, and somewhat outside the model, we could allow totally unexpected shocks to marriage market possibilities (for instance, if women were to randomly find a very high quality partner).

As with entry, it is evident from the model that exit will be less likely the higher is τ_i (in relation to λ_i^h). While these transfers will not impede all exit, on the margin they will tend to keep women in the market.

With this motivating framework in mind, the objective of the remainder of this paper will be first to test if such insurance is provided in practice, and then to provide some descriptive evidence on whether these transfers affect behavior as predicted by the model.

III. Data

A. Sample Selection

The data for this paper was collected from a sample of women engaging in transactional sex in Busia, a semi-urban town in Western Province, Kenya. Busia is a town of 44,196 (Central Bureau of Statistics 2001), which is located on the Ugandan border, along one of two major trucking routes connecting the port city of Mombasa to Kampala, Uganda (via Nairobi). Due to its location along this trucking corridor, Busia is a known “hotspot” for transactional sex. HIV prevalence is also very high: In 2003 (just before the data for this paper was collected), prevalence was estimated at 9.8 percent in the Kenya Demographic and Health Survey, substantially higher than the national average of 6.7 percent (Central Bureau of Statistics 2004).

Because sex workers are difficult to identify, we worked closely with the Strengthening STD/HIV Control Project in Kenya (SHCP), a Kenyan organization that worked with thousands of formal and informal sex workers across Kenya. SHCP identified women and organized them into peer groups to provide HIV education and promote behavioral change and condom use. By 2005, when this study began, SHCP had recruited approximately 400 women into 30 peer groups. In order to collect reliable data, we secured the cooperation of each peer group leader, and employed SHCP’s district coordinator and one of the peer educators as enumerators.

As discussed earlier, the line between commercial sex and other, more standard types of sexual relationships can be blurry in Kenya, as in much of Africa (since many types of relationships have a transactional sex-for-money/services component). For this reason, SHCP employed a broad definition of a sex worker: any single, widowed, divorced, or separated woman, aged 18 or older, who had multiple concurrent sex partners. Because SHCP was already using this definition, we continued to do so in this project. Though such a definition would be inappropriate in other contexts (such as in the United States), it worked well for this study—all of the women who were selected from this sampling frame did in fact engage in sex-for-money.

Though SHCP had been relatively successful in enrolling women into their program, it was possible that women who joined the peer groups were not representative

of the average sex worker in the area.¹⁴ To construct as representative a sample as possible, we identified other women who met SHCP's definition of a sex worker but who were not involved in the peer groups. To do this, the enumerators visited each peer group and asked members to list all the women she knew who fit SHCP's description of a sex worker, whether they were in a peer group or not. After compiling this list, duplicates were eliminated by the peer group educators. The resulting "universe" of sex workers we identified for our sampling frame from this method thus includes all women in the peer groups as well as all other women identified by any peer group member.

Overall, we identified 1,205 women in this manner. Since the population of Busia Town is only 44,196, and assuming that the age distribution of the population fits that of the 2003 Kenyan Demographic and Health Survey (in which women aged 15–49 make up 21.9 percent of the rural population), we estimate that roughly 12.5 percent of women in Busia earn some income from transactional sex.¹⁵

From this sample frame, we randomly sampled women to participate in the project (stratified by the peer group in which they were identified). Initially, we sampled 248 women. Of these, seven women refused to participate in the project, and another 49 dropped out before data collection was finished.¹⁶ In total, we received useable data from 192 women (77 percent of the original sample).

Overall, the women who appear in our data set tend to be more informal than would be the case of streetwalkers or women who work out of brothels. Most of the women in our sample find clients in bars, nightclubs, or hotels, and many see clients in the client's home (or, less frequently, in their own home). The vast majority do not self-identify as sex workers: Instead, most refer to themselves as "survivors," women who engage in transactional sex to make money to live.

B. Diaries and Other Survey Modules

The primary source of data we use are daily "diaries" which were kept by the sex workers. The diaries were essentially preprinted surveys with questions on income, expenditures (across a number of different categories), and the shocks that were encountered that day. The diaries also include details on each encounter with a client, including the specific sexual activities performed, the price, and whether a condom was used.¹⁷

As discussed previously, the main outcome in this paper are the transfers received by sex workers from clients. On a separate page from the sexual behavior with

14. However, Robinson and Yeh (2011) show that there is no difference in observable characteristics between those in the peer groups and other women who supply transactional sex.

15. Though estimates of the size of the transactional sex market are hard to come by, this figure is higher than that in other studies (for instance, Morison et al. 2001 or Vandepitte et al. 2006). We attribute this in part to the fact that Busia is a hotspot for commercial sex within Kenya, and in part because our enumerators (and SHCP) were known and trusted by the sex workers in the community. As a result, we were likely able to identify a relatively large percentage of the women in the market.

16. In Robinson and Yeh (2011), we find no statistically significant differences in observable characteristics at baseline between the 49 women who dropped out and other women.

17. Some versions of the diaries do not differentiate between unprotected vaginal and anal sex, so we aggregate them together in this paper.

clients, women recorded all the other sources of in- and outflows that they received in a day. These included gifts and loans from friends and relatives, ROSCA payouts, and other sources of income (such as other regular work, or irregular income sources such as the sale of livestock or of animal produce). On this page, women recorded transfers from clients in four separate categories: cash, rent, household expenses, and other in-kind gifts (such as food or clothes). Women were instructed to record only those gifts that were not tied to sex on this page.

Given these instructions, and that the information was recorded on a page separately from sexual activities, it is unlikely that women would include payment for sex here. However, it was up to the women themselves to record what was cash payment for sex, and what was the transfer, and so it is theoretically possible that they did not differentiate between these two sources of income. However, as we will discuss later, we test this in several different ways and find no evidence that transfers were counted in as part of the price.

Lastly, in informal qualitative work before starting the diaries, it was extremely rare for casuals to send transfers to women (which were not payment for sexual activity). To even know a woman to the point of providing transfers, a client must have seen a woman previously and so was likely somewhat of a regular in any case. Thus, the diaries include only information on regular transfers. Though we have likely measured the majority of transfers from clients in this way, to the extent that we miss some transfers from “quasi-regular” clients we will likely underestimate the response of transfers to shocks.

Women were asked to fill in the diaries every day for a period of approximately three months. The data collection took place over two separate three month intervals: Round 1 occurred between October and December 2005, and Round 2 occurred between July and October 2006.¹⁸

The main concern with a diary method for data collection is that women may make mistakes filling them out, or may get tired or bored. Fortunately, we are confident that the data quality is high, for two main reasons. First, before use, the diaries were extensively pretested to ensure that they could be understood and accurately completed by the women, and to make sure that the questions were culturally appropriate. Second, to maintain data quality, the enumerators visited women on a weekly basis to inspect the diaries and note any problems with them. During these visits, they answered questions about the diaries and continued to train women who were having difficulty.¹⁹

There are several important differences between the two versions of the diaries, which will affect our analysis. First, the Round 2 diaries included information on client characteristics, for each transaction. These include the client’s occupation, perceived wealth level, attractiveness, and cleanliness. In addition, they include measures of whether the sex worker thought the client was at high risk of HIV, whether

18. Most women participated in only one round, but 17 women were selected to participate in both rounds of the data collection. Thus we have 209 diaries from 192 women.

19. Since the diaries were self-filled, it was necessary for women to be literate to complete them. Although the majority of the sample is literate, we also made an effort to keep illiterate women in the sample. Every illiterate woman sampled for the project was visited by her peer educator once a day to help her fill out the diary.

she thought that the client saw a higher than average number of sex workers, and whether the client was circumcised. Unfortunately, these measures are somewhat problematic in that they were collected from the sex worker rather than the clients themselves, so measurement error is a concern. In addition, recording this level of detail for each client was burdensome for women. Consequently, even in the Round 2 data, many observations are missing client information.²⁰

Finally, to supplement the diary information, we administered a one-time background survey that included questions on demographics, asset ownership, knowledge of HIV/AIDS, attitudes toward sex work, and related issues. In total, the final data set includes 192 women, 19,041 transactions, and 12,526 sex worker days.

C. Regular and Casual Clients

This paper focuses on transfers received from regular clients. Before discussing the results, it is helpful to discuss what we mean by the term “regular” client in this context. In general, regulars have a longer-term relationship with a particular woman, whereas casuals might only have a single encounter. Regular clients are also much more likely to buy items or pay expenses for women (like helping with rent or paying for clothes). In fact, in an environment in which a transactional sex-for-money component exists in many relationships (Swidler and Watkins 2007), some regulars are thought of as essentially boyfriends or lovers.

Overall, regulars tend to have closer relationships with women, outside of a specific transaction. That said, though women are familiar with the general terms “regular” and “casual,” the distinction between them is not always sharp. For this reason, we allowed women to determine for themselves, which clients were regulars and which were casuals. The goal of the rest of this paper will be to examine the extent to which the regular client relationship extends to providing informal insurance.

IV. Background Statistics

A. Background Statistics (Women)

Summary statistics for the women in the sample are presented in Table 1. Panel A presents averages across the 192 women in the sample from the background questionnaire. The average woman in our sample is 28 years old, started seeing clients at 19, and is fairly well educated for rural Kenya (average educational attainment is 9.2 years, and 95 percent of women can read Kiswahili). The majority (84 percent) of women are the heads of their households, and the average woman has three dependents.

Panels B and C present averages from the daily diaries. The average woman makes almost 700 Kenyan shillings (Ksh) from sex work, which was equivalent to about \$10 during the sample period and which is roughly 4–5 times that of other female daily income earners in the area (Dupas and Robinson 2009). Also of note from

20. An important complication this causes is that while we know whether a particular client is a regular or casual, we are not able to match client-specific activities across days.

Table 1
Background Characteristics

Panel A. Background Information

Age	28.43		
	(6.98)		
Age began seeing clients	18.67		
	(5.14)		
Educational attainment	9.20		
	(2.69)		
Literacy	Read Kiswahili	Write Kiswahili	
	0.95	0.88	
Respondent is head of household	0.84		
Total number of dependents	2.96		
	(2.36)		
Respondent is in a peer group	0.44		
Number of regular clients (at time of background survey)	2.24		
	(1.07)		
Marital status			
Widowed	0.23		
Divorced / separated	0.20		
Cohabiting	0.13		
Never married / not cohabiting	0.44		
Observations	192		

Panel B. Labor Supply in the Sex Market (Daily Averages)

Participated in sex market	0.76
Total income from sex work	686.84
	(749.55)
Total income from all sources	788.26
	(778.89)
Number of clients seen	1.52
	(1.12)
Number of regular clients seen	0.54
	(0.66)
Had unprotected sex	0.18
Number of times unprotected sex	0.42
	(1.10)
Observations	12,526
Number of women	192

(continued)

Table 1 (continued)

	Daily Average (1)	Probability of Occurring in a Week (2)	Occurred at Least Once over Three-Month Sample Period (3)
Panel C. Shocks			
Someone in household sick (other than respondent)	0.37	0.60	0.93
Respondent sick	0.34	0.60	0.98
A friend or relative of respondent died	0.04	0.14	0.46
Respondent was asked for money	0.07	0.23	0.70
Respondent had STI	0.03	0.08	0.34
Observations	12,481	2,384	209 ^a
Number of women	192	192	192

Notes: Figures in Panel A are averages across the 192 women in the sample, from a background survey. Figures in Panels B and C are daily averages from self-reported diaries. Standard deviations are in parentheses. The exact number of observations differs for some variables due to missing values. Sickness is an indicator variable equal to one if the household or respondent reported having a cough, fever, malaria, typhoid, diarrhea, cuts or burns, or any other illness. Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.

a. There are more observations than IDs in Panel C, Column 3 because 17 women took part in two rounds of diaries.

Panel B is that women see a client on 76 percent of days and see about 1.5 clients per day. Roughly one-third of these clients are regulars. Despite the substantial risk of HIV in this area, unprotected sex is also common: Women have unprotected sex on 18 percent of all days and have an average of 0.42 unprotected sex acts per day (including the 24 percent of days in which they do not participate in the transactional sex market).

Finally, Panel C highlights how vulnerable women are to health and other shocks. Women report having a sick household member (where sickness is an indicator equal to one if a person experiences cough, fever, malaria, typhoid, diarrhea, cuts or burns, or other illness) on 37 percent of days, own sickness on 34 percent of days, and report having an STI on 3 percent of days. Women are also frequently asked for money by friends or relatives (on 7 percent of days). Finally, the biggest shock of all is also unfortunately quite common: Women report the death of a friend or relative on 4 percent of days.

To examine shocks over a somewhat longer time period, Column 2 shows the probability of experiencing a shock over a week. Own and household sickness are experienced on 60 percent of weeks, and the death of a friend or relative occurs on 14 percent of weeks. Similarly, Column 3 shows the percentage of women that experienced these shocks at least once over the three-month sample period—as expected, the percentages are quite high for all shocks. This is an environment in which access to insurance is likely to be important.

B. Background Statistics (Clients)

Table 2 presents background statistics on the clients of sex workers. In this table, Column 1 gives the overall average for each variable, Column 2 gives the mean among regulars, Column 3 the mean among casuals, and Column 4 reports a p -value for the test that the means for regulars and casuals are equal. Interestingly, though it is well documented that long-distance truckers are major consumers of commercial sex (Orubuloye et al. 1993, World Bank 2009), and even though Busia is located on a major trucking route, it turns out that the majority of clients come from other professions. While 18 percent of clients are truck drivers, another 28 percent are government employees, 20 percent are businessmen or other salaried workers, and the remainder are distributed between shop owners, bicycle taxi drivers, and salaried workers in other occupations. The distribution of jobs is similar between regular and casual clients, though casuals are somewhat more likely to be shop owners.

Also of particular interest are the percentages of men whom the sex worker thinks are at high risk of HIV/AIDS. Thirty-four percent of regulars and 51 percent of casuals are judged to be at high risk. Given the HIV prevalence of 9.8 percent around the survey period, this suggests that both types of clients are very risky, though regulars less so. It should be noted, however, that this question was left blank by many women, so that we only have 1,952 observations for this variable (of the 4,195 observations with any client information).

The rest of the Table reports the means for the questions about the client's perceived wealth, attractiveness, and the frequency with which the client has unprotected sex (with all of his sexual partners). Casuals are somewhat richer but seen as less attractive than regulars. There are no significant differences in the question about unprotected sex, suggesting again that regulars are quite risky sexual partners as well.

V. Results

A. Shocks and Client Transfers

The first goal of this paper is to test whether client transfers serve a risk-coping function. We implement this by running the following fixed effects regression:

$$(5) \quad \tau_{it} = \gamma S_{it} + X'_{it}\theta + \mu_i + \phi_t + \epsilon_{it}$$

In this setup τ_{it} is the sum of all the transfers a woman received on a particular day,²¹ S_{it} are measures of shocks and X_{it} are controls for participation in the transactional sex market (the number of clients she saw, and various measures of sexual

21. This variable is the sum of all transfers from all regulars that she interacted with on a given day. Thus this measure includes those regulars who never send transfers. We are unable to tell if there are clients who never send transfers since we do not have a useable client ID in the database. Anecdotally, however, there are clients who never send transfers.

Table 2
Client Characteristics

	(1) All Clients	(2) Regular Clients	(3) Casual Clients	(4) <i>p</i> -value for regular = casual
Occupation				
Truck driver	0.18	0.18	0.18	0.78
Government employee	0.28	0.29	0.27	0.41
Businessman / salaried workers	0.20	0.21	0.18	0.32
Shop owner	0.11	0.10	0.14	0.02**
Bicycle taxi driver	0.07	0.06	0.08	0.19
Works in bar / restaurant / hotel	0.13	0.13	0.13	0.72
Other	0.04	0.04	0.03	0.41
Sex worker thinks client is at high risk of HIV/AIDS ^a	0.38	0.34	0.51	0.40
Sex worker rates the client's wealth as				
Above average	0.53	0.50	0.62	0.01***
About average	0.40	0.43	0.33	0.11
Below average	0.06	0.07	0.05	0.07*
Sex worker rates the client as				
Handsome	0.57	0.63	0.44	0.01***
About average attractiveness	0.36	0.31	0.48	0.01***
Below average attractiveness	0.07	0.06	0.09	0.72
Sex worker thinks the client has unprotected sex ^b				
More often than average client	0.49	0.49	0.49	0.60
About as much as average client	0.13	0.11	0.20	0.49
Less often than the average client	0.38	0.40	0.31	0.25
Number of observations	4,195	2,968	1,204	
Number of women			108	

Notes: Averages are sex worker reports from daily diaries. Client data is only available for a portion of the data. The number of observations in Column 1 does not equal the sum in Columns 2 and 3 because client information is missing for some observations. The *p*-values in Column 4 are from regressions with sex worker fixed effects. Standard errors in those regressions are clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). The exact number of observations differs from variable to variable due to missing values.

a. Response to the question on HIV risk is nonmissing for only 1,952 respondents. The rest are coded as "don't know" or were left blank.

b. The question about unprotected sex is the total amount of unprotected sex the woman thinks the client has, with all of his sexual partners.

behavior). μ_i are individual fixed effects, ϕ_t are date controls (dummies for the month and the day of the week), and ϵ_{it} is an error term.²²

We focus on three types of shocks in this paper: (1) the illness of a family member (as discussed above, illness includes fever, flu, cough, malaria, typhoid, diarrhea, cuts and burns, and other illnesses); (2) the illness of the respondent; and (3) the death of a friend or relative. For robustness, we also examine two other shocks in the appendix: whether the sex worker was asked for a loan from a friend or relative, and whether the sex worker was suffering from the symptoms of an STI.

In our regressions, we include controls for sexual behavior X_{it} to control for the fact that transfers may be directly related to the provision of sexual activities (however, as we will show in the robustness section, the relationship between transfers and the provision of sexual services is, at most, weak), and because we know from previous work that women increase their labor supply in response to negative shocks so that shocks and labor supply will tend to be correlated. Overall, if client transfers do in fact serve a risk-coping purpose, we would expect to find that $\gamma > 0$.²³

Since client transfers may not increase on the very day of the shock, we include indicators for whether a shock occurred that day, whether a shock had occurred the day before, and an interaction between the two (regressions including more lags look similar but are omitted for space). The results are presented in Table 3. Columns 1–3 include indicators for whether a shock was experienced that day, while Columns 4–6 also include indicators for whether the shock was experienced the day before. For each set of shocks, the columns differ in the labor supply and sexual activity controls they include: Columns 1 and 4 do not include any controls, Columns 2 and 5 include controls for the number of regular and casual clients that the woman saw, and Columns 3 and 6 include detailed activity controls. These controls include whether the woman engaged in vaginal, anal, and oral sex, whether she gave the client a massage, whether she kissed the client, whether she provided company, whether she stripped for the client, and whether she provided any other services. Lastly, we control for whether the woman had unprotected sex with the client.²⁴

In Panel A, we examine household and own illness. The results are very consistent across specifications, and show that transfers increase by 21–27 Ksh on days in which the sex worker is sick. These estimates understate the total amount transferred, since clients do not always make the transfer on the day of the illness: from Columns 4–6, transfers are also 26–27 Ksh higher on the day after a sex worker was ill. However, the client seems to make a transfer only once: The interaction sick today * sick yesterday is negative and of the same size as the sickness dummies. Thus,

22. We perform robustness checks in which we examine weekly averages with similar results. Since the daily data is directly comparable to our companion paper Robinson and Yeh (2011), and is more directly interpretable and cleaner, we focus on that measure in this paper.

23. Some sexual activity controls are missing for some observations. To avoid dropping these observations, we generate dummies for whether the activity is missing, code the activity as 0, and include the dummies in the regressions.

24. The diaries do not include information on the number of times the woman engaged in each type of sexual activity. Instead, we only know whether she engaged in the activity with a client or not (for instance, we know if the woman kissed a particular client, but not the number of times). For this reason, all sexual activity measures are sums of dummy variables—they give the number of clients with whom she engaged in the given activity at least once in a day (rather than the total number of repetitions across all clients).

clients transfer more on the first day of an illness and the day after a woman recovers from an illness, but they do not transfer more on the second day of an illness if she is sick for multiple days. In total, for an illness that lasts one day, women get about 51–54 Ksh in transfers from clients in the days around an illness, a result that is highly statistically significant (see p -value at the bottom of the panel). Since average daily transfers are 76 Ksh on days in which a woman does not encounter any shock (Table 3, top row), transfers increase by 67–71 percent of an average day's transfers when a woman falls sick.²⁵

Interestingly, client transfers respond more strongly to the larger shock of the death of a friend or relative. Funeral expenses are a very sizeable shock in Kenya, as they are elsewhere in Africa (for instance, see Case and Menendez 2009 for evidence on the effect of funerals on South African households). While point estimates vary somewhat across specifications, transfers are 62–65 Ksh higher on the day a friend or relative dies, and 32–33 Ksh higher the day after. In total, transfers increase by around 124 percent of an average day's transfer. Unfortunately, due to the imprecision of our estimates (due to the rarity of funerals and to the fact that we only asked about this shock in Round 2 of the diaries), only the coefficients in Columns 1–3 are significant at 10 percent. In Columns 4–6, the sum of the coefficients has a p -value between 0.14 and 0.16.

While the results for sickness and the death of a friend or relative are our strongest findings, we present some supporting evidence in Appendix Table A2. Here, we present results for being asked for a gift or loan, and for experiencing the symptoms of an STI. The results paint a similar picture, though with considerably less precision than our earlier results (especially for being asked for a gift/loan, since this shock was only measured in Round 2 of the diaries). While the results do not achieve significance, the coefficients are positive, and relatively large. While only speculative, we view these results as generally supportive of our main results.²⁶

The one shock that is not at all insured is illness of other family members. Although we do not have a good explanation for this, one possible reason is that own sickness and funeral expenses are more easily observable and verifiable by the client. Women might be able to ask clients for help only with those types of shocks, and must deal with household health shocks on their own. This explanation is at best speculative, however.

B. How Big Are the Transfers?

In this subsection, we try to quantify how big these transfers are in terms of the size of the shocks incurred. To do this, we run similar fixed effects equations as Equation 5, but with income, expenditures, and transfers as dependent variables (without any controls other than the day of the week and month of the year). The results are presented in Table 4.²⁷

25. In Appendix Table A1, we take the average of each dependent variable over a week and regress average daily transfers on the average of the shocks. The results look very similar. We take the average of each variable rather than the sum because some variables are missing on some days.

26. Results look similar at the weekly level—see Supplementary Table 2, posted at people.ucsc.edu/jmrtwo.

27. These estimates differ slightly from Robinson and Yeh (2011) because we restrict our regressions to observations with complete data on all expenditures, income, and transfers.

Table 3
Shocks and Transfers from Regular Clients (Daily)

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Gifts from Regular Clients					
Mean of Dependent Variable ^a				76.10		
Panel A. Household Sickness						
Household sickness						
Somebody in household (other than respondent) sick today	-10.79 (8.43)	-10.16 (8.42)	-11.34 (8.42)	-2.48 (12.15)	-2.67 (12.13)	-3.06 (12.20)
Somebody in household (other than respondent) sick yesterday				3.35 (12.11)	3.66 (12.13)	3.56 (12.12)
Somebody in household sick Today * sick yesterday				-14.69 (16.45)	-13.82 (16.39)	-14.76 (16.53)
Own sickness						
Respondent sick today	22.07 (7.59)***	21.28 (7.76)***	20.83 (7.75)***	26.73 (12.36)**	25.78 (12.35)**	25.02 (12.32)**
Respondent sick yesterday				27.02 (11.37)**	26.25 (11.37)**	26.27 (11.26)**
Respondent sick today *				-29.11 (17.24)*	-28.65 (17.32)*	-28.23 (17.30)
Number of regular clients seen					6.23 (7.39)	
Number of casual clients seen					-10.10 (4.76)**	
Detailed sexual activity controls	No	No	Yes	No	No	Yes
Observations	12,154	12,154	12,154	11,148	11,148	11,148
Number of women	192	192	192	192	192	192

<i>p</i> -value for somebody in household sick today + somebody in household sick yesterday = 0	—	—	—	0.19	0.22	0.17
<i>p</i> -value for respondent sick today + respondent sick yesterday = 0	—	—	—	0.01***	0.02**	0.03**
Panel B. Death of a Friend or Relative						
Death of a friend or relative today	62.47 (34.34)*	61.40 (34.45)*	63.90 (34.44)*	63.09 (41.95)	62.01 (42.22)	64.54 (42.14)
Death of a friend or relative yesterday				32.51 (35.25)	32.88 (35.35)	32.27 (35.03)
Death of a friend or relative today * death of a friend or relative yesterday				-2.23 (83.92)	-2.28 (83.66)	-0.28 (83.49)
Number of regular clients seen		6.23 (9.77)			7.10 (10.39)	
Number of casual clients seen		-9.66 (7.58)			-10.12 (7.73)	
Activity controls	No	No	Yes	No	No	Yes
Observations	7,385	7,385	7,385	6,681	6,681	6,681
Number of women	190	190	190	190	190	190
<i>p</i> -value for death today + death yesterday = 0	—	—	—	0.16	0.16	0.14

Notes: All variables are measured at the daily (rather than client) level, as we are not able to match client-specific transfers to client-specific activities. Regressions are fixed effects regressions with controls for the day of the week and the month of the year. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). Sickness is an indicator variable equal to one if respondent reports a cough, fever, malaria, typhoid, diarrhea, cuts, burns, or other illnesses. Sexual activity controls include vaginal sex, anal sex, kissing, massage, stripping, whether the woman gave a client company, whether the woman had unprotected sex, and whether she engaged in any other activities. All sexual activity variables measure the number of clients with whom the woman engaged in the given activity at least once, since we did not record the number of repetitions for all activities. Sexual activities were missing for some women. To avoid dropping them from the regressions, we code the activity as zero and generate dummies for whether the activity is missing (see text for more details). Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.

a. Mean of dependent variable is mean when all shocks equal 0.

Table 4
Income and Other Risk-Coping Mechanisms (Daily Shocks)

	(1)	(2)	(3)	(4)	(5)
	Total Income from Sex Work	Total Income	Total Expend	Medical Expend.	Net Gifts + Loans Friends and Relatives
Mean of Dependent Variable ^a	663.34	751.86	429.11	13.23	-18.40
Panel A. Household Sickness					
Household sickness					
Somebody in household (other than respondent) sick today	37.45 (28.35)	45.57 (28.47)	121.92 (24.07)***	23.92 (4.81)***	-11.19 (12.50)
Somebody in household (other than respondent) sick yesterday	36.72 (26.81)	39.52 (28.24)	50.19 (21.54)**	6.98 (3.45)**	5.35 (9.08)
Somebody in household sick Today * sick yesterday	-11.71 (40.21)	-17.77 (40.63)	-140.15 (31.71)***	-12.43 (6.66)*	0.28 (17.61)
Own Sickness					
Respondent sick today	-81.84 (25.46)***	-81.73 (26.88)***	103.59 (22.07)***	43.08 (5.69)***	-16.91 (12.04)
Respondent sick yesterday	27.18 (24.18)	23.04 (24.90)	46.67 (18.05)**	6.75 (2.87)**	-17.97 (8.98)**
Respondent sick today * Respondent sick yesterday	-46.17 (37.63)	-47.48 (40.92)	-120.91 (30.23)***	-28.75 (6.32)***	27.59 (14.59)*

<i>p</i> -value for sum of household health shocks = 0	0.01***	0.01***	0.07***	0.001***	0.46
<i>p</i> -value for sum of own health shocks = 0	0.001***	0.001***	0.13	0.001***	0.29
Observations	11,148	11,148	11,148	11,148	11,148
Number of women	192	192	192	192	192

Panel B. Death of Friend or Relative

Death of a friend or relative today	-65.74 (67.20)	-62.64 (68.78)	464.95 (69.85)***	7.12 (9.56)	3.86 (21.45)
Death of a friend or relative yesterday	-25.68 (48.04)	-24.92 (48.88)	37.93 (39.36)	-1.99 (5.94)	13.69 (17.81)
Death of a friend or relative today * death of a friend or relative yesterday	-262.18 (160.86)	-256.64 (167.54)	0.55 (154.90)	-8.27 (17.37)	12.14 (34.49)
<i>p</i> -value for sum of shocks = 0	0.03***	0.05***	0.001***	0.82	0.19
Observations	7,385	7,385	7,385	7,385	7,385
Number of women	190	190	190	190	190

Note: All regressions are fixed effects regressions (at the daily level) with controls for the day of the week and the month of the year. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). Sickness is an indicator variable equal to one if respondent reports a cough, fever, malaria, typhoid, diarrhea, cuts, burns, or other illnesses. Transfers are negative for inflows and positive for outflows. Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.

a. Mean of dependent variable is mean when all shocks equal 0.

We start with own sickness—when women fall sick themselves, it serves as a shock in two ways: they must spend money to treat the illness, and they are unable to work. Taking the example of a one-day illness, women lose about 82 Ksh in labor income on the day of the illness and make about 27 Ksh more on the day after an illness. They spend an extra 104 Ksh on the day of the illness and an extra 47 Ksh the day after. Thus, in total, women lose about 55 Ksh in labor income and spend 151 Ksh more, so that the total shortfall is around 206 Ksh. From Table 3, client transfers increase by 51 Ksh on the days surrounding the illness, so clients insure about 25–26 percent of the total.²⁸ While this is only a fraction of the shock, it is larger than the support provided by friends and family (Column 5), which (insignificantly) increases by only 35 Ksh on such days.

Support is also significant in the case of funeral expenses (Panel B). Funerals are probably the biggest shock facing people in rural Kenya—for a one-day funeral, total expenditures increase by about 503 Ksh (465 Ksh on the day of the funeral and 38 Ksh the day after)²⁹ Clients transfer about 95–96 Ksh for such shocks, or about 19 percent of the total.³⁰ Transfers from others is 18 Ksh, representing a net outflow, most likely due to funeral contributions. Though not reported here, a similar pattern is observed in the case of being asked for money or experiencing an STI.

It is interesting to note that funerals are partially insured by clients, since women do not work more in response to funerals (in fact, from Table 4, they work somewhat less on such days, perhaps because they are attending the funeral or wake).³¹ Apparently, women are able to rely on clients for some support with such shocks, and so are less obligated to work more to pay for the expenses.

Equally apparent, however, is that much income risk remains uninsured by clients (and from other insurance networks as well). While the transfers make up some of the money required to deal with these emergencies, they fall far short of full insurance. Consequently, women must also supplement these transfers by increasing their labor supply in response to shocks (which we have explored in prior work).

VI. Alternative Hypotheses

In this section, we consider an important alternative hypothesis for our results: that the transfers that clients send are actually directly tied to sexual or other services provided by women, so that they should be seen as part of the price that regular clients pay. That is, the concern is either that what we code as transfers are in fact payments for sexual activities, or that the contract for regulars involves a “discount” at the time of the transaction but that regulars are obligated to provide state-dependent transfers later on. This seems unlikely since we controlled for sexual activity controls in our regressions in Table 3, but we provide two further pieces of

28. For all shocks, expenditures do not change significantly on the day after the shock is experienced.

29. Note that we code funeral expenses as expenditures instead of transfers to the family of the deceased.

30. A similarly large response is found when aggregating at the weekly level—see Supplementary Table 3, posted at people.ucsc.edu/jmrtwo.

31. In previous work, we also find that women do not substitute to riskier sexual activities in response to funerals (Robinson and Yeh 2011).

evidence against this hypothesis in this section: (1) the level of client transfers is at most weakly correlated with sexual activities or participation in the transactional market and (2) regular and casual clients pay statistically indistinguishable prices for sexual activities, even when controlling for background characteristics of the clients.

A. Transfer Levels are Not Correlated with Sexual Activities

We first document that transfers from regulars are not strongly correlated with labor market participation, which suggests that they should be thought of as transfers rather than as payments. To examine this, we run the following regression, at the daily level:

$$(6) \quad \tau_{it} = X'_{it}\beta + \mu_i + \phi_t + \epsilon_{it}$$

In the equation, τ_{it} are transfers from regular clients to sex worker i on day t , and X_{it} is a vector that includes various measures of participation in the transactional sex market. The regression includes individual fixed effects μ_i and date controls ϕ_t (the day of the week and the month of the year), as well as controls for the round of data collection. In all regressions, the standard errors are clustered at the individual level. The coefficient of interest is β : if transfers are not tied to sexual behavior, then β should be near 0.

Results are presented in Table 5. From the bottom of the table, women receive 102 Kenyan shillings on average in client transfers (US \$1.46) on days in which they see no clients.³² Moving across the table, Column 1 includes a dummy for whether the woman saw any clients, Column 2 includes the number of clients seen, Column 3 includes the number of regular and casual clients seen separately, and Column 4 includes detail on the specific sexual activities performed.³³

In Columns 1 and 2, we find no evidence that transfers are higher on days in which women see clients; if anything, transfers are slightly lower on days in which a woman supplies transactional sex, and on days when she sees more clients, though both coefficients are insignificant. That transfers do not depend on whether a woman sees a client is a strong piece of evidence to suggest that transfers are not implicit payment for sex.

In Column 3, we find a small, statistically insignificant increase in transfers on days in which women see more regulars, but a small decrease when she sees more casuals (which is significant at 10 percent). Because the transfers we consider in this paper are exclusively from regular clients, the small negative coefficient on the number of casual clients is almost surely due to sampling variation. In any case, both coefficients are very small: Seeing an additional client affects transfers by seven or eight shillings, which is a small percentage of daily transfers (102 Ksh per day).

32. The number of clients is defined as the number a woman saw that day, rather than the "stock" of regulars she has. We are unable to measure the latter. While we asked women to keep an ID number for each of her regulars in the second round of diaries, this data was kept very incompletely so we do not know how many regulars a woman is seeing at any point in time.

33. Since transfers come exclusively from regular clients, we could instead control only for activities with regular clients. Doing this yields very similar results.

Table 5
Transfers and Sexual Activities (Daily Level)

	(1)	(2)	(3)	(4)
	Dependent Variable: Gifts from Regular Clients (Daily)			
Mean of Dependent Variable ^a			102.21	
Sex worker saw at least 1 client	-11.57 (10.08)			
Number of clients seen		-3.74 (4.68)		
Number of regular clients seen			6.95 (7.05)	
Number of casual clients seen			-8.14 (4.63)*	
Number of clients vaginal sex ^b				-13.86 (5.75)**
Number of clients anal sex				1.35 (5.83)
Number of clients oral sex				-4.64 (5.03)
Number of clients manual stimulation				-2.95 (6.32)
Number of clients massage				-1.28 (5.97)
Number of clients kissing				8.04 (4.69)*
Number of clients giving company				7.40 (4.75)
Number of clients stripping				-1.47 (5.22)
Number of clients sex in thighs				-1.37 (7.16)
Number of clients "other" activities				5.46 (18.27)
Number of clients unprotected sex				18.06 (7.27)**
Activity controls	No	No	No	Yes
Observations	12,460	12,460	12,460	12,460
Number of women	192	192	192	192

Notes: These are fixed effects regressions (at the daily level) with controls for the day of the week and the month of the year. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.

a. Mean is for days on which a woman does not see clients.

b. This variable measures the number of clients with whom the woman had vaginal sex at least once in a given day. It is not the total number of times she had vaginal sex that day, since we did not collect information on the number of sex acts per client for all activities in all diary versions. All sexual behavior variables are coded in this manner. See text for more details.

Since women see an average of 0.54 regular clients and 0.98 casual clients in a normal day, the magnitudes of these coefficients are not large.

Finally, in Column 4, we examine the specific sexual activities provided by women. Most activities are insignificant, though several are not: Kissing and unprotected sex are positively correlated with transfers, while vaginal sex is negatively correlated. In interpreting the positive unprotected sex coefficient, note that the vast majority of unprotected sex acts are unprotected vaginal sex (Robinson and Yeh 2011), so that in most cases the unprotected sex and vaginal sex coefficients should be added together (yielding a small, statistically insignificant increase of about 4.2 Ksh associated with unprotected vaginal sex). Thus, while unprotected anal sex is associated with higher transfers, this is a rare event (occurring on 2 percent of days—see Robinson and Yeh 2011). Similarly, the kissing coefficient is not large, since women kiss only 0.92 clients on an average day. Overall, the results from Column 4 suggest that sexual activities have at most a weak effect on client transfers. Though we do not report the coefficients here, we also find that the response of transfers to shocks is similar even on days in which women see no clients, suggesting again that the transfers are not crowding out payments for sexual activities. Finally, we also find no evidence that transfers change in the days following a shock, so it is not the case that the transfers simply substitute payment for sex intertemporally.³⁴

An alternative way to test that transfers are not related to sexual activity would be to create a dependent variable, which is the sum of income and transfers, and examine how this sum varies with shocks. There are several problems with this, however, since labor supply is endogenous to the shocks—from Table 4, women work less when they are sick and when a friend or relative dies, so that income will tend to go down on days when shocks occur. We could in principle account for this by including labor supply measures as controls, but this will not work well if there are unobserved aspects of labor supply, which we do not have in our data set and which are correlated with both shocks and income (such as a woman's mood on a certain day, or the amount of time she spends with a client). In a regression of income on shocks, the existence of such omitted variables will tend to bias coefficients downward. Indeed we find just this: even when controlling for labor supply, income goes down on shock days.³⁵ For this reason, the sum of income and transfers does not respond significantly to shocks.

In light of our other evidence, however, it seems that the most likely interpretation for this result is that several important unmeasured dimensions of labor supply are omitted.

B. Regulars and Casuals Pay Similar Prices

Even though transfers are not correlated with activities, it still might be the case that regular clients pay a lower price for sexual activities and repay through later transfers. To test this, we run hedonic price regressions in Table 6, in which we regress the price paid on various sexual activities, along with interactions between those

34. See Supplementary Table 4 for results at the weekly level, posted at people.ucsc.edu/jmrtwo.

35. Note that this is not because women change the prices they charge in response to shocks - see Appendix Table A3.

Table 6
Prices and Sexual Activities by Client Type

	(1) Dependent Variable: Price Paid	(2)	(3) <i>p</i> -value for interaction term
Vaginal sex	24.21 (25.10)	7.58 (27.59)	
Vaginal sex * regular		57.44 (42.50)	0.18
Anal sex	77.19 (20.93)***	72.34 (21.65)***	
Anal sex * regular		16.77 (26.04)	0.52
Oral sex	23.68 (15.06)	6.20 (15.14)	
Oral sex * regular		52.32 (31.40)*	0.1*
Manual stimulation	48.60 (15.79)***	39.60 (14.95)***	
Manual stimulation * regular		28.39 (25.43)	0.27
Massage	61.27 (14.18)***	74.12 (16.27)***	
Massage * regular		-38.98 (26.52)	0.14
Kissing	51.92 (12.06)***	52.10 (11.88)***	
Kissing * regular		0.92 (22.54)	0.97
Company	72.07 (12.94)***	73.43 (14.58)***	
Company * regular		-5.05 (21.52)	0.81
Stripping	39.78 (11.22)***	29.50 (13.74)**	
Stripping * regular		27.54 (22.84)	0.23
Sex in thighs	34.87 (15.68)**	48.24 (18.49)***	
Sex in thighs * regular		-40.74 (29.27)	0.17
“Other” activities	58.58 (33.41)*	18.80 (27.08)	
“Other” activities * regular		92.37 (52.08)*	0.08*

(continued)

Table 6 (continued)

	(1)	(2)	(3)
	Dependent Variable: Price Paid		<i>p</i> -value for interaction term
Unprotected sex	42.33 (16.45)**	33.60 (19.98)*	
Unprotected sex * regular		23.72 (30.19)	0.43
Regular client	-16.64 (14.69)	-89.75 (49.32)*	
<i>p</i> -value for <i>F</i> -test that “regular” coefficient and all interaction terms are jointly insignificant		0.20	
Mean of dependent variable	453.40	453.40	
Observations	18,824	18,824	
Number of women	192	192	
R-squared	0.04	0.05	

Note: All regressions are fixed effects regressions with controls for the month and the day of the week. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent).

All regressions include controls for the round of data collection. The dependent variable is Kenyan shillings. The exchange rate was approximately 70 Kenyan shillings to \$1 US during the data collection period.

activities and whether the client is a regular. These regressions take the following form:

$$(7) \quad P_{irt} = \sum_{a=1}^A (\beta_a X_{irt}^a + \gamma_a X_{irt}^a R_{irt}) + \alpha_i + \nu_t + \epsilon_{irt}$$

In this equation, P_{irt} is the price for transaction r for woman i at date t . X_{irt}^a are controls for the specific activities that the women engages in with a client. R_{irt} is an indicator for whether the client in transaction r is a regular or a casual, and α_i is an individual fixed effect. ν_t is a date control, and ϵ_{irt} is a normally distributed error term.

In this regression, β_a measures the premium to a particular sexual activity for casuals, and γ_a represents the difference in premia between regulars and casuals. If these differences are negative and significant, it is possible that transfers are compensation for lower payments for sexual activities. If, however, the γ s are close to 0, then it is unlikely that transfers are implicit compensation for sexual activities.

In Table 6, Column 1 presents Equation 7 without the interaction terms, but with an indicator for whether the client is a regular, while Column 2 includes the interaction terms. Column 3 presents the *p*-value for the test that the coefficient for regulars is equal to that for casuals, for each activity. As can be seen from the last coefficient in Column 1, conditional on activities performed, regulars pay insignifi-

cantly different prices than casuals—the coefficient on the regular dummy is insignificant and small. From Column 2, the premia to each activity is similar for both types of clients. If anything, regulars pay more for oral sex and “other activities.” However, the regular coefficient is now negative and significant at 10 percent. To test whether the coefficients are jointly significant, we perform an F -test for the joint significance of all the interactions and the regular coefficient. The p -value of this test is 0.20, suggesting minimal differences in activity-specific premia.

One possible concern with these results is that regulars and casuals may differ in various background characteristics (even though Table 2 shows small differences in observables). We check this by including client characteristics (occupation, tribe, cleanliness, attractiveness, and whether the client is circumcised) as controls in these regressions, and find similar results.³⁶ However, these results should be taken with some caution since we only asked for client information in the second round of diaries and, even in that round, many women neglected to fill this information. Consequently, there are few observations with client information, and the subsample with this information is not random. That caveat in mind, we find no evidence that transfers are compensation for sexual activities: While regulars are more likely to have unprotected sex than casuals, they pay just as much for this as do casuals. Thus, the explanation for these results does not appear to be that regulars are implicitly paying for higher-risk sex through these transfers.

Why then do clients become regulars, if they do not receive a discount on the price and if they are obligated to make state-dependent transfers to women? While we did not interview clients to ask this question, there are several likely reasons. First, as sex work is technically illegal in Kenya, there are few brothels in this area. Instead, men will often meet sex workers at bars or nightclubs. Doing this may be costly—a client has to physically go to the location, spend money on food and drinks, negotiate with the sex worker, and there is some risk he cannot find a woman to his liking. Thus, having a relationship with a woman who he can simply call on the phone might save on transaction costs and minimize the risks of not finding a woman on a particular evening. Second, men might prefer a certain “type” of woman, or the personality of a particular woman. One of the main services sex workers provide is to provide company, and so men will likely value those women with whom they enjoy spending time. For either reason, becoming a regular may bring benefits (even if he is then obligated to send her transfers).

VII. Access to Client Transfers and Participation in Transactional Sex

Our primary interest in these results is the extent to which they affect the decisions that women make to enter or remain in transactional sex, particularly in an environment with frequent and costly shocks. Unfortunately, our data set is not well-suited for answering this question: in a perfect world, we would have a

36. See Supplementary Table 5, posted at people.ucsc.edu/jmrtwo

long panel on a large, representative sample of women, and observe whether those women more vulnerable to shocks are more likely to enter transactional sex.

However, since our data set consists exclusively of women already engaging in transactional sex, the most that our analysis can show is evidence of transfers providing an insurance function for women already in the market. To provide some evidence on the decision to enter transactional sex, we conducted a short survey in April and May 2010. As it had been several years since we had conducted the diaries (and many women had moved, left sex work, or died), we surveyed a separate sample of 99 women. These women are currently active in the peer groups, and are similar in age and in experience in transactional sex to the women who participated in the diaries. It is important to note that these women were not randomly selected and all of them participate in the peer groups.³⁷

In the survey, we asked women questions about why they entered sex work originally, why they continue in sex work, and why they see regular clients. We also asked questions about whether they expect help from regular clients, and whom they most rely upon in times of need. To avoid influencing responses, we asked each question in two ways: (1) by asking the questions in an open-ended way and coding all responses that were given, and (2) by reading the woman a list of all possible responses and checking those to which she responded yes. The unprompted questions were always read first.

The results are presented in Table 7. The top of the Table reports responses to questions about motivations for entering sex work. As expected, the income premium to sex work is cited by the vast majority of women: 79 percent of women report this as a reason even when not prompted, and 100 percent do when prompted. Also of interest, however, is that between 78 and 99 percent of women report that they entered because they encountered an adverse shock and needed the income to cope with it. Smaller but significant percentages of women report love or looking for a husband as reasons for entry.

Turning to the questions about why women choose to remain in transactional sex, all women cite the income premium. A sizeable fraction of women also cites support from regular clients: between 21 percent (unprompted) and 97 percent (prompted) of women report access to insurance through clients as a reason for staying in the market. This motivation is substantially larger than that of love or finding a husband.

The evidence is even stronger when women are asked directly why they see regular clients specifically. Help with shocks is the primary reason listed. This is a much more common response than that it is more enjoyable to spend time with regulars, that regulars are at less risk of being HIV positive, or that regulars pay more.

Panel B provides some evidence against the alternative hypothesis that women enter sex work to find a husband. While the average woman in this subsample has 2.37 clients, she reports having no chance of marrying 1.32 of these. In addition, all women in this sample report that they expect help from regulars when shocks occur, even those whom they have no chance of marrying.

37. Apart from age and experience, we did not collect detailed demographic information from these women.

Table 7
Self-Reported Reasons to See Regulars and Engage in Sex Work

Panel A. Self-Reported Reasons	(1) Unprompted ^a	(2) Prompted ^b
Self-reported reasons for entering sex work		
Love / bodily desire	0.02	0.41
To find a husband	0.07	0.36
Income premium	0.79	1.00
Encountered adverse shock	0.78	0.99
Self-reported reasons for continuing sex work		
Love / bodily desire	0.04	0.58
To find a husband	0.12	0.61
Income premium	1.00	1.00
Regular clients provide help with shocks	0.21	0.97
Self-reported reasons for seeing regular clients		
Love / bodily desire	0.33	0.86
To find a husband	0.31	0.78
They pay more	0.09	0.71
They are less trouble	0.07	0.37
They are at less risk of HIV	0.01	0.02
It is more enjoyable spending time with regulars	0.07	0.29
They can help with shocks	0.87	0.98
Panel B. Information about Regular Clients	(1)	
Number of regular clients	2.37 (1.07)	
Number of regular clients with a good chance to marry	0.73 (0.47)	
Number of regular clients with no chance to marry	1.32 (0.81)	
Do you expect help from regular clients when shocks occur?	1.00	
Do you expect help from regular clients whom you have no chance of marrying when shocks occur?	1.00	

(continued)

Finally, in Panel C, we asked women for the primary sources they use for coping with risk. Ninety-eight percent of women report that clients are either the primary or secondary source used for risk-coping, a figure far greater than any other source (transfers from friends or family, working more, or using savings). This is reassuring in that it closely parallels our findings from the diaries.

Table 7 (continued)

	Self-Reported Sources Used for Risk Coping	
	(1) Primary	(2) Secondary
Panel C. Risk-Coping		
Regular Clients	0.70	0.28
Friends / family	0.13	0.45
Working more	0.10	0.12
Savings	0.07	0.14
Observations	99	

Notes: Figures are averages from a short survey conducted in April-May 2010 with a sample of 99 women. Standard deviations are in parentheses. In Panel B, the omitted category is those clients with whom the woman has an intermediate chance of marrying.

a. "Unprompted" responses are coded responses from open-ended questions.

b. "Prompted" responses are responses when women were read a list of possible reasons, to which they could respond yes or no. The unprompted questions were always asked first.

VIII. Conclusion and Policy Implications

In previous work, we have shown that income risk has important effects on the intensive margin for sex workers: When shocks occur, women are more likely to increase the amount of sex they have, and switch to riskier but better-paying activities (Robinson and Yeh 2011; Dupas and Robinson 2010a; Dupas and Robinson 2010b). In this paper, we present additional evidence that vulnerability to income risk also affects the extensive margin to enter and continue in the transactional market. In particular, we have shown that sex workers develop relationships with regular clients, and that regular clients become one of the primary sources of insurance that women can rely upon when shocks occur. Women report access to these transfers as an important reason for engaging in transactional sex.

Taken together with our previous work, our results strongly suggest that programs to reduce vulnerability to income risk can have large effects. For instance, access to health insurance or to subsidized health inputs could substantially lessen the magnitude of health shocks, and could reduce incentives to find regulars to help with such occurrences. Individual savings accounts could also potentially reduce vulnerability by allowing women to save securely in anticipation of shocks.

Of course, as long as there exists a large income premium to sex work, many women will always be willing to engage in transactional sex, so reducing vulnerability to risk will not eliminate the transactional sex market. However, policies to reduce income and consumption risk will make it less likely that women who enter are those who have recently been hit with negative shocks (as suggested in Table 7), or those who are least able to cope with risk on their own.

References

- Arunachalam, Raj, and Manisha Shah. 2008. "Prostitutes and Brides?" *American Economic Review (Papers & Proceedings)* 98(2): 516–522.
- Caldwell, John C., Pat Caldwell, and Pat Quiggin. 1989. "The Social Context of AIDS in Sub-Saharan Africa." *Population and Development Review* 15(2): 185–205.
- Case, Anne and Alicia Menendez. 2009. "Requiescat in Pace? The Consequences of High Prices Funerals in South Africa." NBER Working Paper #14998.
- Central Bureau of Statistics. 2001. *1999 Housing and Population Census*. Nairobi, Kenya: Central Bureau of Statistics.
- Central Bureau of Statistics, Ministry of Health, and ORC Macro. 2004. *Kenya Demographic and Health Survey 2003*. Calverton, Maryland: Central Bureau of Statistics, Ministry of Health, and ORC Macro.
- Della Giusta, Marina, Maria Laura Di Tommaso and Steinar Strom. 2008. *Sex Markets: A Denied Industry*. Routledge: New York, NY.
- Dupas, Pascaline and Jonathan Robinson. 2009. "Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya." NBER Working Paper #14693.
- . 2010a. "Coping with Political Instability: Micro Evidence from Kenya's 2007 Election Crisis." *American Economic Review (Papers & Proceedings Issue)* 100(2): 120–124.
- . 2010b. "The (Hidden) Costs of Political Instability: Evidence from Kenya's 2007 Election Crisis." Working paper, UCLA and UCSC.
- Edlund, Lena, and Evelyn Korn. 2002. "A Theory of Prostitution." *Journal of Political Economy* 110(1): 181–214.
- Gertler, Paul, Manisha Shah, and Stefano M. Bertozzi. 2005. "Risky Business: The Market for Unprotected Commercial Sex." *Journal of Political Economy* 113(3): 518–550.
- Hunter, Mark. 2002. "The Materiality of Everyday Sex: Thinking Beyond Prostitution." *African Studies* 61(1): 99–120.
- Luke, Nancy. 2006. "Exchange and Condom Use in Informal Sexual Relationships in Urban Kenya." *Economic Development and Cultural Exchange* 54(2): 319–348.
- Morduch, Jonathan. 1995. "Income Smoothing and Consumption Smoothing." *Journal of Economic Perspectives* 9(3): 103–114.
- Morison, Linda A., Helen A. Weiss, Anne Buve, Michel Carael, Severin-Cecile Abega, Frederick Kaona, Lydie Kanhonou, Jane Chege and Richard J. Hayes. 2001. "Commercial Sex and the Spread of HIV in Four Cities in Sub-Saharan Africa." *AIDS* 15(4): S61–9.
- Orubuloye, I.O., Pat Caldwell, and John Caldwell. 1993. "The Role of High-Risk Occupations in the Spread of AIDS: Truck Drivers and Itinerant Market Women in Nigeria." *International Family Planning Perspectives* 19(2): 43–48.
- Plummer, F.A., N.J.D. Nagelkerke, S. Moses, J.O. Ndinya-Achola, J. Bwayo, and E. Ngugi. 1991. "The Importance of Core Groups in the Epidemiology and Control of HIV-1 Infection." *AIDS* 5(Supplement 1): S169–176.
- Rao, Vijayendra, Indrani Gupta, Michael Lokshin, and Smarajit Jana. 2003. "Sex Workers and the Cost of Safe Sex: The Compensating Differential for Condom Use Among Calcutta Prostitutes." *Journal of Development Economics* 71(2): 585–603.
- Robinson, Jonathan and Ethan Yeh. 2011. "Transactional Sex as a Response to Risk in Western Kenya." *American Economic Journal: Applied Economics* 3(1): 35–64.
- Rosenzweig, Mark R. and Oded Stark. 1989. "Consumption Smoothing, Migration, and Marriage: Evidence from Rural India." *Journal of Political Economy* 97(4): 905–926.
- Rosenzweig, Mark and Kenneth Wolpin. 1993. "Credit Market Constraints, Consumption Smoothing, and the Accumulation of Durable Production Assets in Low-Income

- Countries: Investments in Bullocks in India.” *Journal of Political Economy* 101(2): 223–44.
- Schoepf, Brooke Grundfest. 2004. “AIDS in Africa: Structure, Agency, and Risk.” In *HIV and AIDS in Africa: Beyond Epidemiology*, eds. Ezekiel Kalipeni, Susan Craddock, Joseph R. Oppong, and Jayati Ghosh, 121–132. Malden, MA: Blackwell Publishers.
- Swidler, Ann and Susan Cotts Watkins. 2007. “Ties of Dependence: AIDS and Transactional Sex in Rural Malawi.” *Studies in Family Planning* 38(3): 147–62.
- Townsend, Robert. 1994. “Risk and Insurance in Village India.” *Econometrica* 62(3): 539–591.
- UNAIDS. 2002. *Sex Work and HIV/AIDS: UNAIDS Technical Update*. Geneva: UNAIDS.
- Vandepitte, J et al. 2006. “Estimates of the Number of Female Sex Workers in Different Regions of the World.” *Sexually Transmitted Infections* 82(Supplement 3): 18–25.
- Wojcicki, Janet Maia. 2002. “Commercial Sex Work or Ukuphanda? Sex-for-Money Exchange in Soweto and Hammanskraal Area, South Africa.” *Culture, Medicine, and Psychiatry* 26(3): 339–70.
- World Bank. 2009. “Transport against HIV/AIDS: Synthesis of Experience and Best Practice Guidelines.” Transport Papers 25, Washington, DC.

Table A1
Shocks and Transfers from Regular Clients (Weekly)

	(1)	(2)	(3)	(4)	(5)	(6)
Mean of Dependent Variable ^a			72.03			
Panel A. Household Sickness						
Household Sickness						
Proportion of days somebody in the household other than respondent) sick this week	5.21 (18.96)	5.54 (18.52)	6.79 (18.92)	-5.21 (25.86)	-4.98 (25.77)	-6.05 (26.21)
Proportion of days somebody in the household other than respondent) sick last week				-1.91 (21.36)	-1.46 (21.22)	-3.89 (21.29)
Proportion of days somebody in the household sick last week * proportion of days somebody in the household sick this week				6.28 (41.76)	6.25 (41.40)	6.63 (41.54)
Own Sickness						
Proportion of days respondent sick this week	58.82 (20.62)***	58.81 (20.62)***	56.62 (21.16)***	38.47 (22.35)**	38.25 (22.42)**	38.54 (22.36)**
Proportion of days respondent sick last week				33.89 (19.29)**	33.02 (19.53)**	30.57 (19.85)
Proportion of days respondent sick this week * proportion of days respondent sick last week				7.42 (46.21)	7.86 (45.99)	7.88 (46.68)
Mean number of regular clients seen		12.74 (23.21)			12.91 (20.45)	
Mean number of casual clients seen		-2.70 (10.68)			-5.86 (8.88)	
Detailed sexual activity controls	No	No	Yes	No	No	Yes
Observations	2,344	2,344	2,344	2,116	2,116	2,116
Number of women	192	192	192	192	192	192

p-value for proportion of days somebody in the household sick this week + proportion of days last week 0
p-value for proportion of days respondent sick this week + proportion of days last week 0

0.02**
0.89

0.01***

0.01***

—

—

—

—

—

—

—

Panel B. Death of a Friend or Relative

Proportion days in which there was death of a friend or relative this week	130.67 (86.22)	131.96 (86.68)	134.09 (83.53)	102.03 (69.97)	102.94 (70.72)	103.19 (69.99)
Proportion days in which there was death of a friend or relative last week				2.09 (41.49)	3.60 (41.65)	3.62 (40.26)
Proportion of days death this week * proportion of days death last week				-101.70 (90.44)	-101.98 (88.72)	-116.38 (94.89)
Average number of regular clients seen		16.90 (33.40)			20.20 (30.11)	
Average number of casual clients seen		-4.42 (16.07)			-5.24 (12.08)	
Activity controls	No	No	Yes	No	No	Yes
Observations	1,532	1,532	1,532	1,320	1,320	1,320
Number of women	190	190	190	190	190	190
<i>p</i> -value for proportion of days death this week + proportion of days death last week = 0				0.97	0.94	0.89

Notes: All variables are means aggregated over a week. Regressions are fixed effects regressions with month fixed effects. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). Sickness is an indicator variable equal to one if respondent reports a cough, fever, malaria, typhoid, diarrhea, cuts, burns, or other illnesses. Sexual activity controls include vaginal sex, anal sex, oral sex, kissing, massage, stripping, whether the women gave a client company, whether the woman had unprotected sex, and whether she engaged in any other activities. All sexual activity variables measure the number of clients with whom the woman engaged in the given activity at least once, since we did not record the number of repetitions for all activities. Sexual activities were missing for some women. To avoid dropping them from the regressions, we code the activity as zero and generate dummies for whether the activity is missing. See text for more details. Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.
 a. Mean of Dependent variable is mean when all shocks equal 0 over the week.

Table A2
Shocks and Transfers from Regular Clients for Other Shocks (Daily)

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Gifts from Regular Clients					
Mean of Dependent Variable ^a			76.10			
Panel A. Respondent was Asked for a Gift or Loan						
Respondent was asked for a gift or loan today	24.26 (18.62)	24.25 (18.57)	24.81 (17.80)	47.05 (29.45)	46.84 (29.10)	47.97 (28.41)*
Respondent was asked for a gift or loan yesterday				21.71 (26.38)	21.24 (26.58)	20.33 (26.39)
Respondent was asked today * respondent was asked yesterday				-57.05 (77.07)	-57.47 (76.12)	-58.28 (76.45)
Number of regular clients seen				5.37 (11.47)	6.02 (12.22)	
Number of casual clients seen				-6.02 (8.73)	-7.80 (8.78)	
Activity controls	No	No	Yes	No	No	Yes
Observations	5,465	5,465	5,465	4,929	4,929	4,929
Number of women	108	108	108	108	108	108
<i>p</i> -value for asked for gift/loan today + asked for gift/loan yesterday = 0	—	—	—	0.84	0.86	0.86

Panel B. Respondent had an STI

Respondent had an STI today	19.52 (21.90)	17.02 (21.97)	16.88 (22.25)	82.39 (54.17)	78.22 (54.01)	78.72 (54.58)
Respondent had an STI yesterday				53.21 (30.37)*	53.93 (30.52)*	53.34 (29.85)*
Respondent had an STI today *				-135.64	-135.17	-135.55
Respondent had an STI yesterday				(69.81)*	(69.20)*	(69.93)*
Number of regular clients seen		6.49 (7.03)			5.77 (7.35)	
Number of casual clients seen		-8.71 (4.69)*			-10.04 (4.75)**	
Activity Controls	No	No	Yes	No	No	Yes
Observations	12,321	12,321	12,321	11,330	11,330	11,330
Number of women	192	192	192	192	192	192
p-value for STI today + STI yesterday 0	—	—	—	1.00	0.89	0.87

Notes: All variables are measured at the daily (rather than client) level, as we are not able to match client-specific transfers to client-specific activities. Regressions are fixed effects regressions with controls for the day of the week and the month of the year. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). Sexual activity controls include vaginal sex, anal sex, oral sex, kissing, massage, stripping, whether the woman gave a client company, whether the woman had unprotected sex, and whether she engaged in any other activities. All sexual activity variables measure the number of clients with whom the woman engaged in the given activity at least once, since we did not record the number of repetitions for all activities. Sexual activities were missing for some women. To avoid dropping them from the regressions, we code the activity as zero and generate dummies for whether the activity is missing. See text for more details. Exchange rate was roughly 70 Kenyan shillings to US \$1 during the sample period.

a. Mean of dependent variable is mean when all shocks equal 0.

Table A3
Prices and Shocks

	(1)	(2)
	Dependent Variable Price Paid	
Somebody in household sick	25.81 (62.83)	
Respondent sick	74.36 (60.06)	
Death of a friend or relative		-72.38 (107.87)
Vaginal sex	69.41 (30.66)**	43.55 (35.19)
Vaginal sex * somebody in the household sick	-35.37 (42.80)	
Vaginal sex * respondent sick	-62.05 (39.64)	
Vaginal sex * funeral		33.50 (83.67)
Anal sex	89.49 (26.77)***	147.49 (37.47)***
Anal sex * somebody in the household sick	-5.06 (33.85)	
Anal sex * respondent sick	-23.18 (37.11)	
Anal sex * funeral		50.74 (71.00)
Oral sex	26.66 (19.16)	47.76 (22.49)**
Oral sex * somebody in the household sick	-6.22 (23.57)	
Oral sex * respondent sick	3.92 (19.60)	
Oral sex * funeral		128.87 (74.59)*
Had unprotected sex	43.83 (22.11)**	75.14 (25.09)***
Had unprotected sex * somebody in the household sick	7.65 (27.84)	
Had unprotected sex * respondent sick	-9.16 (22.18)	
Had unprotected sex * funeral		-98.05 (93.07)

(continued)

Table A3 (continued)

	(1)	(2)
	Dependent Variable	
	Price Paid	
Regular	- 18.29 (18.44)	- 13.06 (20.01)
Regular * somebody in the household sick	- 5.18 (25.50)	
Regular * respondent sick	12.19 (25.20)	
Regular * funeral		- 52.19 (40.41)
<i>p</i> -value for joint significance, household sickness interaction terms	0.37	
<i>p</i> -value for joint significance, own sickness interaction terms	0.13	
<i>p</i> -value for joint significance, funeral interaction terms		0.54
Mean of dependent variable	453.71	531.66
Observations	18,504	10,331
Number of women	192	190
R-squared	0.05	0.05

Note: All regressions are fixed effects regressions with controls for the month and the day of the week. Standard errors are in parentheses and clustered at the individual level (* significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent). All regressions include controls for the round of data collection. The dependent variable is Kenyan shillings. The exchange rate was approximately 70 Kenyan shillings to \$1 US during the data collection period. Regressions include several other measures of sexual behavior, but the coefficients are omitted for space. These include providing company, massage, stripping, sex in thighs, manual stimulation, and other activities. The *p*-values listed at the bottom of the table test for the joint significance of all the interaction terms (including those that are omitted for space).