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The (Hidden) Costs of Political Instability: Evidence from Kenya's 2007 Election Crisis*

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Abstract

This paper studies whether and how households coped with the civil conflict that immediately followed the December 2007 Presidential Election crisis in Kenya. We observe sizeable downfalls in income, expenditure, and food consumption for a broad segment of the rural population over the two months of social unrest. To make up for the income shortfall, women who supply transactional sex engaged in higher risk sex both during and after the crisis, increasing the risk of HIV/AIDS transmission. These results suggest that social unrest is an important channel through which political instability can affect long-term outcomes and development.

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1 Introduction

Across countries, there is a strong inverse relationship between political instability and growth, investment and savings rates.[1] There are two main channels through which political instability (even conditional on overall government quality) may negatively affect growth. First, political instability increases uncertainty and expropriation risk, which in turn may discourage physical capital accumulation and investment. Second, political instability typically generates episodes of social unrest and civil conflict, during which households may need to disinvest in physical and human capital in order to cope with disruptions in market and productive activities. This paper focuses on the second channel, which has so far been largely understudied given the difficulty of collecting data during civil conflict and the typical lack of a credible counterfactual.[2]

Episodes of social unrest and their associated market disruptions, even if short-lived, may have long-term consequences, especially in poor countries where individuals lack formal means of coping with shocks, such as insurance or access to credit. Studies of other types of aggregate shocks, such as financial crises or weather shocks, have identified several pathways through which large short-term shocks may affect long-term outcomes. For example, households might be forced to reduce caloric intake (Bhattacharya et al., 2003; Maccini and Yang, 2009), which may have long-term effects for children (e.g., Hoddinott et al., 2008). Further, if households are poor enough that the marginal utility of consumption is very high, they may choose to maintain consumption above a minimum level by engaging in strategies that

[1] See, for example, Barro (1991); Alesina and Perrotti (1995); Alesina et al. (1996); Venieris and Gupta (1986); Collier (2007).

[2] A notable exception is Abadie and Gardeazabal (2003).

are costly in the long-run; for example by pulling their children out of school. While these types of responses may be very costly, they will not show up in basic risk-coping tests which examine the responsiveness of consumption to income shocks (Morduch, 1995; Chetty and Looney, 2006). In general, these types of "hidden costs" are difficult to identify empirically and consequently have received relatively little attention. In this paper, we document a specific hidden cost of income risk: the supply of unprotected transactional sex. Since unprotected sex carries a significant income premium, women without alternative risk-coping options may choose to increase their supply of unprotected sex to make up for income shortfalls. Given the prevalence of HIV/AIDS in the region, such a coping mechanism could have dramatic long-term health consequences for these women, their partners, and Kenya generally.

We use a unique dataset collected in 2008 in Kenya, in the wake of two months of social unrest caused by an unexpected political crisis. After a contentious and bitterly fought Presidential campaign between the incumbent Mwai Kibaki and the challenger Raila Odinga, Kibaki was announced the winner on December 29, 2007 despite widespread reports of vote-rigging and other abuses. The announcements sparked protest and violence throughout Kenya, and led to a state of emergency that virtually shut down roads and markets. The upheaval lasted until February 28, 2008, when a peace agreement was signed and a power-sharing government was formed.

To estimate the impact of the crisis, we interviewed a total of 586 daily income earners in the immediate aftermath of the crisis (starting just a few weeks after it ended), and asked them to recall their income, expenditures, and consumption over the November 2007 – March 2008 period. We collected this data in Western Kenya, where the upheaval did not result in a

substantial direct human toll in terms of casualties, but where market activity was seriously disrupted, with price increases of 20-30% between December and the first week of January.

Figures 2-5 visually present our main findings. We first document the impact of the crisis on the income, expenditures, and food consumption of two samples of individuals: (1) poor, small-scale vendors and artisans who earn approximately $2.50 per day; and (2) somewhat richer shop owners who could be considered "middle class" in rural Kenya and who self-report an income of about $10 a day. We estimate that the crisis had a sizeable negative impact on the incomes of both types of individuals. We also find that the crisis had large, negative impacts on expenditures and quantities consumed for all individuals, and that households were more likely to skip meals during and immediately after the crisis. The main mechanisms used to mitigate the drop in income were the sale of assets (particularly, durables and animals) and transfers from relatives or friends, but these strategies provided little protection overall. Impacts of the crisis were similar across baseline wealth and access to informal credit, likely because this crisis was an aggregate shock which affected all members of informal insurance networks simultaneously.

We then analyze the effect of the crisis on the frequency with which women supply unprotected transactional sex. Informal sex work is ubiquitous in rural Kenya, as in many poor areas around the world (Swidler and Watkins, 2007; Luke, 2006; Wojcicki, 2002). The area of study is a known "hotspot" for transactional sex, and commercial sex is indeed quite common: an estimated 12% of women aged 15-49 in the area of study are involved in formal or informal sex work (Robinson and Yeh, 2009). While this figure is only an estimate, it does point to the prevalence of transactional sex in the area, and highlights how studying the transactional sex market is relevant for understanding the spread of HIV in the general

population.

Without adequate formal consumption smoothing devices, women involved in transactional sex often resort to unprotected sex, which pays more than protected sex, to make up for income shortfalls (Robinson and Yeh, 2009). This poses a significant risk to the long-term health of these women, as well as that of the entire population, since the sexual practices of sex workers have been identified as a main factor in the spread of HIV/AIDS (Plummer et al., 1991; UNAIDS, 2002; Chen et al., 2007).

We find that women who supply transactional sex suffered even greater income downfalls than the general population during the height of the crisis (largely because it was hard to find clients with markets closed), and were unable to maintain consumption. As a result, women increasingly engaged in high-risk sex. These effects persisted after the crisis ended.

These findings suggest that major political crises might have large, positive impacts on HIV transmission rates in the long-run. In order to make up for lost income, the women in our sample increased their chance of becoming infected with HIV, which in turn could easily be passed on to the general population. While this particular crisis was likely too short-lived to have a large increase on overall HIV prevalence, other crises could. Given that formal risk-coping mechanisms are very rare in poor countries, the fact that women use unprotected sex to cope with shocks could be part of the explanation for the high HIV and the high mortality rates observed among women who supply transactional sex.

An obvious shortcoming of our analysis is that we do not know the counterfactual – what the income and consumption patterns of households in our study area would have been, had the crisis not taken place. This is potentially a problem because there is likely to be some seasonal variation. For example, it is well established that expenditures are higher than usual

in December, because of the holidays. The magnitude of the changes we observe in Figures 2-5 is quite large, however, and it is difficult to imagine that seasonal variations in consumption and income in a normal year are anywhere close to the variation we observe over the crisis period. To strip the estimates of possible seasonal variation, we resurveyed our sample of sex workers exactly one year after the post-crisis survey, and asked them about income and sexual behavior between November 2008 and March 2009. This enables us to control for seasonal fluctuations by including month fixed effects in our regression specifications. This difference-in-difference approach confirms that the crisis had a large short-term impact on income and consumption of sex workers, and generated a substantial increase in the supply of risky sex.

Our contribution to the literature is two-fold. First, we estimate the economic impacts of civil conflict. Typically the dual causality between conflict and economic conditions make convincing identification of impacts difficult (Collier, 2007; Miguel et al., 2004; Blattman and Miguel, forthcoming). The data in this paper represents high-quality microeconomic data collected immediately after an unexpected political crisis, making it possible to identify the immediate effects of the crisis and ensuing social unrest on outcomes. While a previous literature has shown that civil war has devastating effects on both health and education (Blattman and Annan, forthcoming; Bundervoet, Verwimp and Akresh, 2009; Akresh and De Walque, 2009), our contribution is to show that civil unrest, a milder and more common form of civil conflict, also has important negative effects.

Second, by identifying the increase in unprotected sex during and after the crisis our paper contributes to a literature which looks at the hidden costs of conflict, such as excess mortality due to the deterioration of health infrastructure or the diversion of public funds

from public health or education towards military or economic rebuilding.[3] In Sub-Saharan Africa, where transactional sex is ubiquitous, increases in unprotected sex and other risky behaviors are likely to be common during periods of conflict. These costs come in addition to the direct health costs of civil conflict, such as casualties directly linked to the violence.[4]

Political instability of the type we study is common in poor countries, especially in Sub-Saharan Africa (Blattman and Miguel, forthcoming). Besides the Kenya crisis we study in this paper, recent examples of social conflict generated by political instability include unrest following the coup in Madagascar in January/February 2009, state violence before the presidential election run-off in Zimbabwe in 2008, and riots that forced thousands of businesses to shut down in Pakistan following Benazir Bhutto's assassination in 2007. Understanding how these sporadic yet recurrent episodes of social unrest affect households is critical in understanding the role of political instability in underdevelopment.

2 Background: The 2007 Election Crisis in Kenya

After a long and hard fought election campaign, Kenya held general elections on December 27, 2007. Despite concerns about serious flaws in the counting and tallying of votes and the long delay before announcing the results, the incumbent Mwai Kibaki was announced the winner of the Presidential vote on December 29, by a narrow margin, over the opposition candidate, Raila Odinga. The announcement of the election results sparked widespread violence in many parts of Kenya. Looting, arson, and property destruction were rampant

[3] See, for example, Ghobarah, Huth, and Russett (2003), Roberts et al. (2003), Burnham et al. (2006), and Coghlan et al. (2006).

[4] For studies documenting the effect of conflict on sexual violence against women, see Swiss et al. (1998) and Johnson et al. (2008).

throughout January and February, 2008. The violence is estimated to have resulted in about 1,200 deaths and the displacement of 500,000 or more people (Gibson and Long, 2009). After weeks of negotiation, a power sharing agreement was finally signed on February 28, 2008, and general calm was restored.

The human toll was high. A few months after the end of the civil conflict, 30 percent of the population reported a specific personal impact of the post-election violence (Romero, Kimenyi and Dercon, 2008). These impacts included personal injury, displacement from home, property destruction, or the death of friends or relatives. In addition to the direct effect on the victims of the violence, the political crisis and resulting civil conflict led to massive economic disruptions in January and February, as commercial transport was halted through much of the country and market centers were closed. People remained hidden inside their houses for days on end, often without food, to avoid getting caught in the violence. Areas dependent on transportation and imports or exports were particularly hard-hit (Glauser, 2008).

Our data comes from Busia District in Western Province. Its market center, Busia Town, is a semi-urban border town on the main trucking route between Nairobi and Kampala, Uganda. Busia was only marginally affected by outright violence, but fires, road blockades, and market closures were common during the crisis. In particular, roadblocks on the main transportation artery (the Nairobi-Kampala road) led to shortages in many items, and prices skyrocketed. Figure 1 shows the changes in prices for 6 essential products during and after the crisis. The price of food items such as sugar, milk, and cooking oil increased by 20-30% in the week following the presidential election. Other essential items such as cell phone cards and soap experienced similar price changes. For some items, the price remained high even

after the power-sharing agreement was signed. Note that for several of the items, prices exceeded the manufacturer's suggested retail price during the crisis.

The disruptions had large impacts on the lives of those that depend on the local markets for their livelihoods. Figure 2 presents graphs showing the extent of the disruption in income and expenditures for small-scale market vendors and artisans, and Figure 3 presents similar graphs for a higher-income group, the owners of retail shops. Both groups were severely affected for at least 3 weeks in January.

The disruptions also had severe, less obvious effects for one understudied population that particularly depends on normally functioning markets: women who supply transactional sex. Since the crisis caused curfews and market closures, it was difficult for women to find clients. In addition, since a significant percentage of the clients of sex workers are truck drivers, the road closures and roadblocks decreased the pool of available clients. Finally, to the extent that transactional sex is a normal good, the drop in income observed among the general population (Figures 2 and 3) further contributed to the decrease in the demand for transactional sex over the crisis period. Figure 4 presents a few graphs showing the extent of the disruptions experienced by women who supply transaction sex. Average income from sex work was essentially zero for two full weeks, and did not return to normal until February. Other sources of income (which include small-scale entrepreneurship and salaried work in bars and restaurants) also dried up during the period, and had not recovered by the time we conducted the survey in March 2008, possibly because they had to draw down their business capital during the crisis period.

3 Data and Methodology

3.1 Sample

The data we use is drawn from three distinct samples. First, we collected data on a set of 151 market vendors, artisans, and bicycle taxi drivers previously followed in Dupas and Robinson (2009). We visited each individual in the sample in the aftermath of the crisis (March 2008) and collected retrospective data on income, expenditures, various consumption measures including the number of meals consumed and the types of food consumed, and other related outcomes, over the November 2007 – March 2008 period (as presented in Figure 2). For each outcome, respondents were asked to recall the amount for an "average week" in November 2007, December 2007, February 2008 and March 2008. In addition, we asked for a detailed account week by week for January 2008 (since the crisis was particularly severe in early January). Given the salience of the events that occurred during the political crisis, people were able to easily remember each week of January separately.[5] The survey also asked about the risk-coping strategies employed during the crisis. We supplement this dataset with background information collected in 2006 and used in Dupas and Robinson (2009).

Second, using the same survey instrument, we simultaneously collected data from 221 local shop owners (some of this data is presented in Figure 3). The price data presented in Figure 1 was also collected from these shops. We supplement this dataset with background information collected in 2006-2008 and used in Kremer, Lee, Robinson, and Rostapshova

[5] On the one hand, salient events might increase the vividness of memory and thus the accuracy of recall. On the other hand, salient events might lead people to remember only extreme situations. In our case, this would mean that respondents exaggerated how bad things were during the crisis. While we cannot rule this out, it seems unlikely that this accounts for all of our results given the price increases we observe (in which prices increased past the manufacturer's suggested retail price). In addition, much of this paper focuses on how women responded after the crisis ended.

(2009).

Third, we simultaneously collected data on a sample of 214 women who supply transactional sex. The sample is drawn from a universe of sex workers previously constructed in Robinson and Yeh (2009), which constitutes a random sample of sex workers identified through a snowball methodology in July, 2005.[6] The survey instrument used with this sample was similar, but slightly more involved, than the one used with market vendors and shop owners. In addition to the income, expenditure, and consumption measures listed above, we also collected information on income in the sex sector and on the number of clients seen. Importantly, we also collected detailed information on sexual activities performed between November 2007 and March 2008. We supplement this dataset with background information collected in 2005-06 and used by Robinson and Yeh (2009).

Table 1 presents summary statistics on the three populations that compose our sample.[7] Panel A presents data collected in the background surveys collected before the crisis. Overall, 50% of the small-scale vendors and 41% of shop owners are female. Interestingly, sex workers are better educated than market vendors, though less than shop owners. A similar pattern holds for durable asset ownership (note however that shop owners are much richer than sex workers). Eighty-six percent of sex workers are the heads of their households, and 86% hold jobs outside of sex work.

Finally, almost all of the people in the three samples are Luhya, Luo or Teso, the ethnic

[6] In total, we tracked 228 women, but we focus on the 214 of them who were still actively involved in sex work in this paper.

[7] In an effort to keep these three samples as representative as possible, we attempted to find all individuals who had been sampled in prior studies. Overall, we were able to collect surveys from 228/281 shops (81%), 151/167 market vendors, artisans and bicycle taxis (90%), and 228/248 sex workers (92%). Most of those that did not take part in the survey had moved out of the survey area. Note that the violence did not cause many exits of businesses. No market vendors or sex workers exited because of the violence. Four Kikuyu-owned shops were burned down, however, comprising about 1% of the shops in the study area.

groups native to Busia town and the neighboring areas. A very small minority are Kikuyu (the group that strongly backed the incumbent, and the group which was targeted by local mobs in Western Kenya). The ethnic mix again reiterates the point that the majority of individuals in this sample were unlikely to be directly affected by the violence.

Panel B presents data collected immediately after the crisis. It shows that individuals in all three samples are about the same age and have the same number of biological children. One difference is that shop owners have a bit more than 5 dependents on average, while market vendors have about 4, and sex workers only about 3. The three samples are about equally likely to give informal gifts or loans, but vendors are the most dependent on informal transfers (which is reasonable because market are make the poorest of the three groups).

Finally, while we do not have data on HIV infection rates for our three samples, we suspect that HIV rates are substantially higher among sex workers. A follow-up survey conducted in March 2009 found that 3% of women in our sample (who were 31 years old on average in 2008) had died since March 2008. In comparison, the death rate among market vendors and shop owners was 0% over the same period. This disproportionately high mortality rate among women who supply transactional sex suggest a very high prevalence of HIV/AIDS among them.

3.2 Measuring Sexual Behavior

A crucial outcome in this study is the supply of risky transactional sex. Gathering this information is typically very difficult, both because it is hard to enroll women who supply transactional sex into a survey, and because sex workers tend to under-report their sexual

behavior to enumerators. In our context, collecting this data was made easier by the fact that the women we interviewed were organized in peer groups, and had been sampled for a previous study conducted by Robinson and Yeh (2009). For the data collection, we employed as enumerators two women who had previously been trained to run the peer groups, as well as a trained nurse who served as the overall field coordinator for all peer groups in Busia District. Working with these three women tended to improve reporting and to destigmatize transactional sex. In particular, women were much more likely to report "taboo" activities such as anal sex than in other studies, even among similar populations within Kenya (for instance, Ferguson and Morris, 2003).

In previous work with this sample, Robinson and Yeh (2009) obtained information on sexual behavior by asking women to complete detailed daily diaries in which they self-reported their sexual activities (as well as many other outcomes). Since these diaries were self-recorded privately, they afforded respondents added confidentiality (compared to a face-to-face interview). In addition, since they were recorded with high frequency, they were less subject to recall bias.

In this study, collecting diaries was not an option since the data was collected retrospectively. Instead, we used surveys administered through face-to-face interviews. As might be expected, this survey method resulted in lower reported levels of sexual activity than the diaries. Using the diaries, Robinson and Yeh (2009) estimated that women in 2005-2006 made close to 700 Kenyan shillings (Ksh), or US $10, per day from sex work, whereas women in our post-election survey from 2008 reported making only 850 Ksh (US $12) from sex work in an average week in November, 2007.[8] Women reported taking only 2.4 clients and engaging

[8] The exchange rate was roughly 70 Ksh to $1 US during the study period.

in only 0.75 unprotected sex acts per week in November 2007, compared to over 10 clients and about 3 unprotected sex acts in the 2005-2006 diaries. These differences are likely due to two main factors. First, studies find that diaries or more anonymous survey methods such as self-administered computer surveys yield higher levels of sexual activity than face-to-face interviews (Brody and Potterat, 2003). Second, it seems that by 2007, women in the sample had reduced the share of their income that they drew from transactional sex (though only 6% had exited sex work entirely). This is likely because women have gotten older and so many might be transitioning away from sex work.

Consequently, since our sample includes women who are less actively involved in sex work, all estimates in this paper are likely to be lower bounds on the impact of the crisis on sexual behavior. While our estimates suggest substantial responses, they are if anything conservative.

3.3 Empirical Methodology

We estimate the impact of the crisis by simply comparing several dependent variables immediately pre- and post-crisis. We estimate equations of the following form:

$$y_{it} = \beta_0 + \sum_{t=dec2007}^{mar2008} \beta_t period_t + \mu_i + \epsilon_{it} \tag{1}$$

where y_{it} represents the outcome of interest, $period_t$ is a dummy variable for the period in question, μ_i is an individual fixed effect, and ϵ_{it} is the error term. In the surveys, y_{it} is measured as the average for a "normal" week in a given time period. For most activities, we have data on 8 periods: November 2007, December 2007, each of the four weeks in January

2008, February 2008, and March 2008 (in all regressions, the omitted time period will be November 2007). We thus estimate the impact of the violence by examining the pattern of β_ts. If the violence had an impact, we would expect these coefficients to be negative for most income and consumption measures (except for the pre-crisis month of December 2007). Though interpretation of these regressions is potentially complicated by the lack of a control group which was unaffected by the violence, the inclusion of the individual fixed effect purges the coefficients from any bias caused by time-invariant, individual-level errors. We will return to the issue of inference later, when we re-estimate regressions for the sex worker sample using a difference-in-difference approach. As we will see, the results are quite robust.

We then examine how the impact of the violence varied by baseline characteristics by adding interaction terms:

$$y_{it} = \beta_0 + \sum_{t=dec2007}^{mar2008} \beta_t period_t + \sum_{t=dec2007}^{mar2008} (X_i'\gamma_t) period_t + \mu_i + \epsilon_{it} \quad (2)$$

where X_i is a vector of background characteristics. In these regressions, we focus on baseline wealth and labor income, access to credit, and the strength of social ties. Because our estimates of Equation (1) show only minimal differences across weeks in January, we pool together all 4 weeks of January to estimate Equation (2). This limits the number of coefficients of interest to 4 main effects and 4 interaction terms for each baseline characteristic, and makes for easier presentation (the results are unchanged when we estimate Equation (2) without pooling the January data).

4 The Direct Effects on Income and Consumption

4.1 Income Effects

Table 2 presents the results of our estimation of Equation (1) for all three samples for a series of measures of income, expenditures and consumption.[9] As was already clear in Figures 2, 3 and 4, the election crisis had a sizeable effect on income for all three types of individuals. For small vendors and artisans, income went down from 718 Ksh per week on average in the pre-crisis period (November 2007) to less than 500 Ksh throughout January 2008. Shop owners, who have much larger businesses, were affected even more: average incomes dropped from a baseline of over 5,100 Ksh to somewhere between 2,100 and 3,400 Ksh in January. The drop in income was, however, most precipitous for women who supply transactional sex: income from sex work went down from 852 Ksh per week on average in the pre-crisis period to less than 100 Ksh for the first two weeks of January and remained below 50% of pre-crisis income for the rest of the month.

4.2 Consumption Smoothing

Figures 2, 3, 4 and columns 4-6 of Table 2 show a big dip in expenditures in January for all three types of individuals in our sample. Given the price increase we documented earlier, this dip in expenditures implies an even larger drop in quantities purchased. This decrease in purchases was likely caused by both the large negative income shock we have just documented, and the fact that markets and shops were closed for a number of days in January, making it difficult to purchase goods even if one had the cash on-hand.

[9] Expenditures were mismeasured in March, 2008, and are not included in this analysis.

To test the extent to which the observed decrease in expenditures corresponds to a decrease in consumption of essential items such as food, we look more specifically at food expenditures in columns 7-9 of Table 2. We find that impacts varied somewhat across samples. Small market vendors, who live in a more rural area and typically own a small farm, did not decrease their food expenditures over the period. Shop owners saw a significant decrease, but a relatively small one in comparison to their average food expenditures (less than 10%). In contrast, women who supply transactional sex (who typically live in the more semi-urban Busia Town), saw a roughly 20% decrease in their food expenditures throughout January, and were still spending less on food in February 2008 than they had been in November 2007.

Changes in food expenditures are potentially uninformative about changes in food consumption, however. People may have substituted towards cheaper calories, and therefore their caloric intake might have remained unchanged during the crisis, despite their decrease in income and expenditures. To test this, Panels C of Figures 2, 3 and 4 show the impact of the crisis on the number of meals skipped, and the number of days the household had meat. For all three samples, we find a sizeable increase in the likelihood that people skipped a meal, and a large decrease in meat consumption. Overall, these plots suggest that consumption smoothing over the income shock was far from perfect, even among the relatively well-off sample of shop owners. These results are confirmed in a regression framework in Columns 10-12 of Table 2.

4.3 Coping Mechanisms

What coping mechanisms did people use to limit the effect of the crisis? In Table 3, we present suggestive evidence on the mechanisms used. We asked respondents if they had given or received loans or gifts, sold durables or animals, or killed animals during the crisis period. Because people also engage in these behaviors throughout the year, we estimate how "abnormal" the crisis period was by comparing the extent to which people engaged in those behaviors during the two months of January/February 2008 with the extent to which they engaged in those behaviors in 2007. For each behavior, we present the mean and standard deviation observed over the Jan/Feb 2008 period, the 2007 average over a 2 month period (by dividing the 2007 total by 6), and the ratio of the average in 2008 and the average in 2007. If risk-coping in January/February was at the 2007 level, the ratio should be 1; thus, we should expect ratios much greater than 1 if these methods were used to heavily smooth consumption during the crisis.

We find that informal loans and gifts were much more prevalent during the crisis than they were in 2007. Small market vendors and sex workers relied heavily on transfers from friends and relatives, while shop owners were heavily relied upon (though these effects are mitigated somewhat by the fact that those receiving transfers were also sending out transfers to others, and vice-versa). Sex workers did not receive much extra assistance from their regular clients.

Individuals in all three samples were much more likely to kill animals during the crisis than in 2007. The monetary values of durable goods and animals sold during the crisis are also quite large, though we do not have measures of these variables in 2007 with which to compare them. Sex workers were particularly likely to sell durable goods.

Overall, these risk-coping strategies were not nearly enough to cushion the fall in incomes. First, the distribution of the amounts (in Kenyan Shillings) are heavily skewed – for all measures, the median respondent in each sample gave and received no money and received no income from the sale of assets (data not shown). Second, even at the mean, the total amount received from these strategies could cushion at most a week or two of lost income. On the whole, the evidence in Table 3 confirms the large consumption changes in Table 2: overall, these households were unable to smooth over the shock.

4.4 Heterogeneity in Effects and Responses

In this section, we test for heterogeneity in the effect of the crisis within each of the three samples. We find little evidence of heterogeneity that can be explained by background characteristics.

Table 4 includes interactions with several characteristics to estimate Equation (2). We focus on background wealth and access to formal and informal credit, and test whether wealthier individuals or individuals with better access to credit were better able to cope. We look at the percentage change in expenditures in each time period (as a percentage of the November 2007 value).[10] The coefficients of interest are the interaction terms, which for ease of reading we have highlighted. For ease of interpreting magnitudes, we include the mean and standard deviation of the independent variable at the bottom of the table. Since expenditures in March 2008 were misrecorded, we focus on January and February in these Tables.

[10] Specifications looking at changes in levels, rather than percentage changes, yield similar results (available upon request).

We do not find any evidence that people with higher values of animal assets or higher average weekly incomes before the crisis were better able to smooth consumption (Columns 1-6). Other indicators of baseline wealth and assets, such as the value of durable assets, or ROSCA contributions also did not seem to help mitigate the effect of the crisis (results not shown).

Columns 7-12 of Table 4 suggest that those who had access to the formal credit market (defined as loans from a bank, micro-finance organization or money lender) in 2007 were actually slightly less able to smooth consumption. In addition, people who had greater access to informal loans (those who had borrowed more money from friends or relatives in 2007) were, on average, slightly less able to mitigate the impact of the crisis. This could be because people who received transfers were more hooked into informal credit markets on both sides, and so had to send money to others during the crisis. Indeed, this seems to be true: Columns 13-15 show a very similar pattern when the interaction is the amount given rather than the amount received.[11] However, these effects are very small compared to the effect of the crisis, and overall we find surprisingly little difference in smoothing ability across individuals.[12] This speaks to the nature of the crisis, a fundamental political crisis which was felt throughout Kenya, making interpersonal risk-coping difficult. In the absence of effective consumption smoothing mechanisms, individuals were forced to reduce consumption.

[11] Giving and receiving loans are strongly correlated across the individuals in our sample.

[12] This finding is further confirmed by the fact that risk-coping strategies taken in January and February are not strongly correlated with these interactions. For instance, the value of loans received in 2007 does not strongly predict the value of loans received in January and February, 2008. This is not surprising if such transfers serve primarily as a risk-coping strategy, since shocks experienced in 2007 should not be related to the unexpected electoral shock.

5 A Hidden Cost: The Impact of the Crisis on the supply of Unprotected Transactional Sex

In this section, we present evidence to show that the crisis led to an increase in the supply of unprotected transactional sex. We do not have data on entry into sex work and therefore cannot estimate whether women began supplying transactional sex to cope with the crisis.[13] However, we have information on the sexual behavior of women who were already involved in transactional sex prior to the crisis. Our dataset is unusually detailed, and was collected immediately after the crisis ended.

5.1 Average Impact on Sexual Behavior of Women who Supply Transactional Sex

Table 5 presents estimates of the impact of the crisis on the sexual behavior of women who supply transactional sex. Column 1 reproduces Column 3 of Table 2, and Column 2 shows that the average number of clients in the first few weeks of January was close to zero. Column 3 suggests that those clients that women did see were predominantly regulars, suggesting that the disruption in the market was largest in the market for casual clients (which seems reasonable since women find casual clients outside of the home).

Columns 4 and 5 show that women were unable to compensate for the reduction in income from sex work by increasing their income from other sources. In fact, their other forms of income also dried up during the crisis. This is not surprising given that the most

[13] It is possible that the crisis triggered some women to enter the transactional sex market. Multiple newspaper articles reported on this phenomenon during and after the crisis.

common source of other income for these women is work in bars or restaurants or small-scale entrepreneurship, both of which were affected by market closures. For sex workers, the reduction in other income persisted into February and March, suggesting perhaps that those women who have their own businesses had to draw down working capital in their businesses in order to ensure a floor level of consumption during the crisis.

Figure 5 suggests that, in large part, women responded to this negative income shock by significantly increasing the amount of unprotected sex they had, conditional on being able to find clients. Figure 5 shows the total number of times women in the sample had unprotected anal and unprotected vaginal sex over a week, as well as the number of times having either type of unprotected sex with a given client. The corresponding coefficient estimates (controlling for individual fixed effects) are presented in column 6 of Table 5. The pattern is telling: the number of unprotected sex acts per client went up immediately in January 2008 and remained higher than normal throughout February.

The total number of unprotected sex acts was lower in January than before the crisis since women were not able to find clients during the height of the crisis (Table 5, columns 9-11). However, women seemed to increase the total amount of unprotected sex they had after the crisis had ended: in February and March, the total number of unprotected vaginal sex acts went up dramatically, by 0.14 acts per week in February and 0.24 acts in March. These are big effects, compared to the baseline of 0.72 acts in November. Even more troubling is that the number of unprotected anal sex acts per week increased by 0.14 in February and 0.15 in March, compared to a base of just 0.03 acts per week in November 2007 (column 8). Unprotected anal sex is extremely risky: though reliable numbers are hard to come by, the risk of HIV transmission from unprotected anal sex has been estimated to be as high as

0.5-1% per act in several studies (i.e. Mastro and de Vicenzi, 1996).[14]

5.2 Controlling for Seasonal Variation: Difference-in-Differences Estimates

An obvious shortcoming of our analysis is that we cannot know the counterfactual – what the income and consumption patterns of households in our study area would have been, had the crisis not taken place. One way to control for possible seasonal variations would be to test whether the changes observed between November 2007 and January-March 2008 were similar to those between November and January-March in other years.[15] To examine this, we collected data between November 2008 and January-March 2009, exactly one year after the crisis.

We used the exact same modules as we did in March 2008 to record information on income and sexual behavior over the November 2008 – March 2009 period. Out of the 228 sex workers surveyed in 2008, 162 (65%) could be traced for the follow-up in 2009. The main sources of attrition were migration out of the area (20%), dropout of sex work through marriage (5%), death (3%), and refusal to be surveyed (3%). The remaining 3% were unavailable to be surveyed during the survey period. We present the analysis for the 149 women still earning some income from sex work.

[14] All of these responses look similar when controlling for the number of clients women saw, and the mix of regulars and clients she saw. This is important because unprotected sex is normally more common with regular clients (whom the sex worker may know better) than with casual clients (Robinson and Yeh, 2009).

[15] Another option would be to compare changes across regions which were more or less affected by a crisis, but in this case the crisis was felt throughout Kenya so there could not be a control group.

Using this additional data, we can estimate the following equation:

$$y_{imt} = \beta_0 + I_{[t=07-08]} + \sum_{m=dec}^{mar} \beta_m period_m + \sum_{t=dec}^{mar} \gamma_m period_m \cdot I_{[t=07-08]} + \mu_i + \epsilon_{it} \qquad (3)$$

where $I_{[t=07-08]}$ is a dummy indicating the crisis year. The coefficients of interest are the γ_ms: if the estimates of the βs in Tables 2 and 5 were only picking up usual seasonal variation, the estimates of the γ_ms should be zero.

Estimates of Equation (3) for the sample of sex workers are presented in Table 6. The estimates of the γ_ms are highlighted for ease of reading. For expenditures and income data, we present the percent change with respect to November, rather than level changes (the levels look very similar).

The first thing to note is that the estimates of the β_ms are often significant, suggesting that there are important seasonal variations in income and sexual activity for sex workers. However, the estimates of the γ_ms are still very large and significant, suggesting that the responses estimated above were still substantial. In fact, the sexual responses are similar or even bigger in the difference-in-differences: the increase in total unprotected vaginal sex acts is 0.29 in February and 0.28 in March (compared to 0.14 and 0.24 in Table 5). For unprotected anal sex acts, the numbers are 0.11 and 0.09 in February and March, compared to 0.14 and 0.15 in Table 5. Of course, the difference-in-difference numbers are estimated on a much smaller number of women and so these specific coefficients should not be considered as definitive, but the pattern of results strongly suggests that the post election crisis had large negative effects on the lives of these women.

5.3 Heterogeneity in Response through Sex Work

To examine whether some women were less susceptible to the crisis than others, Table 7 tests for heterogeneity in whether women increased their supply of risky sex.[16] Again, the differences are small and typically insignificant, with the general pattern being one of relative homogeneity in the effects of the political crisis. In Table 7, the dependent variable is the total number of unprotected sex acts (with anal and vaginal sex pooled together).

Column 1 suggests that women who had more assets (in the form of animal ownership) did not provide more unprotected sex than before the crisis. The results in Column 2 are somewhat surprising: women with a higher weekly income from sex work in 2007 appeared more affected by the crisis. This is surprising since those women with higher incomes might have been holding higher levels of savings. On the other hand, it could be that those with higher incomes from sex work in a given month are those who need a high income to satisfy household needs. Because the demand for sex work dropped to virtually zero for a few weeks, the women who rely more heavily on transactional sex for income were the ones who were hardest hit by the crisis, in absolute terms.

The results in Columns 3 and 4 of Table 7 suggest small effects of having access to loans on the ability to smooth over the shock without increasing risky sex. Finally, the results in Column 5 suggest that having a larger pool of regular clients also did not help mitigate the need to increase unprotected sex to mitigate the crisis.[17]

[16] It would also be useful to look at women with better access to formal savings. However, no women in our sample had access to an individual bank account in our original baseline (Robinson and Yeh, 2009).

[17] These responses look very similar when examining the effect on the probability of having unprotected sex with a client, rather than on the total number of unprotected sex acts (results available upon request). We prefer the specification with the number of acts, however, because focusing on the probability of having unprotected sex drops women who did not see any clients in a particular week.

Overall, these results suggest that the crisis had major impacts on the behavior of sex workers, a substantial fraction of the female population in Busia (around 12% according to Robinson and Yeh, 2009), and, consequently, on long-term health and on the spread of HIV/AIDS.

6 Conclusion

The violent, mostly ethnic conflict that erupted in Kenya in the wake of the 2007 Presidential election surprised everyone, but it is far from unprecedented. Political coups and civil conflicts around government transitions are common, especially in the developing world. This paper is an attempt to estimate how such conflicts might affect long-term outcomes. We find that even a relatively short-lived crisis (lasting around 2 months) can have large detrimental impacts on income and consumption, in particular when traditional risk-coping mechanisms are mostly inter-household and therefore break down in the presence of aggregate shocks.

We document an important hidden channel through which political unrest can affect long-run outcomes. We find that the market breakdown associated with social unrest led to significant increases in the supply of unprotected sex by poor women, which is likely to fuel HIV transmission and affect long-term health levels in the population.

The disruptions we highlight here are all the more striking because our study area is one that was relatively unaffected by severe violence. The effects on the lives of the (at least) 500,000 people that were displaced, or the families of the 1,200 or more people that were killed are of course even more substantial than for the individuals in our sample. We also do not focus on other negative effects of the crisis, such as possible erosion in investor confidence

in Kenya, a country which enjoyed a reputation of relative stability before 2007, or on the long-term effects of the destruction of railway lines and roads.

While we are able to document only a portion of the effect of the political crisis, the magnitude of the disruption we observe is already substantial, and suggests that social unrest is an important channel through which political instability may affect long-term development – and that it may affect development in many ways that may be difficult to quantify or to even recognize.

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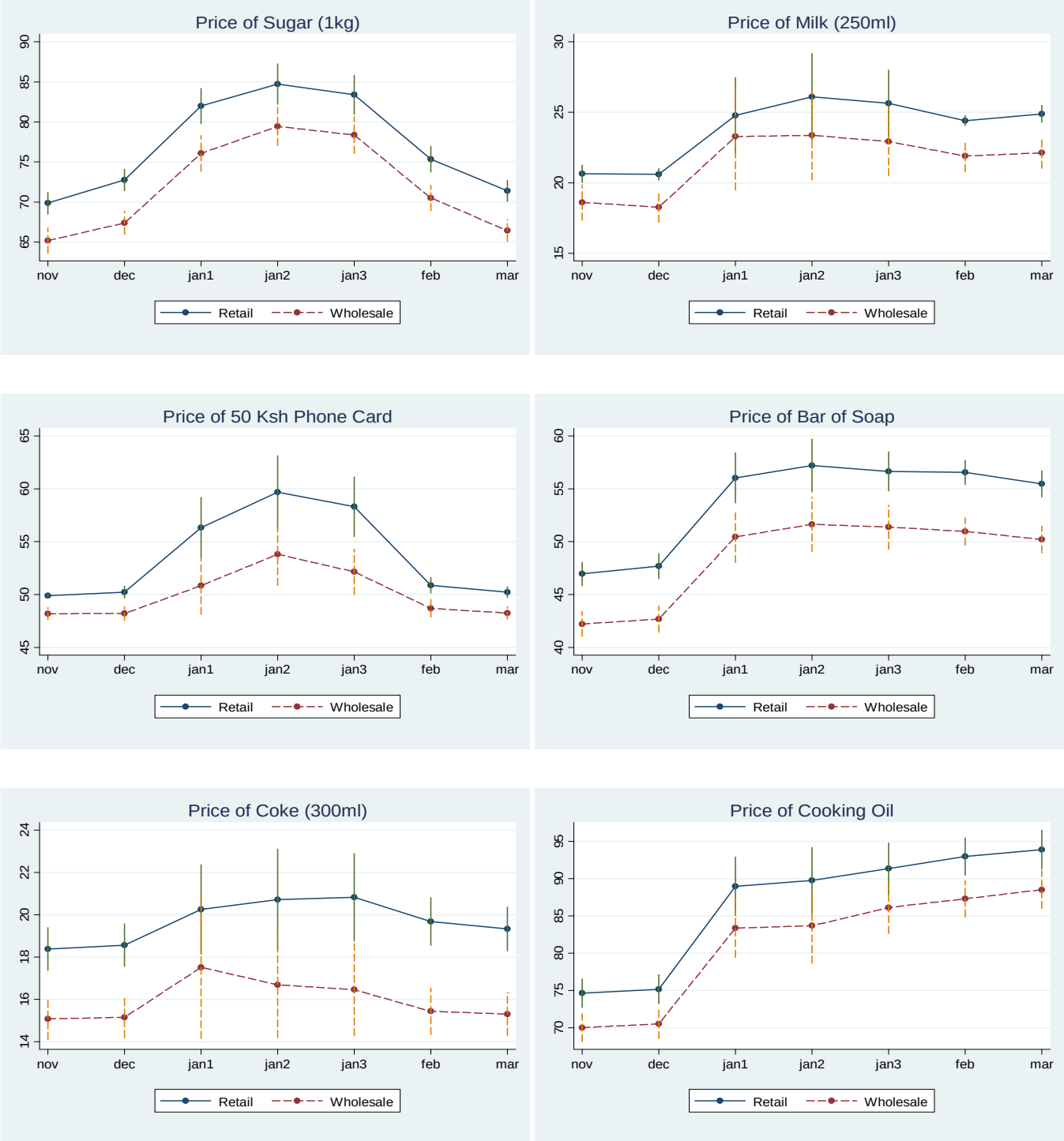
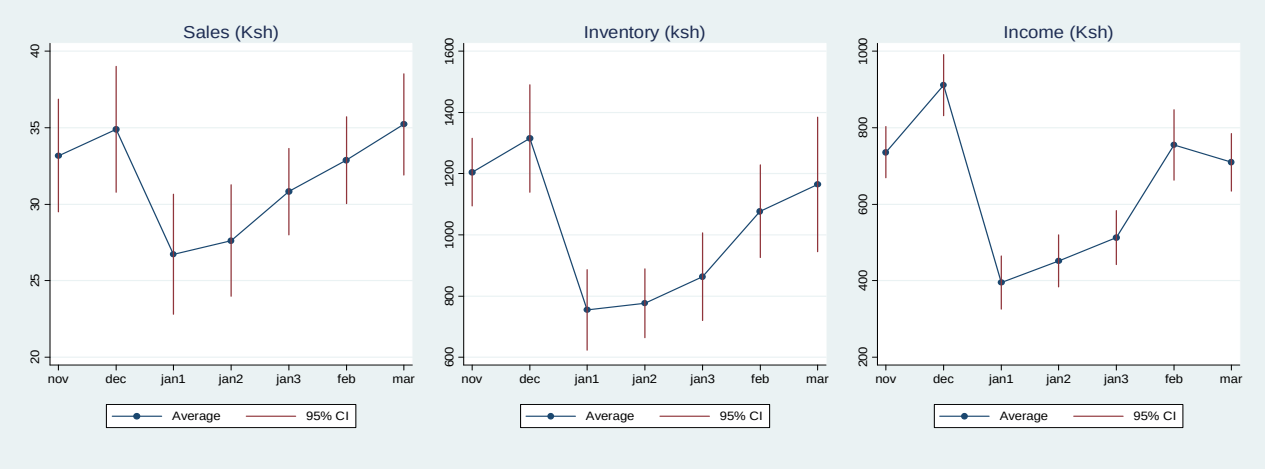
Figure 1. Prices Before and After Presidential Election



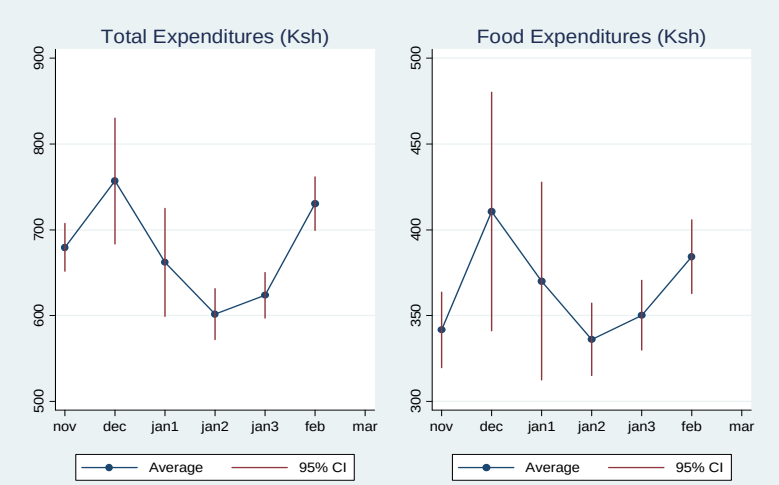
Notes: Average prices in Ksh reported by 221 shop owners in multiple towns in Busia District for November 2007, the first three weeks of December 2007, the first week of January 2008 (jan1), the second week of January 2008 (jan2), the third week of January 2008 (jan3), February 2008 and March 2008. The vertical bars represent 95% confidence intervals. The Presidential Election occurred on December 27, 2007 and violence erupted in the following days. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

Figure 2. Impact of Crisis on Small-Scale Vendors & Artisans

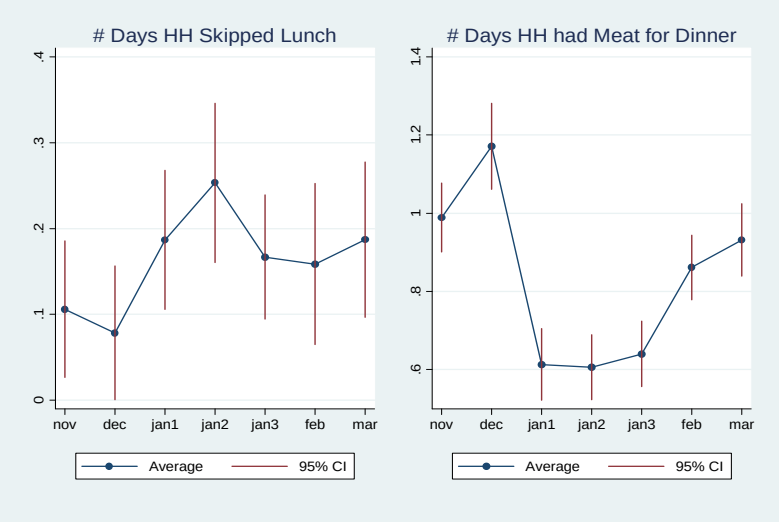
Panel A. Impact on Business and Income



Panel B. Impact on Expenditures



Panel C. Impact on Consumption

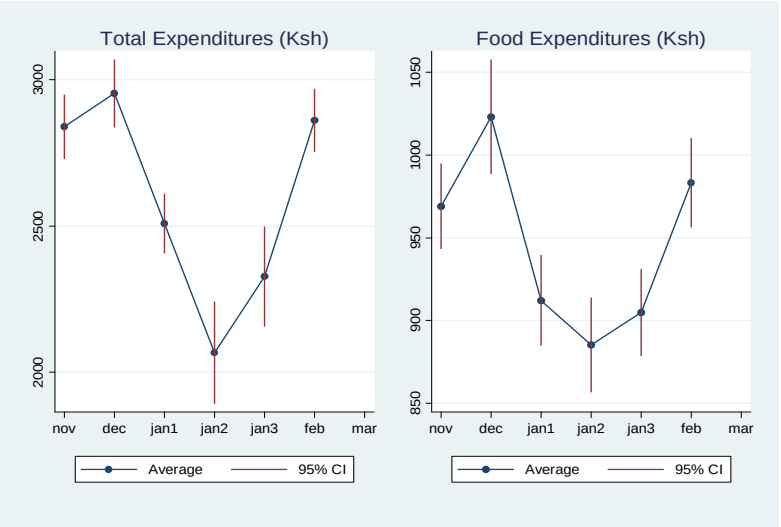


Notes: Weekly averages collected among 151 market vendors/artisans from Bumala Town (in Busia District) for November 2007, the first three weeks of December 2007, the first week of January 2008 (jan1), the second week of January 2008 (jan2), the third week of January 2008 (jan3), the fourth week of January 2008 (jan4), February 2008 and March 2008. The vertical bars represent 95% confidence intervals. The Presidential Election occurred on December 27, 2007 and violence erupted in the following days. Expenditures for March 2008 were misrecorded, and so are not included here. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

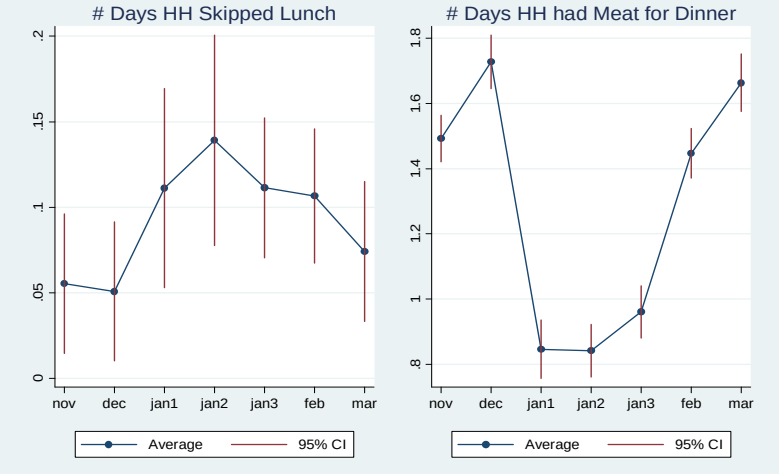
Figure 3. Impact of Crisis on Shop Owners

Panel A. Impact on Business and Income

Panel B. Impact on Expenditures



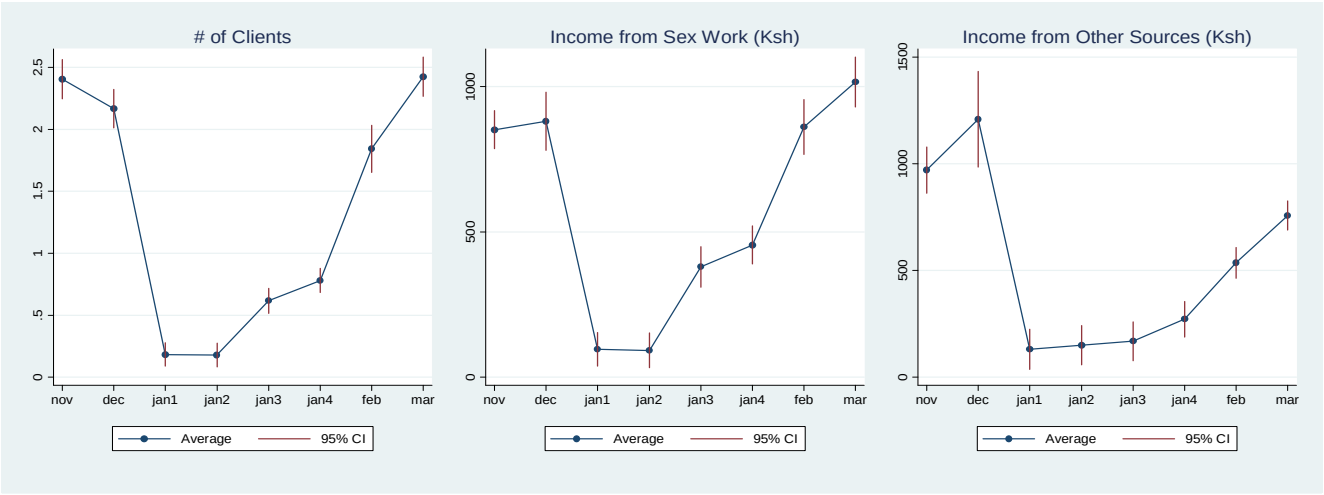
Panel C. Impact on Consumption



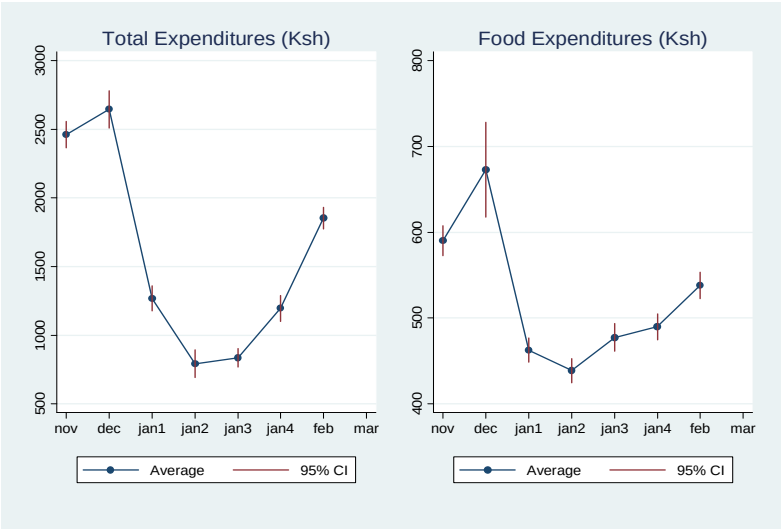
Notes: Weekly averages collected among 221 shop owners in multiple towns in Busia District for November 2007, the first three weeks of December 2007, the first week of January 2008 (jan1), the second week of January 2008 (jan2), the third week of January 2008 (jan3), the fourth week of January 2008 (jan4), February 2008 and March. The vertical bars represent 95% confidence intervals. The Presidential Election occured on December 27, 2007 and violence erupted in the following days. Expenditures for March 2008 were misrecorded, and so are not included here. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

Figure 4. Impact of Crisis for Women Who Supply Transactional Sex

Panel A. Impact on Income from Sex Work and Other Income



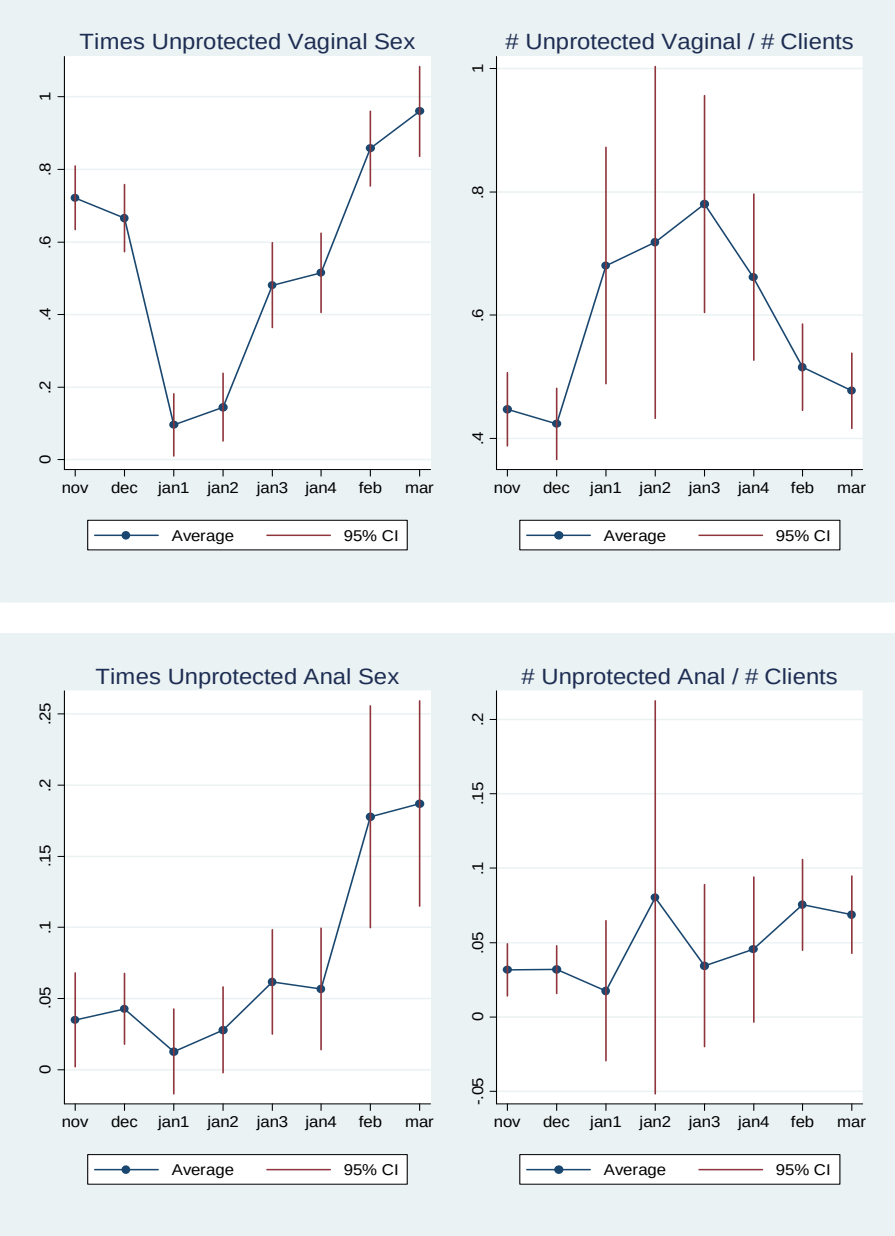
Panel B. Impact on Expenditures



Panel C. Impact on Consumption

Notes: Weekly averages collected among 214 informal sex workers in Busia Town for November 2007, the first three weeks of December 2007, the first week of January 2008 (jan1), the second week of January 2008 (jan2), the third week of January 2008 (jan3), February 2008 and March 2008. The vertical bars represent 95% confidence intervals. The Presidential Election occurred on December 27, 2007 and violence erupted in the following days. Expenditures for March 2008 were misrecorded, and so are not recorded here. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

Figure 5. Impact of Crisis on Sexual Behavior of Women who Supply Transactional Sex



Notes: Weekly averages collected among 214 informal sex workers from Busia Town for November 2007, the first three weeks of December 2007, the first week of January 2008 (jan1), the second week of January 2008 (jan2), the third week of January 2008 (jan3), the fourth week of January 2008 (jan4), February 2008 and March. The vertical bars represent 95% confidence intervals. The Presidential Election occurred on December 27, 2007 and violence erupted in the following days. The standard errors are large for the "per client" figures in January because so many women saw 0 clients during those weeks.

Table 1. Background Characteristics

	Market Vendors & Artisans		Shopkeepers		Women Who Supply Transactional Sex	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Panel A. Information collected through Background Surveys in 2005-2006						
Male	0.50	[.5]	0.41	[.49]	0.00	[.]
Years of Schooling	6.99	[2.76]	9.93	[2.18]	9.22	[2.67]
Can Read Swahili	0.86	[.35]	0.92	[.28]	0.96	[.19]
Married	0.74	[.44]	0.79	[.41]	0.00	[.]
Widowed	0.12	[.33]	0.07	[.26]	0.25	[.43]
Cohabitating	-	-	-	-	0.14	[.34]
Ethnic Group						
Luhya	0.59	[.49]	0.40	[.49]	0.42	[.49]
Luo	0.41	[.49]	0.46	[.5]	0.48	[.5]
Teso	0.00	[.]	0.09	[.28]	0.05	[.22]
Kikuyu	0.00	[.]	0.01	[.07]	0.02	[.13]
Other	0.00	[.]	0.16	[.37]	0.04	[.19]
Durable Assets Value	13672	[14304]	120441	[320115]	21765	[18707]
Age Began Seeing Clients	-	-	-	-	18.51	[5.28]
Number of Regular Clients (at time of background survey)	-	-	-	-	2.29	[1.13]
Respondent has outside job	-	-	-	-	0.86	[.35]
Panel B. Background Information collected through Post-Crisis Survey in 2008						
Age	32.72	[8.5]	33.75	[9.66]	30.90	[7.51]
Number of Biological Children	3.09	[2.16]	3.38	[2.54]	2.66	[1.5]
Total # of Dependents	3.94	[2.39]	5.25	[3.53]	3.05	[1.65]
Participates in ROSCA	0.77	[.42]	0.42	[.49]	0.59	[.49]
Value of Animals Owned	9280	[18580]	20692	[30738]	1783	[6820]
Received loan from a formal institution or moneylender in 2007	0.07	[.26]	0.21	[.41]	0.14	[.34]
Received an informal loan (from a friend, relative, neighbor) in Previous Year	0.50	[.5]	0.17	[.37]	0.27	[.45]
Received Gift (from a friend, relative, neighbor) in 2007	0.71	[.46]	0.46	[.5]	0.55	[.5]
Gave an informal loan (to a friend, relative, neighbor) in 2007	0.40	[.49]	0.43	[.5]	0.27	[.44]
Gave a Gift (to a friend, relative, neighbor) in Previous Year	0.50	[.5]	0.45	[.5]	0.38	[.49]
Observations	151		221		214	

Notes: Monetary values in Kenyan shillings. Exchange rate was roughly 70 Kenyan shillings / $1 US during study period. Standard deviations in brackets.

Table 2. Income Before and After the Presidential Election

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Income from Primary Occupation[1]			Total Expenditures			Food Expenditures			# Days Household had Meat		
Sample	vendors & artisans	shop-owners	women who supply sex	vendors & artisans	shop-owners	women who supply sex	vendors & artisans	shop-owners	women who supply sex	vendors & artisans	shop-owners	women who supply sex
December, 2007	171.16	2421.18	29.37	77.20	107.12	183.24	68.88	53.43	82.84	0.19	0.24	0.30
	(37.44)***	(699.79)***	(45.31)	(42.92)*	(46.78)**	(51.46)***	(41.25)*	(20.37)***	(29.85)***	(0.07)***	(0.04)***	(0.05)***
1st week of January, 2008	-349.98	-3025.82	-755.11	-17.52	-331.49	-1193.47	28.41	-57.05	-127.58	-0.38	-0.65	-1.05
	(54.53)***	(669.21)***	(43.91)***	(39.01)	(65.17)***	(75.21)***	(35.39)	(22.74)**	(12.02)***	(0.08)***	(0.07)***	(0.08)***
2nd week of January, 2008	-289.42	-2998.13	-758.66	-77.69	-773.18	-1670.35	-5.51	-83.95	-151.41	-0.38	-0.65	-1.13
	(59.10)***	(587.82)***	(45.60)***	(21.05)***	(134.34)***	(88.98)***	(12.33)	(19.87)***	(12.76)***	(0.07)***	(0.07)***	(0.08)***
3rd week of January, 2008	-231.08	-1690.02	-471.64	-55.99	-512.80	-1625.83	8.45	-64.42	-112.89	-0.35	-0.53	-0.88
	(62.18)***	(356.66)***	(57.54)***	(18.98)***	(135.55)***	(73.96)***	(11.34)	(23.69)***	(13.09)***	(0.07)***	(0.07)***	(0.08)***
4th week of January, 2008	-	-	-395.92	-	-	-1266.76	-	-	-100.33	-	-	-0.74
	-	-	(55.64)***	-	-	(80.80)***	-	-	(13.28)***	-	-	(0.08)***
February, 2008	9.45	-329.22	9.71	51.26	19.82	-608.47	42.87	14.05	-52.06	-0.13	-0.05	-0.53
	(67.33)	(444.54)	(71.17)	(18.31)***	(54.03)	(75.13)***	(10.43)***	(19.05)	(12.74)***	(0.06)**	(0.05)	(0.08)***
March, 2008	-37.04	967.53	164.13	-	-	-	-	-	-	-0.05	0.17	-0.22
	(52.19)	(653.93)	(58.73)***	-	-	-	-	-	-	(0.07)	(0.05)***	(0.08)***
Observations	1040	1527	1671	1040	1527	1462	1040	1527	1462	1040	1527	1671
Number of individuals	151	221	214	151	221	214	151	221	214	151	221	214
R-squared	0.13	0.08	0.28	0.05	0.08	0.49	0.02	0.03	0.15	0.12	0.26	0.29
Mean of Dep. Var. for Nov. 2007	725.90	5125.99	851.97	676.76	2835.58	2450.90	342.03	972.17	589.62	1.00	1.50	1.93

Notes: Self-reported values in Kenyan Shillings for an average week in each time period. Several outcomes were not collected for vendors/artisans and shopkeepers during the 4th week of January. Expenditures for March 2008 were misrecorded. Coefficient estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

** significant at 10%; ** significant at 5%; *** significant at 1%.*

[1] *For women who supply sex, "Income from Primary Occupation" is income from transactional sex.*

Table 3. Risk Coping Strategies Used During January/ February 2008

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Small Vendors & Artisans				Shopkeepers				Women who Supply Sex			
	Jan-Feb 08		2007		Jan-Feb 08		2007		Jan-Feb 08		2007	
Amount for Jan/Feb 2008 of :	Mean	Std. Dev.	2 Month Average	Ratio of 08 to 07 Mean	Mean	Std. Dev.	2 Month Average	Ratio of 08 to 07 Mean	Mean	Std. Dev.	2 Month Average	Ratio of 08 to 07 Mean
Inflows												
Formal Loans Received	5	57	142	0.03	858	8405	4100	0.21	127	1204	304	0.42
Informal Loans from Friends/Family	381	1143	282	1.35	1927	7036	413	4.66	440	1719	98	4.49
Gifts from Friend/Family	336	1097	123	2.73	275	2122	255	1.08	209	1274	57	3.69
Gifts from Regular Clients									211	786	156	1.36
Outflows												
Informal Loans to Friends/Family	247	818	99	2.50	2003	11142	866	2.31	113	717	77	1.46
Gifts to Friend/Family	182	694	52	3.50	393	1267	79	4.94	123	529	83	1.49
Income from Selling or Liquidating Assets												
Durable Goods Sold	52	322	N/A	N/A	78	894	N/A	N/A	885	1796	N/A	N/A
Animals Sold	434	1581	N/A	N/A	509	3414	N/A	N/A	94	375	N/A	N/A
Animals Killed	81	184	35	2.31	158	355	120	1.32	65	166	19	3.34
Total												
Total Amount Received	890	2382			1409	15979			1807	3478		

Notes: All values in Kenyan Shillings. For each sample, the figures in the first 2 columns are means and standard deviations for each variable during the crisis period. The next column is the mean for the same variable for all of 2007, divided by 6. Thus, this the average for a normal 2 month period in 2007. If the amounts observed over the two crisis months in 2008 were representative of the average for 2007, the figures in columns 4, 8 and 12 would be 1. Exchange rate was roughly 70 Ksh to US $1 during the sample period. Mean total transfers do not quite add up to the sum of mean inflows and outflows because some variables are missing for some individuals. The median value for all January/February averages is 0.

Table 4. Testing for Heterogeneity in Effect of Crisis on % Change in Expenditures

Dependent Variable: Change in Expenditures (as a % of Nov. 2007 Expenditures)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Independent Variable interacted with Time Periods:														
	Monetary Value of Animals Owned in '07			Average Weekly Income in November '07			Value of Loans Received from Formal Institution in '07			Value of Informal Gifts/Loans Received in '07			Value of Informal Gifts/Loans Given in '07		
Sample	vendors & artisans	shop owners	women who supply sex	vendors & artisans	shop owners	women who supply sex	vendors & artisans	shop owners	women who supply sex	vendors & artisans	shop owners	women who supply sex	vendors & artisans	shop owners	women who supply sex
December, 2007	0.145	0.088	0.085	0.047	0.096	0.088	0.136	0.103	0.084	0.140	0.104	0.082	0.143	0.101	0.084
	(0.086)*	(0.027)***	(0.024)***	(0.050)	(0.026)***	(0.041)**	(0.076)*	(0.027)***	(0.024)***	(0.077)*	(0.027)***	(0.025)***	(0.084)*	(0.028)***	(0.022)***
Dec, 2007 * Indep. Var	**-0.013**	**0.004**	**-0.002**	**1.220**	**0.001**	**-0.034**	**-0.039**	**-0.002**	**0.005**	**-0.024**	**-0.002**	**0.007**	**-0.120**	**-0.007**	**0.006**
	(0.016)	**(0.008)**	**(0.011)**	**(1.495)**	**(0.006)**	**(0.524)**	**(0.028)**	**(0.010)**	**(0.015)**	**(0.015)**	**(0.010)**	**(0.015)**	**(0.107)**	**(0.011)**	**(0.069)**
January, 2008	-0.085	-0.115	-0.555	-0.075	-0.132	-0.522	-0.044	-0.119	-0.546	-0.036	-0.118	-0.537	-0.037	-0.123	-0.544
	(0.030)***	(0.025)***	(0.016)***	(0.049)	(0.023)***	(0.029)***	(0.033)	(0.022)***	(0.016)***	(0.036)	(0.022)***	(0.018)***	(0.038)	(0.025)***	(0.018)***
January, 2008 * Indep. Var	**0.043**	**-0.008**	**0.005**	**0.426**	**0.002**	**-0.425**	**-0.015**	**-0.005**	**-0.042**	**-0.030**	**-0.005**	**-0.044**	**-0.055**	**-0.014**	**-0.103**
	(0.026)	**(0.007)**	**(0.010)**	**(0.399)**	**(0.018)**	**(0.264)**	**(0.032)**	**(0.002)*** **	**(0.015)*** **	**(0.025)**	**(0.002)*** **	**(0.015)*** **	**(0.112)**	**(0.015)**	**(0.059)***
February, 2008	0.139	0.028	-0.206	0.137	0.039	-0.215	0.130	0.046	-0.192	0.148	0.047	-0.176	0.113	0.050	-0.198
	(0.045)***	(0.023)	(0.021)***	(0.071)*	(0.022)*	(0.038)***	(0.040)***	(0.023)**	(0.021)***	(0.043)***	(0.023)**	(0.022)***	(0.041)***	(0.025)**	(0.023)***
February, 2008 * Indep. Var	**-0.015**	**0.008**	**-0.025**	**-0.174**	**0.008**	**0.065**	**-0.067**	**-0.001**	**-0.092**	**-0.079**	**-0.001**	**-0.088**	**-0.093**	**-0.011**	**-0.133**
	(0.012)	**(0.007)**	**(0.013)***	**(0.568)**	**(0.007)**	**(0.530)**	**(0.028)** **	**(0.010)**	**(0.027)*** **	**(0.025)*** **	**(0.010)**	**(0.027)*** **	**(0.146)**	**(0.012)**	**(0.087)**
Mean of Indep. Var.	0.92	2.03	0.17	0.07	0.51	0.08	0.09	2.46	0.18	0.35	2.87	0.37	0.09	0.57	0.10
S.D. of Indep. Var.	1.84	3.05	0.66	0.07	1.34	0.05	0.52	7.88	0.70	1.06	8.05	0.74	0.19	1.13	0.19
Observations	741	1090	836	741	1090	836	741	1090	836	741	1090	836	723	1090	836
Number of Individuals	151	220	213	151	220	213	151	220	213	151	220	213	147	220	213
R-squared	0.05	0.09	0.62	0.05	0.09	0.62	0.05	0.10	0.62	0.05	0.09	0.62	0.04	0.09	0.62

Notes: Self-reported weekly averages. Coefficient estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. All variables in 10,000 Kenyan shillings.
** significant at 10%; ** significant at 5%; *** significant at 1%.*
The table reads as follows. Taking Column 1 as an example: while vendors and artisans who did not own any animal before the crisis saw a drop in expenditures of 8.5% in January 2008 compared to November 2007, vendors and artisans who owned animals before the crisis could protect their consumption by 4.3% per 10,000 Ksh of animal value owned. Since the mean value of animals owned before the crisis among vendors and artisans was 0.92, those with the mean animal value before the crisis saw a drop in expenditures of only 4.5% in January 2008 relative to November 2007. However, this difference is not significant.
Regression in Column 3 has fewer observations because it is set to missing for any woman who do not see any clients. There are fewer observations than in Table 2 because the weekly averages in January are collapsed into a monthly average.

Table 5. Sexual Activities for Women who Supply Transactional Sex

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Income					Risk Taken in Transactional Sex					
						Ave. Sex Acts per Client			Total Sex Acts		
	Income from Sex Work	# Clients	Prob Client is Regular	Other Income	Hours Worked in Other Job	# of Unprotected Vaginal Sex Acts Per Client	# of Anal Sex Acts per Client	# of Unprotected Anal Sex Acts Per Client	# of Unprotected Vaginal Sex Acts	# of Anal Sex Acts	# of Unprotected Anal Sex Acts
December, 2007	29.37	-0.24	0.00	237.69	-0.68	-0.02	0.00	0.00	-0.06	0.01	0.01
	(45.31)	(0.08)***	(0.04)	(78.27)***	(0.35)*	(0.04)	(0.01)	(0.01)	(0.05)	(0.04)	(0.02)
1st week of January, 2008	-755.11	-2.22	0.18	-839.71	-30.44	0.23	-0.01	-0.01	-0.63	-0.15	-0.02
	(43.91)***	(0.10)***	(0.08)**	(96.62)***	(1.87)***	(0.11)**	(0.03)	(0.03)	(0.07)***	(0.04)***	(0.02)
2nd week of January, 2008	-758.66	-2.23	0.27	-821.13	-29.68	0.27	0.05	0.05	-0.58	-0.15	-0.01
	(45.60)***	(0.10)***	(0.07)***	(97.35)***	(1.83)***	(0.15)*	(0.07)	(0.07)	(0.07)***	(0.04)***	(0.02)
3rd week of January, 2008	-471.64	-1.79	0.19	-802.48	-28.18	0.33	0.00	0.00	-0.24	-0.04	0.03
	(57.54)***	(0.12)***	(0.06)***	(96.97)***	(1.83)***	(0.10)***	(0.03)	(0.03)	(0.08)***	(0.05)	(0.03)
4th week of January, 2008	-395.92	-1.63	0.16	-699.14	-23.80	0.21	0.01	0.01	-0.21	-0.05	0.02
	(55.64)***	(0.11)***	(0.05)***	(91.93)***	(1.85)***	(0.08)**	(0.03)	(0.03)	(0.08)**	(0.04)	(0.03)
February, 2008	9.71	-0.56	0.01	-434.70	-9.39	0.07	0.04	0.04	0.14	0.24	0.14
	(71.17)	(0.15)***	(0.05)	(75.43)***	(1.33)***	(0.05)	(0.02)**	(0.02)**	(0.08)*	(0.07)***	(0.05)***
March, 2008	164.13	0.02	0.03	-213.11	-1.37	0.03	0.04	0.04	0.24	0.24	0.15
	(58.73)***	(0.12)	(0.04)	(57.99)***	(0.60)**	(0.05)	(0.02)**	(0.02)**	(0.08)***	(0.06)***	(0.05)***
Observations	1671	1671	990	1671	1671	985	988	988	1661	1666	1669
Number of women	214	214	214	214	214	214	214	214	214	214	214
R-squared	0.28	0.46	0.04	0.18	0.44	0.05	0.01	0.01	0.13	0.07	0.03
Mean of Dep. Var. for Nov. 2007	851.97	2.40	0.49	967.33	40.01	0.40	0.02	0.02	0.72	0.19	0.03

Notes: Self-reported weekly averages. Coefficient estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. Columns 3 and 6-8: sample restricted to women who saw at least one client.

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table 6. Women who Supply Transactional Sex: Difference in Differences

	(1)	(2)						
	Expenditures		Risk Taken in Transactional Sex					
			Ave. Sex Acts per Client			Total Sex Acts		
	Total Exp (% Change)	Food Exp (% Change)	# of Unprotected Vaginal Sex Acts Per Client	# of Anal Sex Acts per Client	# of Unprotected Anal Sex Acts Per Client	# of Unprotected Vaginal Sex Acts	# of Anal Sex Acts	# of Unprotected Anal Sex Acts
December	0.16	0.16	0.01	0.00	0.01	0.21	0.00	0.00
	(0.03)***	(0.03)***	(0.05)	(0.01)	(0.05)	(0.13)	(0.02)	(0.00)
December 2007	**-0.09**	**-0.06**	**-0.02**	**0.03**	**-0.01**	**-0.27**	**0.02**	**0.00**
	(0.03)* **	**(0.03)***	**(0.06)**	**(0.02)**	**(0.06)**	**(0.14)** **	**(0.05)**	**(0.02)**
January	-0.09	0.01	0.14	0.00	0.14	-0.16	-0.02	0.00
	(0.01)***	(0.02)	(0.08)*	(0.01)	(0.08)*	(0.11)	(0.02)	(0.00)
January 2008	**-0.47**	**-0.24**	**0.27**	**-0.03**	**0.28**	**-0.27**	**-0.07**	**0.01**
	(0.02)* **	**(0.03)*** **	**(0.14)***	**(0.03)**	**(0.14)***	**(0.13)** **	**(0.04)**	**(0.02)**
February	-0.07	0.00	0.00	0.00	0.01	-0.27	-0.03	0.00
	(0.01)***	(0.02)	(0.06)	(0.01)	(0.06)	(0.10)***	(0.02)	(0.00)
February 2008	**-0.15**	**-0.09**	**0.11**	**0.08**	**0.16**	**0.29**	**0.24**	**0.11**
	(0.03)* **	**(0.03)*** **	**(0.09)**	**(0.04)***	**(0.09)***	**(0.13)** **	**(0.08)*** **	**(0.06)***
March	-0.03	0.01	0.12	0.00	0.13	-0.12	-0.01	0.00
	(0.01)***	(0.02)	(0.07)*	(0.01)	(0.07)*	(0.09)	(0.02)	(0.00)
March 2008			**-0.10**	**0.05**	**-0.07**	**0.28**	**0.24**	**0.09**
			(0.09)	**(0.03)***	**(0.09)**	**(0.13)** **	**(0.07)*** **	**(0.04)** **
Year after Crisis[1]			-0.15	-0.08	-0.17	-0.12	-0.14	-0.04
			(0.08)*	(0.02)***	(0.08)**	(0.14)	(0.04)***	(0.02)**
Observations	1473	1473	1218	1218	1216	1462	1463	1465
Number of women	149	149	149	149	149	149	149	149
R-squared	0.55	0.16	0.05	0.09	0.05	0.04	0.09	0.04
Mean of Dep. Var. for Nov. 2007	1.00	1.00	0.72	0.03	0.40	0.72	0.16	0.03
P-value: Jan 2008 = Dec 2007	0.00	0.00	0.05	0.13	0.04	0.69	0.06	0.89
P-value: Feb 2008 = Dec 2007	0.05	0.51	0.16	0.16	0.06	0.69	0.00	0.02
P-value: Mar 2008 = Dec 2007			0.29	0.41	0.49	0.69	0.00	0.02

Notes: Self-reported weekly averages. Sample restricted to women who could be re-interviewed in 2009. Coefficient estimated through OLS regressions with individual fixed effects and a dummy for the year following the crisis. Standard errors clustered at the individual level in parentheses. Columns 1 and 2: percent change compared to previous November. Thus the mean for the dependent variables in Columns 1 and 2 is 1 for both November 2007 and November 2008.

** significant at 10%; ** significant at 5%; *** significant at 1%*

The table reads as follows. Column 1: while in a normal year women in the sample spend 9% less in January than in the previous November, in January 08 they spent 47% less than in the previous November (07). Column 4: while in a normal year women in the sample have 0.27 fewer acts of unprotected sex per week in February than in the previous November, in Ferbuary 08 they had 0.40 more acts than in the previous November (07).

Expenditures for March 2008 were misrecorded. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

1Year after crisis is a dummy variable equal to 0 for the data from the conflict year (November 2007 - March 2008) and 1 for the year after (November 200

Table 7. Testing for Heterogeneity in Effect of Crisis on Changes in Sexual Behavior, by Baseline Characteristics of Women who Supply Transactional Sex

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Total # of Unprotected Sex Acts				
	Independent Variable interacted with Time Periods:				
	Monetary Value of Animals Owned in '07	Average Weekly Income from Sex Work in Nov. '07	Value of Loans Received from Formal Institution in '07	Value of Informal Gifts/Loans Received in '07	# Regular Clients in Background Survey
December, 2007	-0.040	-0.050	-0.060	-0.080	0.100
	(0.050)	(0.110)	(0.050)	(0.050)	(0.120)
Dec, 2007 * Indep. Var.	**-0.090**	**-0.100**	**0.020**	**0.060**	**-0.050**
	(0.05)*	**(1.750)**	**(0.020)**	**(0.03)***	**(0.040)**
January, 2008	-0.380	-0.410	-0.440	-0.490	-0.410
	(0.06)***	(0.10)***	(0.050)	(0.050)	(0.15)***
January, 2008 * Indep. Var	**-0.170**	**0.010**	**0.140**	**0.190**	**0.010**
	(0.110)	**(1.450)**	**(0.04)*****	**(0.05)*****	**(0.060)**
February, 2008	0.180	-0.350	0.140	0.110	0.240
	(0.08)**	(0.12)***	(0.08)*	(0.090)	(0.200)
February, 2008 * Indep. Var	**-0.220**	**6.320**	**-0.010**	**0.070**	**-0.020**
	(0.08)***	**(1.89)*****	**(0.040)**	**(0.060)**	**(0.080)**
March, 2008	0.280	-0.060	0.250	0.250	0.200
	(0.08)***	(0.110)	(0.08)***	(0.09)***	(0.220)
March 2008 * Indep. Var	**-0.220**	**3.800**	**-0.030**	**-0.030**	**0.060**
	(0.07)***	**(1.76)****	**(0.040)**	**(0.060)**	**(0.100)**
Mean of Indep. Var.	0.170	0.08	0.18	0.37	2.28
S.D. of Indep. Var	0.660	0.05	0.7	0.74	1.13
Observations	1043	1043	1043	1043	848
Number of Individuals	214	214	214	214	174
R-squared	0.11	0.14	0.11	0.11	0.12

Notes: Self-reported weekly averages. All monetary variables expressed in 10,000s Ksh. Coefficient estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. Exchange rate was roughly 70 Ksh to US $1 during the sample period.

** significant at 10%; ** significant at 5%; *** significant at 1%*

*The table reads as follows. Taking Column 1 as an example: while women who did not own any animal before the crisis had 0.18 additional unprotected sex acts per week in February 2008 compared to November 2007, women who owned animals before the crisis had 0.22 fewer additional unprotected sex acts per 10,000Ksh of animal value owned. Since the mean value of animals owned was 0.17, women with the mean animal value before the crisis had 0.18 - 0.22*0.17 = 0.14 additional unprotected sex acts in February 2008 compared to November 2007, compared to 0.18 for those who did not own any animals. There are fewer obsrevations than in Table 5 because the weekly averages for January are collapsed into monthly averages.*