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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 the microeconomic impacts of the political crisis and civil conflict that immediately followed the December 2007 Presidential Election in Kenya. Income, expenditures, and consumption dramatically declined for a broad segment of the rural population for the duration of the conflict. To make up for the income shortfall, women who supply transactional sex engaged in higher risk sex both during and after the crisis. While this particular crisis was likely too short for these behavioral responses to seriously increase the risk of HIV or other STIs for these women, such responses could have long-term repercussions for health in countries with longer or more frequent crises. Overall, our results suggest that social unrest can be an important channel through which political instability can affect long-term outcomes such as health.

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1 Introduction

After a contentious and bitterly fought campaign between the incumbent Mwai Kibaki and the challenger Raila Odinga, Kibaki was announced the winner of Kenya's presidential election on December 29, 2007 despite widespread reports of vote-rigging and other abuses. The announcement sparked violent protests throughout Kenya, and led to a state of emergency that virtually shut down roads and markets. The upheaval lasted for two months, and ended in late February 2008 when a peace agreement was signed and a power-sharing government was formed.

This type of civil conflict is common in sub-Saharan Africa and in developing countries in general (Blattman and Miguel, 2010). Besides the Kenyan crisis, recent examples of social conflict generated by political instability include the disputed 2010 Presidential election in Cote d'Ivoire, coups in Madagascar in early 2009 and Guinea in late 2008, state violence before the presidential election run-off in Zimbabwe in 2008, and riots following Benazir Bhutto's assassination in Pakistan in 2007, among others. Understanding how these sporadic yet recurrent episodes of social unrest affect households is critical in understanding the role of political instability in underdevelopment.

This paper uses a unique dataset collected immediately following the upheaval to estimate the impact of Kenya's political crisis on households in Busia District, Western Kenya, an area in which the upheaval did not result in a substantial direct human toll in terms of casualties, but in which market activity was seriously disrupted. Episodes of social unrest and associated market disruptions such as this, even if short-lived, may have long-term consequences on a variety of important outcomes. The basic issue is that such crises tend to drastically reduce individual income during (and sometimes after) the period of unrest, and many individuals are unable to cope with this income reduction except by engaging in activities which are detrimental to their long-term well-being. These responses will be particularly large in poor countries where formal means of coping with risk (such as insurance policies or bank accounts) are largely absent, and

where the marginal utility of consumption is very high, so that households are forced to take costly actions to maintain consumption.[1] 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's health (e.g., Hoddinott et al., 2008), or they may pull children out of school to help on the farm (Jacoby and Skoufias, 1997; see Ferreira and Schady, 2009 for a recent review article). 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).[2] In general, these types of hidden costs are difficult to identify empirically and consequently have received relatively little attention.

We show that the two months of civil conflict in Kenya had a sizeable negative impact on the incomes of a broad range of households, and led to large declines in expenditures and in consumption of necessary items, notably food. We find that these negative impacts were similar across baseline wealth and income levels. We also show that access to informal credit did not moderate the severity of the shock. This implies that access to social networks, which are one of the primary ways people cope with idiosyncratic risk in less developed countries (see studies by Townsend, 1994 in India and Udry, 1994 in Nigeria), and which have been shown to be critical coping strategies during localized conflicts (see for example the study by Westley and Mikhalev, 2002 in Kosovo), was not useful in the Kenyan case because the crisis was an aggregate shock which affected all members of informal insurance networks simultaneously (so that there was nobody who could insure others).

We then analyze the effect of the crisis on the frequency with which women supply unprotected transactional sex. We find compelling evidence that women supplying transactional sex lacked adequate insurance or consumption smoothing devices to cope with the income downfall, and so

[1] See Skoufias (2003) and Oxfam (2002) for reviews of risk coping strategies taken by households in crisis periods. Corbett (1988) also discusses a number of strategies households take in crisis periods.

[2] See Baird et al. (2010) for evidence that negative aggregate income shocks are strongly correlated with increased child mortality.

increased their supply of high-risk but more lucrative sex (particularly unprotected sex) after the crisis ended. In informal qualitative interviews, women tended to report needing to make up for their lost income as a rationale for their post-crisis behavior, and our data bears this out. Such impacts are noteworthy because unprotected sex is extremely dangerous in this part of Kenya: in the 2003 Kenya Demographic and Health Survey, HIV prevalence was estimated to be 9.8%, substantially higher than the national average of 6.7% (Central Bureau of Statistics, 2004). Over a long enough time period, substituting to these types of activities can have a sizeable effect on the probability of contracting HIV.

Our results potentially have much wider significance than for just this particular sample of sex workers affected by this specific crisis. Transactional sex is ubiquitous in many parts of Sub-Saharan Africa, and throughout the developing world (Swidler and Watkins, 2007; Luke, 2006; Wojcicki, 2002). In our area of study (Busia), an estimated 12.5% of women aged 15-49 are involved in formal or informal sex work (Robinson and Yeh, 2011a). While Busia is a known "hotspot" for transactional sex in which sex work is likely more prevalent than in Kenya as a whole (because it is a border town which is located on the main trucking corridor from Nairobi to Kampala), sex-for-money is certainly a major source of income for many poor women in developing countries. This in turn warrants serious attention because transactional sex has long been seen as an important factor in the spread of HIV/AIDS (i.e. Plummer et al., 1991; UNAIDS, 2002; Chen et al., 2007). Due to the sheer number of women in transactional sex worldwide, the behavioral responses we identify are likely relevant for the spread of HIV and other STIs in many conflicts across the world (particularly because countries which experience unrest tend to have underdeveloped social safety nets). These responses will be especially important in countries where episodes of conflict are recurrent.

Our contribution to the literature is four-fold. First, and most importantly, our dataset makes it possible to look at the household-level effects of a political crisis immediately after it ended. While a

previous literature has shown that civil war has devastating effects on human capital accumulation, particularly health and education (Blattman and Annan, 2010; 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, can also have important negative economic and health effects. Collecting quality data in areas of conflict is usually difficult, for multiple reasons: entering the study area during or soon after the crisis is often out of the question for security reasons, and pre-crisis data often does not exist. We were able to overcome both of these challenges because we had been following a broad range of individuals even before the crisis began, which made it possible for us to track respondents down immediately after the peace sharing agreement was signed. This dataset makes it possible to identify the immediate effects of the crisis and ensuing social unrest on outcomes. Such inference is typically very difficult because of the dual causality between conflict and economic outcomes (Collier, 2007; Miguel et al., 2004; Blattman and Miguel, 2010), but this is an example in which it is clear that the conflict was the cause of the income shock.

Second, given these empirical strengths, we bring some evidence to bear on how households cope with income shocks more generally (and not just those caused by political unrest). There exists a copious literature in development studies, political science, and economics which studies the effects of shocks on the livelihoods of poor or marginal populations. Among others, these include studies of seasonal hunger periods or unforeseen famines (see, for example, Cekan, 1993 in Mali; De Waal, 1989 in Sudan; Webb, et al., 1992 in Ethiopia) and natural disasters (e.g., del Ninno et al.'s 2001 study of floods in Bangladesh). In regards to civil conflict and unrest more specifically, Longley and Maxwell (2003) synthesize ten studies which examine strategies used by households in coping with chronic political instability, and Korf (2003) studies how the civil war in Sri Lanka affected land use and agricultural coping strategies of small-scale farm households. While the approaches used in these studies differ from one to another, ours is the only one (which we are aware of) to utilize

quantitative data on income, labor supply and consumption which was collected before, during, and after a crisis that was both intense and unanticipated.

Third, 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). Such costs are typically "hidden" because it is extremely difficult to collect data on sexual behavior in any context, let alone immediately post-crisis. This was possible in our case only because we had done previous work with a sample of women involved in sex work and our enumerators had developed a relationship with them. As such, our study represents one of the very few studies to quantitatively estimate the effect of civil unrest on transactional sex.

Fourth, our paper contributes to a literature on the effect of income shocks or economic downturns on the decision to engage in commercial sex. Historically, such crises have generated an increase in entry into sex work as a coping strategy, both in developed and less developed countries. For instance, Bullough and Bullough (1987) discuss how entry into sex work increased in immediate post-World War II Germany, Italy, and Japan. Similar increases were seen following the Great Depression in the United States (Allen, 2004) and during the economic turmoil in the former USSR in the 1990s (Aral et al., 2003; Atlani et al, 2000). Interview or questionnaire-based studies find a similar pattern - when asked, a significant fraction of women report that the reason that they entered sex work was financial distress or hardship (see Bucardo et al., 2004 for a study

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

in Mexico; and Robinson and Yeh, 2011b for evidence from Kenya). These studies all focus on the extensive margin of sex work (entry into the profession). Our study differs in that it is the first study that we know of to look at the intensive margin (the amount of sex that women already in the market supply).

2 Background: The 2007 Election Crisis in Kenya

After a long and contentious election campaign, Kenya held general elections on December 27, 2007. Despite concerns about serious flaws in the counting and tallying of votes and a 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 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 (Gutiérrez-Romero, Kimenyi and Dercon, 2008). These impacts included personal injury, displacement, 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 to avoid getting caught in the violence. Areas dependent on transportation and imports or exports were particularly hard-hit (Glauser, 2008).

While election-related violence is not unprecedented in Kenya, all evidence suggests that the intensity, duration and geographic reach of the 2007-08 crisis was unparalleled and generally unanticipated. Although previous elections have resulted in casualties and in the displacement of people (particularly in 1992 and 1997), those disturbances were nowhere near the scale of the 2007 election (Dercon and Gutiérrez-Romero, 2010; Human Rights Watch, 2008; Kenya National Commission on Human Rights, 2008). Moreover, the most recent election (in 2002, in which Kibaki was originally elected) was marked by relative peace. While people might have expected some disruption in advance of the 2007 election, it seems reasonable to assume that the severity and length of this crisis was unanticipated in the average household in Western Kenya.[4]

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. Dupas and Robinson (2010) document 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 two weeks 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.

The disruptions had large impacts on the lives of those who depend on the local markets for their livelihoods. 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

[4] We are not aware of any studies which had asked for people's expectations about the election before it occurred.

addition, to the extent that transactional sex is a normal good, the drop in income observed among the general population further contributed to the decrease in the demand for transactional sex over the crisis period.

3 Data

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 (2011). 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. For each outcome, respondents were asked to recall the amount for an average week in November 2007, December 2007, February 2008 and March 2008.[5] 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.[6] Dupas and Robinson (2010) present this data in graphs, and show very drastic changes in income and consumption over the time period of the survey. The survey also asked about the risk-coping strategies employed during the crisis. We supplement this dataset with background information collected in 2006.

Second, using the same survey instrument, we simultaneously collected data from 220 local shop

[5] In an early version of the survey, we asked for each week in every month (including the pre-crisis period), but we found that asking for that level of detail provided little further information.

[6] 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.

owners. We supplement this dataset with background information collected in 2006-2007 and used in Kremer, Lee, Robinson, and Rostapshova (2010).

Third, we simultaneously collected data on a sample of 214 women who supply transactional sex. It is hard to get such women to trust enumerators enough to respond to detailed personal questions (particularly about their sexual behavior). To work with such women, we partnered with the Strengthening STD/HIV Control Project (SHCP) in Kenya, a Kenyan organization that worked with thousands of formal and informal sex workers across the country by organizing women into peer groups. In order to collect reliable data, we employed as enumerators two women who had previously been trained to run peer groups, as well as a trained nurse who served as the overall field coordinator for all the peer groups in Busia District.

Another problem with identifying sex workers is that the line between commercial sex and other, more standard types of sexual relationships can be blurry in Kenya (and indeed, in much of Africa). For instance, a transactional sex-for-money component can be present in many types of relationships, including marriage (Swidler and Watkins, 2007). For this reason, SHCP employed a very loose definition of a sex worker: any single, widowed, divorced, or separated woman, aged 18 or older, who had multiple concurrent sex partners. We used the same definition in drawing our sample.

The sample for this paper is drawn from a universe of sex workers previously constructed in Robinson and Yeh (2011a), which constitutes a random sample of sex workers identified through a snowball methodology in July 2005.[7] 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

[7] In total, we were able to get useable data from 228 women. In the analysis, we focus on the 214 women who were still actively involved in sex work at the time of the crisis. The other 14 who completed surveys but who had no income from sex work had started other professions. Those who had married or left the area were not interviewed.

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.

Table 1 presents summary statistics on the three populations that compose our sample.[8] 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 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 vendors are the poorest of the three groups). However, all three samples are quite well integrated into informal networks of gifts and loans (including the women who supply transactional

[8] In an effort to keep these three samples as representative as possible, we attempted to find all individuals who had been sampled in our prior studies. Overall, we were able to collect surveys from 220/281 shops (78%), 151/173 market vendors, artisans and bicycle taxis (87%), and 228/264 sex workers (86%). However, note that 14 of the sex workers are dropped from the analysis as they had stopped engaging in transactional sex. Of the remainder that could not be traced in the 3 samples, most had moved out of the survey area (for marriage, work, or other reasons). 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 destroyed, however, comprising about 1.4% of the shops in the sample.

sex). This implies that the reason that people suffered from the crisis is not that they were somehow isolated from informal networks, but that the shock was felt economy-wide, affecting everybody in the network simultaneously.

Finally, while we do not have data on HIV infection rates for our three samples, we suspect that HIV rates are very high among sex workers. This is based both on evidence from other studies (i.e. National AIDS Control Council 2005; UNAIDS 2004), and because mortality is high among our sample of sex workers. In a follow-up survey conducted in March 2009, we 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. While we do not know the cause of death of those women, it is very likely that it is HIV/AIDS.

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. For this paper, collecting this data was made easier by the fact that the women we interviewed were organized into peer groups, and that many of them had previously participated in our earlier study (Robinson and Yeh, 2011a). It was also important that two of our enumerators were women trained to run the peer groups, and the other was a trained nurse who oversaw all the peer groups in Busia District and worked closely with the women. Working with these three enumerators 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).

Through extensive qualitative work in a study conducted with this sample prior to the crisis,

we identified a reliable and culturally appropriate way to obtain information on sexual behavior by asking women to complete detailed daily diaries in which they could self-report 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 (2011a) 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.[9] Women reported taking only 2.4 clients and engaging 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 2007-08, 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 had gotten older and so many might have been transitioning away from sex work.[10]

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

[10] Since these women are likely less reliant on income from sex work than the average sex worker, our estimates of the impact of the crisis on sexual behavior are likely to be lower bounds. However, we cannot know this definitively as we did not resample a representative sample of women after the crisis.

4 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:

$$\frac{y_{it}}{y_{iNov2007}} = \beta_0 + \sum_{t=Dec2007}^{Mar2008} \beta_t period_t + \mu_i + \varepsilon_{it} \quad (1)$$

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. We thus estimate the impact of the violence by examining the pattern of the βs, which reflect the percentage change compared to the pre-crisis period (November 2007). 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). To maintain comparable samples across outcomes, we restrict the analysis to individuals for whom all the outcomes of interest are observed (income, expenditures, consumption, and sexual behavior for the sex worker sample). 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:

$$\frac{y_{it}}{y_{iNov2007}} = \beta_0 + \sum_{t=Dec2007}^{Mar2008} \beta_t period_t + \sum_{t=Dec2007}^{Mar2008} (X_i'\gamma_t) period_t + \mu_i + \varepsilon_{it} \quad (2)$$

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).

5 The Direct Effects on Income and Consumption

5.1 Average Effects on Income, Expenditures and Consumption

Table 2 presents the results of our estimation of Equation (1) for all three samples, with income, expenditures and consumption as dependent variables.[11] The election crisis had a sizeable effect on income for all three types of individuals. For small vendors and artisans, income was 48% lower in the first week of January 2008 than it was for an average week in November 2007, and remained significantly lower throughout the month of January. Shop owners, who have much larger businesses (the mean income for the pre-crisis period is indicated at the bottom of each column), were affected even more: average incomes dropped by 59%. However, the drop in income was most precipitous for women who supply transactional sex: income from sex work went down by 89% in the first two weeks of January and remained below 50% of pre-crisis income for the rest of the month.

Columns 4-6 of Table 2 show a dip in expenditures in January for all three types of individuals in our sample. Here again, the dip is particularly pronounced for women supplying transactional

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

sex (between -49% and -68% in January, and still -25% in February). Given the price increase documented in Dupas and Robinson (2010), 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.

To test the extent to which the observed decrease in expenditure corresponds to a decrease in consumption of essential items such as food, we look more specifically at food expenditure 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 (so that they are less reliant on the market to meet food needs even in good times), did not decrease their food expenditure over the period. Shop owners saw a significant decrease, but a relatively small one in comparison to their average food expenditure (less than 10%). In contrast, women who supply transactional sex (who live in a semi-urban area), saw a roughly 20% decrease in their food expenditure throughout January, and were still spending less on food in February 2008 than they had been in November 2007.

To provide some measure of actual food consumption, we study the impact of the crisis on the number of days the household had meat in Columns 10-12 of Table 2. For all three samples, we find a sizeable decrease in meat consumption. These results suggest that consumption smoothing over the income shock was far from perfect, even among the relatively well-off sample of shop owners. We also ran regressions with whether the household had skipped a meal as the dependent variable, and obtain similar results (not shown).

Note that the dramatic decrease in consumption that we observe confirms that the crisis was at least partially unanticipated by households. If households had rationally anticipated a crisis of this length and magnitude, they should have adjusted down consumption even before the crisis to build

up buffer stocks and avoid such a massive drop in consumption in January and February. Rather than accumulate buffer stocks in cash, which can be useless when markets are shutdown, they should have stocked food and other items, meaning that their *expenditures* prior to the crisis should have gone up, while their consumption should have gone down.[12] Even though people throughout the world have difficulty fully saving in advance of anticipated shocks (for instance, see Stephens, 2004, for evidence from the US), the magnitude of the decline we observe in the consumption of basic necessities strongly suggests that the crisis was not fully anticipated. Furthermore, as we will show later, there was very little heterogeneity of the impact across individuals: for instance, even those with greater animal holdings did not fare better. Again, if the crisis had been anticipated, those households with more assets should have sold them off in anticipation.

5.2 Coping Mechanisms

What coping mechanisms did people use to limit the effect of the crisis? We present some suggestive evidence in Table 3. During the post-crisis survey, respondents were asked 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.[13] For each behavior, we present the mean, median 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 to the average in 2007. If risk-coping in Jan/Feb 2008 was at the 2007 level, the ratio should be 1; thus, we should expect ratios much greater than 1 if these

[12] While we did not collect any information on whether people had been saving in anticipation of the crisis, the magnitude of the decline in consumption afterwards suggest that saving was, at most, minimal (at least among poor rural households in Western Kenya).

[13] Data on 2007 behavior was collected through surveys administered with each sample for independent studies. While not all behaviors were asked from all three samples, when asked, behaviors were asked in similar ways.

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).

Besides friends and relatives, another possible source of insurance for sex workers are so-called regular clients. While there is no universal definition of a regular, in general a regular is a client who sees a particular sex worker on a regular basis (in contrast to a casual client who will often see a given sex worker only once). The relationship between women and regular clients has several dimensions, one of which is that regulars are expected to provide assistance when shocks occur (Robinson and Yeh, 2011b). During the crisis, however, sex workers did not receive much extra assistance from their regular clients, which again speaks to the fact that the clients themselves were adversely affected.

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. 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 declines in Table 2: overall, these households were unable to smooth consumption over the shock.

5.3 Heterogeneity in Effects and Responses

In this section, we test for heterogeneity in the effect of the crisis within each of the three samples. Overall, we find little evidence of heterogeneity which 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 informal transfers and test whether wealthier individuals or individuals receiving more transfers (pre-crisis) were better able to cope. As before, we look at the percentage change in total expenditures in each time period (as a percentage of the November 2007 value).[14] The coefficients of interest are the interaction terms, which for ease of reading we have highlighted. To interpret magnitudes, we include the mean and standard deviation of the independent variable at the bottom of the table. All independent variables are expressed in 100,000 Ksh. Hence an estimated coefficient of +1 means that a 1,000 Ksh difference in the independent variable leads to a 1% increase in the dependent variable.

Table 4 reads as follows, taking Column 1 as an example: while vendors and artisans who did not own any animals before the crisis saw a drop in expenditures of 10% in January 2008 compared to November 2007, the consumption of vendors and artisans who owned animals before the crisis was 29.8% less affected per 100,000 Ksh of animal value owned. Since the mean value of animals owned (in 100,000 Ksh) before the crisis among vendors and artisans was 0.09, those with the mean animal value before the crisis saw a drop in expenditures of only -10+(0.09)*29.8=7.3% in January 2008 relative to November 2007. However, this difference is not significant.

From Columns 1-6, 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. Other indicators of baseline wealth and assets, such as the value of durable assets, or ROSCA contributions

[14] Specifications looking at changes in levels, rather than percentage changes, yield similar results.

also did not seem to help mitigate the effect of the crisis (results not shown).

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, as evidenced by the negative interaction terms (January, 2008 * Indep. Var and February, 2008 * Indep. Var) in Columns 7-9. This was particularly true for women who supply transactional sex. 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 10-12 show a very similar pattern when the interaction is the amount given rather than the amount received.[15] However, these effects are relatively small compared to the effect of the crisis. For instance, taking the coefficient of 2.559 on the "January, 2008 * Indep. Var" interaction for women in column 9, and given that the mean of "Value of informal gifts/loans received" in the sex worker sample is only 0.04 (as shown at the bottom of column 9), a woman at the mean (in terms of social connectedness) had 2.559 * 0.04 = 10.0 percentage points lower expenditures in January 2008 than a totally unconnected woman, who herself had a mean decrease of 48.8 percent in January 2008.

Thus we find surprisingly little difference in smoothing ability across individuals overall.[16] This speaks to the nature of the crisis, a fundamental political crisis which was felt throughout Kenya, making interpersonal risk-coping difficult. Thus, it does not appear to be the case that certain individuals suffered because they were isolated from social networks. This is particularly relevant for sex workers, as one hypothesis for the large hit they took was that they are removed from traditional risk-coping mechanisms. However, given that market vendors and shopkeepers were

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

[16] 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.

also affected, and that well connected sex workers did no better than those less well connected, this does not seem to be the explanation. Instead, in the absence of effective consumption smoothing mechanisms, everybody was forced to reduce consumption.

These results raise several questions about how and why households reacted to the crisis as they did. We will interpret these findings in the discussion section (Section 7).

6 A Hidden Cost: Impact of the Crisis on the Supply of Unprotected Transactional Sex

In this section, we present evidence 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.[17] However, we have information on the sexual behavior of women who were already involved in transactional sex prior to the crisis.

6.1 Impact on Sexual Behavior of Women who Supply Transactional Sex

Figure 1 and Table 5 present estimates of the impact of the crisis on the sexual behavior of women who supply transactional sex. We consider two types of outcomes: the number of sex acts *per client*, and the total number of acts per week. These regressions are in levels, instead of percentage changes.

The table reads as follows. Taking column 1 as an example, the coefficient at the bottom of the column shows that the average number of unprotected vaginal sex acts per client was 0.40 in

[17] 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. As we will discuss later, we have some evidence that more women were in the market in the post-election period. However, we cannot know if this increase was on the intensive or extensive margin. Other work we have done shows that women report large income shocks as a main reason why they enter the market (Robinson and Yeh, 2011b), so we would not be surprised if there was an effect on the extensive margin.

November 2007. The first coefficient estimate suggests that this number increased (insignificantly) to 0.40+0.06=0.46 in December 2007. In contrast, the second coefficient estimate implies that the frequency of such acts increased to 0.40+0.34=0.74 in the first week of January, corresponding to an 85% increase compared to November, significant at 1 percent. Likewise, the third coefficient estimates shows that the frequency remained very high, at 0.40+0.42=0.82 in the second week of January, a more than 100% increase compared to November.

We find that, in large part, women responded to the negative income shock by significantly increasing the amount of unprotected sex they had, conditional on being able to find clients (left panel of Figure 1 and columns 1-3 of Table 5). As described above, the number of unprotected vaginal sex acts per client went up from 0.4 prior to the crisis, to 0.8-0.9 in the middle of January (over a 100% increase).

The total number of weekly unprotected sex acts was lower in January than before the crisis, however, since women were not able to find clients during the height of the crisis (right panel of Figure 1 and columns 4-6 of Table 5). However, women seemed to increase the total amount of unprotected sex they had after the crisis ended: in February and March, the total number of unprotected vaginal sex acts went up dramatically, by 0.25 acts per week in February and 0.36 acts in March.[18] These are big effects, compared to the baseline of 0.72 acts in November.[19] Even more troubling is that the number of unprotected anal sex acts per week increased by 0.16 in February and 0.17 in March, compared to a base of just 0.03 acts per week in November 2007 (column 8).[20] Unprotected anal sex is extremely risky: though reliable numbers are hard to come by, the risk of

[18] Note that this is not because condoms were unavailable during this time period. While we did not collect data on the price or availability of condoms during or after the crisis, we received no reports that condoms were harder to come by. The price of condoms is quite low, relative to sex worker incomes: 10 Ksh ($0.13) for a pack of 3.

[19] While the crisis was associated with an increase in rapes in some parts of Kenya, it is important to note that all of the sexual activities we report here were consensual. We did not receive reports of rapes for the women in our sample.

[20] 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, 2011b).

HIV transmission from unprotected anal sex has been estimated to be as high as 0.5-1% per act (i.e. Mastro and de Vicenzi, 1996). This increase in the supply of risky sex, which pays more than protected sex, suggests that women needed to make up some of the income lost during the crisis.

To examine whether some women were less susceptible to the crisis than others, we also tested for heterogeneity in whether women increased their supply of risky sex. As with the expenditure results presented in Table 4, we find small and typically insignificant differences by background characteristics, with the general pattern being one of relative homogeneity in the effects of the political crisis (results available upon request).

Overall, these results suggest that the crisis had major impacts on the behavior of sex workers, who are, as noted above, a substantial fraction of the female population in Busia. Though this specific crisis lasted only two months, such behavioral responses, if seen during other crises, could have important effects on the spread of HIV and other STIs.

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

An obvious shortcoming of our analysis is that we cannot know the counterfactual – what the income, consumption and labor supply patterns of households in our study area would have been, had the crisis not taken place. This is an important issue since there are several possible seasonal factors at play. Most obviously, Busia District is heavily Christian and Christmas falls in this time period. In addition, this part of Kenya has two growing seasons per year, and the harvest for the shorter, less productive season is in January. While this would tend to increase, rather than decrease, incomes (and to the extent that sex work is a normal good, demand for sex) in January, there could be other seasonal effects driving our results.

One way to control for possible seasonal variation 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.[21] 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, 149 (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 4% were unavailable to be surveyed during the survey period. We present the analysis for the 149 women still earning some income from sex work. As we will discuss below, the 149 that were followed were not random, which will affect the interpretation of these results.

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

$$y_{imt} = \beta_0 + I_{t=2007/08} + \sum_{m=Dec}^{Mar} \gamma_m period_m * I_{t=2007/08} + \mu_i + \varepsilon_{it} \quad (3)$$

where $I_{t=2007/08}$ is a dummy indicating the crisis year. The coefficients of interest are the γ_ms: if the estimates of the βs in the previous Tables were only picking up usual seasonal variation, the estimates of the γ_m coefficients should be zero.

Estimates of Equation (3) for the sample of sex workers are presented in Table 6. The estimates of the γ_m coefficients are highlighted for ease of reading. The first column presents the percent change in expenditures with respect to November, rather than level changes (the levels look very similar). Thus Column 1 reads as follows: while in a normal year women in the sample spend 11% less in January than in the previous November, in January 2008 they spent (11%+49%)=60% less

[21] 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. Another possibility would be to use another country (for instance, Uganda, since Busia is on the Uganda border) as a control, but this was impossible because we had no ability to collect data there in the immediate aftermath of the crisis.

than in the previous November (2007).

The remaining columns present level differences. The first thing to note is that the subsample we could trace in 2009 was not a random sample. For instance, Column 2 gives the increase in unprotected vaginal sex per client in February 2008 as the sum of the "February" and the "February 2008" coefficients, for a total increase of 0+0.11=0.11 sex acts in that month. This is much smaller than the effect for the entire subsample from Table 5 (which was 0.20). The same pattern can be observed across a number of different variables: it looks like those women who could be traced the following year were better able to cope and were much less likely to resort to risky sex to make up for the lost income. Thus, while a difference-in-difference approach is clearly a methodological improvement on our previous results, selection becomes a large problem here. Consequently the results are only relevant for women relatively less affected, and therefore can offer only supporting rather than definitive evidence.

That (major) caveat in mind, the estimates of the β_m coefficients are often significant, suggesting that there are important seasonal variations in income and sexual activity for sex workers. However, the estimates of the γ_m coefficients are still very large and significant, suggesting that the responses estimated above were still substantial. In fact, the sexual responses are similar to our previous specification: the increase in total unprotected vaginal sex acts is 0.29 in February 2008 and 0.28 in March 2008 (compared to 0.25 and 0.36 in Table 5). For unprotected anal sex acts, the numbers are 0.11 and 0.09 in February and March 2008, compared to 0.16 and 0.17 in Table 5. Of course, the difference-in-difference numbers are estimated on a much smaller number of women and therefore these specific coefficients should not be considered as definitive, but the pattern of results strongly suggests that the crisis had large negative effects on the lives of these women.

6.3 Alternative Explanations

Our preferred explanation for why sex workers increased their supply of risky sex during and especially after the crisis is that they needed to make up for lost income. In this section, we consider some alternative explanations for this result.

A first possibility is that the increase in unprotected sex was driven by a change in demand. In particular, it is very likely that the composition of clients changed during the crisis period. For one, the number of clients went down (which is not surprising since there was a curfew and most men were hit by a large income shock themselves, as we have seen above). It is possible that the few men seeking sex workers during or right after the crisis were those more inclined to have unprotected sex. To estimate the role of these potential demand shifts, we asked women, at the end of our follow-up survey in March 2008, some descriptive questions about prices and participation in the transactional sex market. There are four questions which are useful here: (1) Was the price for protected vaginal sex higher, lower, or the same in February 2008, compared to 2007?; (2) Was the price for unprotected vaginal sex higher, lower, or the same in February 2008, compared to 2007?; (3) Did you spend more, less, or the same amount of time looking for clients in February 2008, compared to 2007?; (4) Were there more, less, or the same number of women looking for clients in February 2008, compared to 2007? We present the mean responses to these questions in Appendix Table A1. The evidence suggests that, during the crisis, prices fell and participation rose. In particular, 94% of women reported that the price for protected vaginal sex fell, and 71% reported that the price for unprotected vaginal sex fell. Further, 84% of women reported spending more time looking for clients individually. While this was certainly driven in great part by a decrease in demand, there seems to have been a concomitant supply shift: 92% report that more women were looking for clients in the transactional market in January/February than in normal periods.

A second question is whether the violence affected risk attitudes directly. In other words, the

violence and the intensity of the shock might have made people fatalistic. While this is difficult to rule out conclusively as we did not measure risk attitudes, we do not think this is very likely. While several studies have found that exposure to conflict or to natural disasters can affect risk attitudes, the direction of this effect differs across studies. Those studies which find a positive association between exposure to conflict or trauma and risk-taking behavior tend to involve events much more extreme than we study here: for instance, exposure to casualties in Burundi (Voors et al., 2010) or relocation due to Hurricane Katrina (Eckel et al., 2009). In this part of Kenya, the conflict was closer to a natural disaster (without as much destruction of physical capital) than to a war or a devastating hurricane, and so perhaps closer to exposure to floods or hurricanes as in Cameron and Shah (2010), who find that exposure made people more risk averse. Overall, while it is impossible to completely rule out a change in preferences, we are not able to find any evidence from other studies to suggest that a crisis such as the one we study would have affected risk-taking behavior.

There could also have been other changes in preferences or in the nature of the transactional sex market during or after the violence. Examples of preference shifts might be that women became despondent and accepted risks that they would not have otherwise, or that clients needed comfort in a time of crisis. We view this as unlikely for a few reasons. One is that the increase in sexual behavior we observe occurred only after the worst of the violence had occurred (in February and March, whereas the most violent episodes were in January). Another is that Busia was not directly affected by the violence. While it was no doubt traumatic to hear of violence in other parts of the country, it seems unlikely that this could substantially change preferences.

Another possibility is that women may have lost voice in the post-conflict period such that they were less able to impose their preferences for condoms on clients. This could have been very explicit (for instance, due to an increase in rapes) or a bit less so (women feeling less able to say no to unprotected sex). We find no evidence for either of these. We did not receive any reports of

increases in rapes. We also asked women if they had refused any clients. This data was not well recorded, so we only have 104 women who have complete information on whether they declined clients. Women in that subsample were more likely to refuse clients in the post-election period than before, however: only 6.7% of them declined a client in November/December, compared to 18.3% in February/March. While some of this might be explained by the fact that they were more active in February or March, it does not appear that women had less control over their sexual decisions after the conflict period.

A final concern with our approach is related to the type of data used in this study. Since we used retrospective surveys to estimate our effects, the data is potentially subject to recall bias. While it is possible that such bias could affect our results, the bias must be of a specific form. If women misremembered a constant, time-invariant proportion of their sexual behavior, this would difference out in even the simple before-after comparisons in Table 2. If women instead tend to misremember more for more distant events (such that they have forgotten some of what happened in November by March), but this forgetting is constant across years, then the difference-in-difference estimates would still be accurate. Thus, for recall bias to affect our results, it must be the case that women misremembered more in the conflict period than in other years. While this could be possible if women better remember salient events such as the crisis, we do not think this is likely given that the primary outcome we study is the response after the crisis ended, that prices dramatically increased at the same time as the income shocks women reported, and that all three samples of individuals reported major income losses.

7 Discussion

Kenya's post-election crisis resulted in major consumption declines, even for those who were relatively better off. Furthermore, women in the transactional sex market dramatically increased their

supply of unprotected sex after the crisis ended. Why didn't those who were better off use their savings to maintain consumption? Why did sex workers react so strongly to a crisis which was ultimately quite small relative to lifetime income? Though we will not be able to provide a definitive explanation, this section lays out a basic framework for thinking about the results.

The Permanent Income Hypothesis (PIH) is the benchmark economic framework for estimating the relationship between income, savings and consumption (see Jappelli and Pistaferri, 2010 for a review). In its most basic form, the PIH is based on the idea that risk-averse individuals dislike consumption fluctuations, and would prefer to smooth the marginal utility of consumption over periods. The motivation for saving in the PIH is therefore in anticipation of possible future income shocks.

In this framework, the response to shocks depends crucially on the nature of those shocks. Transitory shocks which are small relative to lifetime income (such as a short illness which causes an individual to miss a day's worth of work) should be handled with savings – people would rather cut into their savings on a rainy day to maintain their normal consumption and pay it back when times are better than drastically reduce consumption only to increase it later. However, savings will not be useful for permanent shocks (such as a permanent wage decrease). Since individuals cannot permanently consume more than they earn, they must reduce consumption to balance the lifetime budget constraint.

The crisis we study was transitory and was ultimately small compared to lifetime income (even sex workers, who were the worst affected, lost less than a month's worth of income in total), so the PIH would suggest that households should have tried to maintain consumption during the crisis by relying on their savings. After the crisis ended, they should have gone back to life as it was before, saving in good times and dissaving in bad times. Assuming demand and supply in the labor market eventually returned to normal, they would also work about as much in the post-crisis period as

they did in the pre-crisis period, since their lifetime income would have changed only marginally.

Clearly, people responded much more strongly than predicted by the PIH. What then explains the responses we observe? We consider several possibilities.

Insufficient Saving Balances. First, many people in our sample might not have had large enough savings balances to cope with the shock. Even if they were to completely deplete their savings, they might still not have had enough to maintain consumption. If this were the case, then we should observe two additional patterns in the data: (1) a large decrease in asset holdings, and (2) heterogeneity in the intensity of the crisis impact across initial levels of asset holdings. Since we have only modest evidence for (1), and no evidence for (2), this seems unlikely to be the sole explanation.

The Crisis Was Seen as Permanent. Second, people might have believed that the crisis would be more severe and last longer than it really did. If people (wrongly) expected the crisis to last permanently, they would have immediately adjusted consumption downwards and would not have drawn down savings. In this case, even those better off wouldn't have relied on their savings, and thus there would be little heterogeneity in the severity of the consumption decrease. This is consistent with what we observe. But this does not explain why sex workers increased their supply of risky sex after the crisis ended (since under this hypothesis, women would not have sold off assets and so would not have had to make back the lost income)..

Precautionary Savings. Finally, people may have had a precautionary savings motive. If this motive were strong enough, people might have preferred to keep some savings on hand at the expense of current consumption, since they were worried about the crisis getting even worse in the future. However, again we would expect to observe some heterogeneity if this were the case, since better off households would have more ability to cut into their precautionary savings than less poorer households would. Again, this does not seem like the sole explanation.

As can be seen, none of these explanations, by itself, fully explains the results, and the magnitude and homogeneity of the consumption drop we observe remain something of a puzzle. However, this is not the only study to find such responses. Kazianga and Udry (2006) find similarly little heterogeneity during a serious drought in Burkina Faso in 1981-85.29

8 Conclusion

While the violent conflict that erupted in Kenya in the wake of the 2007 Presidential election surprised many, these types of conflicts are 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 affect households during the crisis period, and how they 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 further document an important hidden channel through which political unrest can potentially affect long-run outcomes: we show that the market breakdown associated with social unrest led to significant increases in unprotected sex by women who supply transactional sex. While our results are for one sample of sex workers during one particular crisis, they are, to our knowledge, the only evidence to date on how sex workers cope with the substantial income loss associated with a civil conflict. If sex workers living in countries which experience conflict regularly respond similarly to large income shocks (and we suspect that they might, since countries which tend to experience unrest are often poor and usually do not have developed insurance, credit, or savings markets), the channel we identify here could have long-term effects on the spread of HIV and other STIs.

The disruptions we highlight 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.

While our study focuses on only one particular part of Kenya during a single political crisis, our results have implications for understanding such conflicts more generally. In any poor country in which formal insurance is rare and in which access to consumption smoothing devices such as bank accounts or credit is limited, large, economy-wide income shocks like the one which Kenyans experienced in 2008 will be difficult for people to manage. In such an environment (which is unfortunately typical of much of the developing world), our results strongly suggest 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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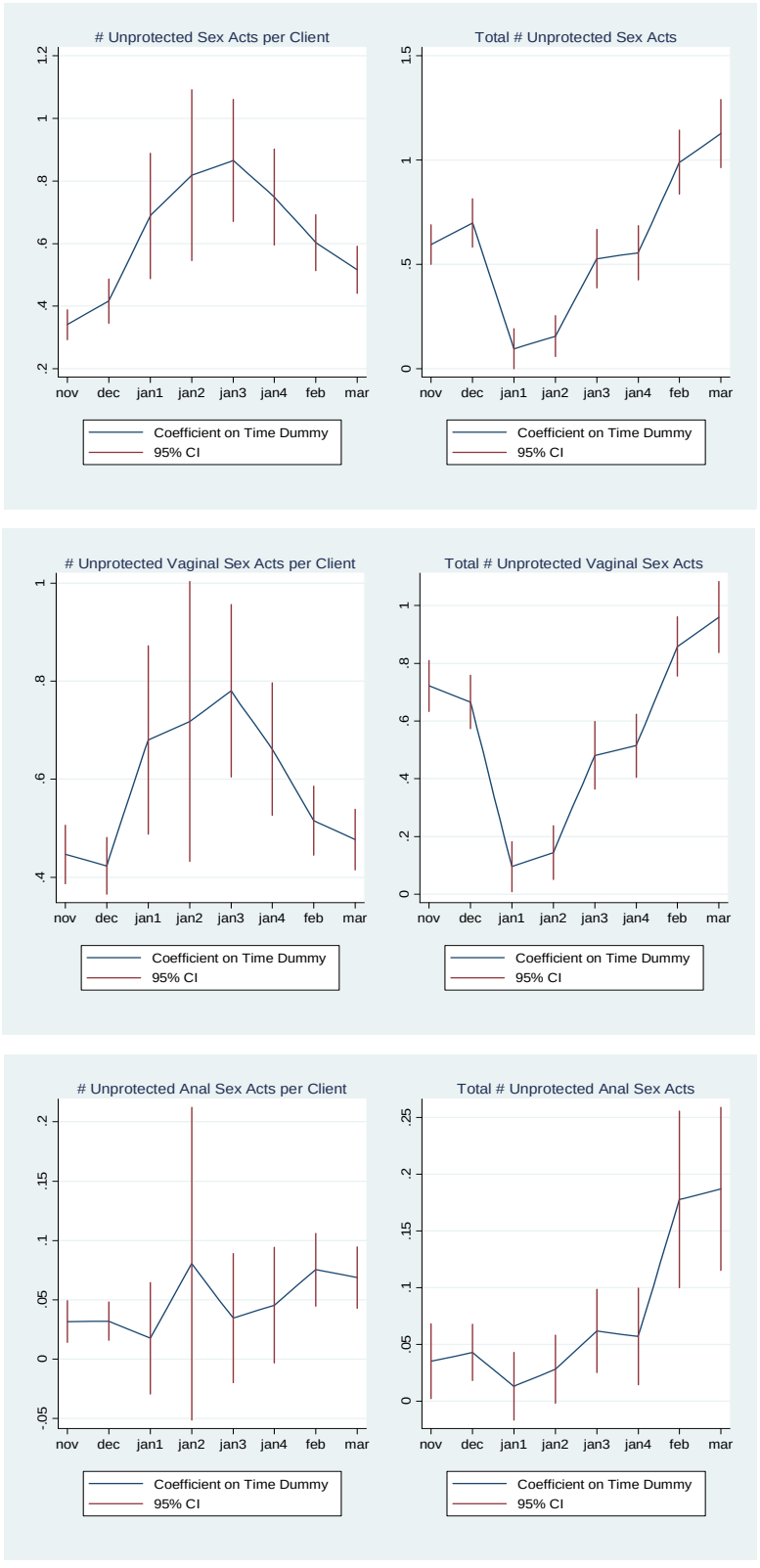
Figure 1. Impact of Crisis on Sexual Behavior of Women who Supply Transactional Sex



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 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	[.]
Cohabitating	-	-	-	-	0.14	[.34]
Widowed	0.12	[.33]	0.07	[.26]	0.25	[.43]
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 (Ksh)	13672	[14304]	120988	[320741]	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 job besides sex work	-	-	-	-	0.86	[.35]
Respondent is Head of Household	-	-	-	-	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 (Rotating Saving and Credit Association)	0.77	[.42]	0.42	[.49]	0.59	[.49]
Value of Animals Owned (Ksh)	9280	[18580]	20749	[30797]	1783	[6820]
Received loan from a formal institution or moneylender in 2007	0.07	[.26]	0.22	[.41]	0.14	[.34]
Received an informal loan (from a friend, relative, neighbor) in Previous Year	0.50	[.5]	0.15	[.36]	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]	0.44	[.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		220		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, Expenditures, and Income During and After Post-Election Crisis

	(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	0.24	0.47	0.03	0.11	0.04	0.07	0.20	0.06	0.14	0.20	0.16	0.16
	(0.05)***	(0.14)***	(0.05)	(0.06)*	(0.02)**	(0.02)***	(0.12)*	(0.02)***	(0.05)***	(0.07)***	(0.03)***	(0.03)***
1st week of January, 2008	-0.48	-0.59	-0.89	-0.02	-0.12	-0.49	0.08	-0.06	-0.22	-0.38	-0.43	-0.55
	(0.07)***	(0.13)***	(0.05)***	(0.06)	(0.02)***	(0.03)***	(0.10)	(0.02)**	(0.02)***	(0.08)***	(0.04)***	(0.04)***
2nd week of January, 2008	-0.39	-0.58	-0.89	-0.11	-0.27	-0.68	-0.02	-0.09	-0.26	-0.40	-0.43	-0.59
	(0.08)***	(0.11)***	(0.05)***	(0.03)***	(0.05)***	(0.04)***	(0.04)	(0.02)***	(0.02)***	(0.07)***	(0.05)***	(0.04)***
3rd week of January, 2008	-0.32	-0.33	-0.55	-0.08	-0.18	-0.66	0.03	-0.07	-0.19	-0.37	-0.35	-0.46
	(0.08)***	(0.07)***	(0.07)***	(0.03)***	(0.05)***	(0.03)***	(0.03)	(0.02)***	(0.02)***	(0.07)***	(0.05)***	(0.04)***
February, 2008	0.01	-0.06	0.01	0.08	0.01	-0.25	0.13	0.01	-0.09	-0.14	-0.03	-0.28
	(0.09)	(0.09)	(0.08)	(0.03)***	(0.02)	(0.03)***	(0.03)***	(0.02)	(0.02)***	(0.06)**	(0.04)	(0.04)***
March, 2008	-0.05	0.19	0.19	-	-	-	-	-	-	-0.06	0.11	-0.11
	(0.07)	(0.13)	(0.07)***	-	-	-	-	-	-	(0.07)	(0.03)***	(0.04)***
Observations	1040	1525	1463	893	1307	1254	893	1307	1254	1040	1525	1463
Number of individuals	151	220	214	151	220	214	151	220	214	151	220	214
R-squared	0.13	0.08	0.30	0.04	0.09	0.52	0.01	0.05	0.15	0.12	0.26	0.31
Mean of Dep. Var. in Nov. '07 (in Ksh)[2]	733	5126	852	679	2836	2451	343	972	590	0.99	1.50	1.93
SD of Dep. Var. in Nov. '07 (in Ksh)	604	11642	577	398	2731	1101	194	855	239	1.06	1.18	1.15

*Notes: Self-reported values in Kenyan Shillings for an average week in each time period. Figures are normalized to their November 2007 mean, so the coefficients represent percentage changes. Several outcomes were not collected for vendors/artisans and shopkeepers during the 4th week of January, so we do not use the data from that week. Regressions restricted to observations with complete information on income, expenditures, and consumption (except for March, since expenditures in that month were misrecorded). Coefficients estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.*

Exchange rate was roughly 70 Ksh to US $1 during the sample period.

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

[2] *Means reported here are not normalized.*

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	Ratio of	Jan-Feb 08		2007	Ratio of	Jan-Feb 08		2007	Ratio of
Amount for Jan/Feb 2008 of :	Mean	Median	Mean	08 to 07 Mean	Mean	Median	Mean	08 to 07 Mean	Mean	Median	Mean	08 to 07 Mean
Inflows												
Formal Loans Received	5	0	149	0.03	793	0	4427	0.18	136	0	326	0.42
	(58)		(892)		(8624)		(13628)		(1246)		(1205)	
Informal Loans from Friends/Family	402	0	181	2.23	1929	0	418	4.61	471	0	93	5.07
	(1171)		(480)		(7150)		(1483)		(1774)		(315)	
Gifts from Friend/Family	338	0	125	2.70	298	0	262	1.13	216	0	59	3.67
	(1101)		(570)		(2206)		(1001)		(1308)		(208)	
Gifts from Regular Clients	-	-	-		-	-	-		205	0	146	1.40
	-				-		-		(801)		(358)	
Outflows												
Informal Loans to Friends/Family	249	0	101	2.47	2113	0	910	2.32	117	0	81	1.45
	(820)		(281)		(11580)		(1864)		(738)		(282)	
Gifts to Friend/Family	183	0	51	3.58	405	0	82	4.95	103	0	75	1.37
	(696)		(119)		(1301)		(253)		(427)		(162)	
Income from Selling or Liquidating Assets												
Durable Goods Sold	54	0	-	-	77	0	-	-	880	0	-	-
	(326)		-		(924)		-		(1764)		-	
Animals Sold	446	0	-	-	549	0	-	-	100	0	-	-
	(1602)		-		(3548)		-		(386)		-	
Animals Killed	82	0	35	2.31	171	0	128	1.34	68	0	21	3.28
	(185)		(62)		(366)		(314)		(170)		(45)	
Total (Net) Amount Received	894				1298				1857			
Total Lost Income[1]	1037				12334				2847			
Number of Observations	145				208				213			

Notes: All values in Kenyan Shillings. For each sample, the figures in the first 2 columns are means (standard deviations in parentheses) and medians 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 is the average for a normal 2 month period in 2007. If the average amounts observed over the two crisis months in 2008 were equal to 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 exactly add up to the sum of mean inflows and outflows because some variables are missing for some individuals.

[1] Lost income is the estimated in regressions similar to those presented in Table 2. Lost income in the 4th week of January (which was not recorded - see Table 2) is estimated from the monthly average for January.

Table 4. Testing for Heterogeneity in Effect of Crisis on Percentage 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)
	Independent Variable interacted with Time Periods:											
	Monetary Value of Animals Owned in '07			Average Weekly Income in November '07			Value of Informal Gifts/Loans[1] 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
December, 2007	0.124	0.038	0.074	-0.058	0.036	0.025	0.118	0.045	0.062	0.118	0.041	0.065
	(0.074)*	(0.018)**	(0.022)***	(0.113)	(0.017)**	(0.033)	(0.065)*	(0.018)**	(0.023)***	(0.070)*	(0.019)**	(0.019)***
Dec, 2007 * Indep. Var	**-0.094**	**0.010**	**0.062**	**23.601**	**0.102**	**2.762**	**-0.090**	**-0.009**	**0.329**	**-0.388**	**0.027**	**1.044**
	(0.158)	**(0.046)**	**(0.120)**	**(23.005)**	**(0.072)**	**(1.436)***	**(0.168)**	**(0.010)**	**(0.319)**	**(1.126)**	**(0.086)**	**(0.744)**
January, 2008	-0.100	-0.070	-0.585	-0.090	-0.167	-0.375	-0.062	-0.177	-0.488	-0.069	-0.183	-0.530
	(0.028)***	(0.047)	(0.030)***	(0.046)*	(0.031)***	(0.074)***	(0.034)*	(0.038)***	(0.033)***	(0.036)*	(0.040)***	(0.030)***
January, 2008 * Indep. Var	**0.298**	**-0.574**	**-0.123**	**2.447**	**-0.458**	**-11.631**	**-0.335**	**-0.048**	**-2.559**	**-0.225**	**-0.166**	**-5.900**
	(0.212)	**(0.300)***	**(0.466)**	**(4.348)**	**(0.237)***	**(4.345)*****	**(0.275)**	**(0.027)***	**(0.856)*****	**(1.130)**	**(0.243)**	**(2.012)*****
February, 2008	0.086	-0.006	-0.243	0.029	0.001	-0.032	0.094	0.019	-0.137	0.062	0.017	-0.206
	(0.030)***	(0.020)	(0.031)***	(0.047)	(0.021)	(0.089)	(0.029)***	(0.022)	(0.035)***	(0.029)**	(0.024)	(0.031)***
February, 2008 * Indep. Var	**-0.085**	**0.067**	**-0.234**	**6.698**	**0.130**	**-11.821**	**-0.549**	**-0.020**	**-2.911**	**0.630**	**-0.080**	**-4.367**
	(0.102)	**(0.052)**	**(0.279)**	**(5.471)**	**(0.094)**	**(5.398)****	**(0.257)****	**(0.017)**	**(1.032)*****	**(1.421)**	**(0.118)**	**(2.270)***
Observations	594	872	840	592	865	840	594	827	840	579	827	840
Number of Individuals	151	220	214	149	217	214	151	208	214	147	208	214
R-squared	0.04	0.21	0.49	0.05	0.13	0.56	0.04	0.12	0.58	0.03	0.12	0.51
Mean Expenditures in Nov. '07 (in Ksh)	679	2836	2451	679	2836	2451	679	2817	2451	687	2817	2451
SD of Expenditures in Nov. '07 (in Ksh)	398	2731	1101	398	2731	1101	398	2729	1101	401	2729	1101
Mean of Independent Variable	0.09	0.21	0.02	0.01	0.05	0.02	0.03	0.31	0.04	0.01	0.06	0.01
SD of Indpendent Variable	0.19	0.31	0.07	0.01	0.12	0.01	0.07	0.83	0.08	0.02	0.12	0.02

*Notes: Self-reported weekly averages. All variables in 100,000 Kenyan shillings. There are fewer observations than in Table 2 because the weekly averages for January are collapsed into a weekly average over the whole month. Coefficient estimated through OLS regressions with individual fixed effects. Standard errors clustered at the individual level in parentheses. * 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 10% in January 2008 compared to November 2007, vendors and artisans who owned animals before the crisis could protect their consumption by 29.8% per 100,000 Ksh of animal value owned. Since the mean value of animals owned (in 100,000 Ksh) before the crisis among vendors and artisans was 0.09, those with the mean animal value before the crisis saw a drop in expenditures of only -10+(0.09)*29.8=7.3% in January 2008 relative to November 2007. However, this difference is not significant.*

[1] *There are 12 shopkeepers with missing information on informal gifts/loans. This is because that information was collected from them in a separate survey which was administered in late 2007, and some of the shopkeepers in this sample did not complete that survey.*

Table 5. Sexual Activities for Women who Supply Transactional Sex

	(1)	(2)	(3)	(4)	(5)	(6)
	---------- Ave. Sex Acts per Client ----------			---------- Total Sex Acts ----------		
	# of Unprotected Vaginal Sex Acts Per Client	# of Anal Sex Acts per Client	# of Unprotected Anal Sex Acts Per Client	Total # of Unprotected Vaginal Sex Acts	Total # of Anal Sex Acts	Total # of Unprotected Anal Sex Acts
December, 2007	0.06	0.08	0.01	0.08	0.11	0.02
	(0.05)	(0.02)***	(0.01)	(0.09)	(0.04)***	(0.01)
1st week of January, 2008	0.34	0.03	0.00	-0.50	-0.05	0.00
	(0.10)***	(0.04)	(0.02)	(0.07)***	(0.03)*	(0.02)
2nd week of January, 2008	0.42	0.03	0.06	-0.45	-0.04	0.01
	(0.15)***	(0.07)	(0.07)	(0.07)***	(0.03)*	(0.02)
3rd week of January, 2008	0.49	0.05	0.03	-0.11	0.07	0.04
	(0.11)***	(0.04)	(0.03)	(0.10)	(0.04)*	(0.03)
4th week of January, 2008	0.37	0.08	0.04	-0.08	0.06	0.04
	(0.09)***	(0.04)*	(0.03)	(0.10)	(0.03)*	(0.02)*
February, 2008	0.20	0.11	0.06	0.25	0.34	0.16
	(0.06)***	(0.03)***	(0.02)***	(0.10)**	(0.07)***	(0.05)***
March, 2008	0.12	0.10	0.05	0.36	0.34	0.17
	(0.05)**	(0.02)***	(0.02)***	(0.10)***	(0.07)***	(0.04)***
Observations	1580	1580	1583	2352	2357	2360
Number of women	214	214	214	214	214	214
R-squared	0.05	0.04	0.02	0.06	0.07	0.04
Mean of Dep. Var. for Nov. 2007	0.40	0.10	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. * significant at 10%; ** significant at 5%; *** significant at 1%.*
Columns 1-3 : sample restricted to weeks for which at least one client was seen.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		---------- Ave. Sex Acts per Client ----------			---------- Total Sex Acts ----------		
	Total Expend.	# of Unprotected Vaginal Sex Acts Per Client	# of Anal Sex Acts per Client	# of Unprotected Anal Sex Acts Per Client	Total # of Unprotected Vaginal Sex Acts	Total # of Anal Sex Acts	Total # of Unprotected Anal Sex Acts
December	0.13	0.01	0.00	0.00	0.21	0.00	0.00
	(0.02)***	(0.05)	(0.01)	(0.01)	(0.13)	(0.02)	(0.01)
December 2007	**0.07**	**-0.01**	**0.02**	**0.00**	**-0.06**	**0.02**	**0.00**
	(0.02)* **	**(0.04)**	**(0.02)**	**(0.01)**	**(0.06)**	**(0.04)**	**(0.02)**
January	-0.11	0.14	0.00	0.00	-0.16	-0.02	0.00
	(0.02)***	(0.08)*	(0.01)	(0.01)	(0.11)	(0.02)	(0.01)
January 2008	**-0.49**	**0.27**	**-0.03**	**0.01**	**-0.27**	**-0.07**	**0.01**
	(0.04)* **	**(0.14)***	**(0.03)**	**(0.02)**	**(0.13)** **	**(0.04)**	**(0.02)**
February	-0.08	0.00	0.00	0.00	-0.27	-0.03	0.00
	(0.01)***	(0.06)	(0.01)	(0.01)	(0.10)***	(0.02)	(0.01)
February 2008	**-0.19**	**0.11**	**0.08**	**0.05**	**0.29**	**0.24**	**0.11**
	(0.04)* **	**(0.09)**	**(0.04)***	**(0.03)***	**(0.13)** **	**(0.08)*** **	**(0.06)***
March	-0.05	0.12	0.00	0.00	-0.12	-0.01	0.00
	(0.01)***	(0.07)*	(0.01)	(0.01)	(0.09)	(0.02)	(0.01)
March 2008	**-**	**-0.10**	**0.05**	**0.03**	**0.28**	**0.24**	**0.09**
	-	**(0.09)**	**(0.03)***	**(0.02)**	**(0.13)** **	**(0.07)*** **	**(0.04)** **
Year = 2008/2009 [1]	0.00	-0.15	-0.08	-0.02	-0.12	-0.14	-0.04
	(0.05)	(0.08)*	(0.02)***	(0.01)**	(0.14)	(0.04)***	(0.02)**
Observations	1331	1218	1218	1220	1462	1463	1465
Number of women	149	149	149	149	149	149	149
R-squared	0.29	0.05	0.09	0.04	0.04	0.09	0.04
Mean of Dep. Var. for Nov. 2007	2453	0.41	0.10	0.02	0.72	0.18	0.03
Mean of Dep. Var. for Nov. 2008	2899	0.26	0.01	0.00	0.59	0.04	0.00
p -value: Jan 2008 = Dec 2007	0.001	0.001	0.348	0.483	0.001	0.020	0.765
p -value: Feb 2008 = Dec 2007	0.001	0.087	0.066	0.068	0.848	0.010	0.058
p -value: Mar 2008 = Dec 2007	0.001	0.745	0.074	0.131	0.062	0.001	0.024

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

For interpretability, the coefficients in Column 1 are percentage changes on the mean in November of the previous year. Thus, Column 1 reads as follows: while in a normal year women in the sample spend 11% less in January than in the previous November, in January 08 they spent (11+49)=60% less than in the previous November (07). The remaining columns are level differences.

Expenditures for March 2008 were misrecorded.

[1] "Year = 2008/2009" 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 2008 - March 2009).

Table A1. Mean Responses to Questions about the Transactional Sex Market in the Post-Election Period

		(1)
Was the price for protected vaginal sex higher, lower, or the same in February 2008, compared to 2007?		
	Lower	0.94
	Higher	0.02
	Same	0.04
	Don't Know	0.00
Was the price for unprotected vaginal sex higher, lower, or the same in February 2008, compared to 2007?		
	Lower	0.71
	Higher	0.09
	Same	0.18
	Don't Know	0.02
Did you spend more, less, or the same amount of time looking for clients in February 2008, compared to 2007?		
	Less	0.11
	More	0.84
	Same	0.03
	Don't Know	0.01
Were there more, less, or the same number of women looking for clients in February 2008, compared to 2007?		
	Less	0.02
	More	0.92
	Same	0.00
	Don't Know	0.05
Observations		210

Notes: The table reports mean responses to the listed questions. Questions were asked at the end of the follow-up survey which was administered in March 2008.