

Impact of Post-Election Violence and Mobile-Money Services on Remittances in Kenya

Dr. Christine Nanjala Simiyu, PhD.

Lecturer

KCA University

Nairobi, Kenya.

Abstract

During the violence following the 2007 general elections in Kenya, it was reported that around 1,000 people were killed and over 500,000 people were displaced. Again, the 2007 elections in Kenya occurred after M-PESA, the mobile-money services, had been launched in March 2007. This paper investigates the impact of the violence, and mobile-money services on remittance receipts using a panel survey of 295 households living in Rift Valley and Nyanza Provinces. Random Effects (RE) Probit and RE Tobit models are applied on the data. The results show that remittance flows to violence victims increased in the aftermath of the 2007 post-election violence to hot conflict zones of Nakuru district in Rift Valley province. Mobile-money services, however, were not useful in terms of remittance receipts to victimized households.

Key Words: Post-election violence, Remittances, Mobile phones, RE Probit, RE Tobit, Kenya.

1. Introduction

Remittances are an important part of many people's lives around the world. Globally, remittances are significantly larger than flows of Foreign Direct Investment (FDI) and aid (Mohapatra et al., 2006). Unlike other financial flows, remittances go directly into family income and thus can have an immediate and direct impact on the livelihoods of the receiving households. However, little is known about the response and role of remittances when households experience negative shocks. In considering the role of remittances in crises, an important question is if remittances act as insurance in the face of negative shocks.

Previous studies have suggested that remittances can play a role of insurance in smoothing consumption when other sources of income decline because of crises (World Bank, 2006). Lucas and Stark (1985) provide some evidence that remittances from internal migration provide insurance. Remittances to Botswana increased with the extent of drought with migrant's home region, and the responsiveness of remittance levels to drought was greater for households with more drought sensitive assets such as cattle. Clarke and Wallsten (2004), looking at Jamaica, used household survey data to track remittance receipts following Hurricane Gilbert in 1988. They found that there was a surge of remittances in 1989, where remittance receipts appear to be significantly higher than in the following several years. They conclude that remittances do seem to act as insurance against losses due to natural disasters, but remittances insured the losses only partially, probably because losses were too large for migrants to fully bear. Each additional dollar of hurricane damage led to \$0.25(US) in additional remittances.

Increasing levels of remittances in Bangladesh have been one of the factors increasing the resilience of the economy to monsoon flooding. Remittance flows increased by 18.0 percent following the 1998 floods (Clay and Benson, 2006). Remittances are estimated to have increased and hence replaced 60.0 percent of income loss due to weather-related shocks in a sample of Filipino households, where rainfall was used as an instrumental variable to avoid simultaneity between remittances and income (Yang and Choi, 2007). Most of these studies in the literature, however, are focused on natural disasters and no study has used panel data to empirically examine the response of remittances after a political unrest or crisis.

Furthermore, all remittance systems require some form of communication between the sending and receiving areas, which is possibly the most important factor in determining how crises will affect remittances. The systems and methods used for communication through various remittance processes can be affected according to the specific nature of the crisis. For example, during political crises it is common for borders to be closed, making it difficult to send hand-carried remittances. Modern telecommunications such as mobile phones can be used to overcome this problem if modern telecommunication systems are quickly restored.

Thus, the effect of crises and disasters on remittance mechanisms is specific to the event and the types of transfer mechanisms in use (Savage and Harvey, 2007). The main purpose of this study, therefore, is to estimate the impact of the 2007-2008 post-election violence that occurred in Kenya, and mobile-money services in Kenya on remittances received by households at monthly level. Prior to the post-election violence, about 800 rural households in central and western regions of Kenya were interviewed twice in a panel survey (Yamano et al., 2011). Then in March 2009, one year after the violence, the research conducted a sub-sample survey of the sample households who were originally located in Rift Valley province and the adjacent Nyanza province¹. The provinces were the epicenter of the post-election violence in rural areas. If sample households were living away from their original homes at the time of the 2009 interview, mostly because of the violence, they were found and interviewed at their relocated areas. By using data from the 295 households, the study find that 11.1 percent of the households were victims of violence and 23.7 percent hosted at least one victimized person.

The results from this study show that, being a conflict affected household in post-election violence hot zones of Nakuru district induced more remittances. Although mobile-money transfer services increase remittance receipts among households, they were not helpful to violence prone households or regions in remittance receipts during the violence mayhem. The balance of the paper proceeds as follows: section 2 explains the background to the 2007 presidential election violence and remittances in context; in section 3 data and simple descriptive statistics are introduced; in section 4 the regression model and variables are explained; section 5 discusses the results; and section 6 concludes with policy implications.

2. The Kenyan Post-Election Violence and Remittances in Context

2.1. Background to the 2007 Presidential Elections and Post-Election Violence

The post-election violence which engulfed Kenya following the disputed elections in December 2007 is rooted in a long-standing ethno-political grievance. Incumbent president Mwai Kibaki's Party of National Unity (PNU) cooperated under the National Rainbow Coalition (NARC) with Raila Odinga, his main opponent in the 2007 elections, and together they won power in 2002 against the old regime led by outgoing president Daniel Arap Moi and his Kenya African National Union (KANU). NARC had effectively presented itself as a modern and people-based party with zero-tolerance to corruption, and therefore would provide for the best alternative to the former regime. By 2007, however, Kibaki and the PNU had lost much of public support as the result of various corruption scandals, failing to deliver the new constitution² (one of the major promises to Kenyans before the elections), which was later vetoed by the disillusioned public in the 2005 referendum. In this context, Kibaki came to be viewed by many Kenyans as little more than a front-man for the entrenchment of the elite interests within both the national economy and the wider body politic (Lynch, 2008).

Central to Kenyan politics, moreover, Kibaki and PNU were seen as the representatives of the largest ethnic group Kikuyu and could not be trusted to deliver on their promises of nation-wide development (Lynch, 2008). This in effect led to the establishment of the Orange Democratic Movement (ODM) led by Raila Odinga which continued to gain support throughout the country by setting up a political partnership called Pentagon, among regional politicians not only from Nyanza province where he comes from but also from four other provinces: Western, Rift Valley, Eastern and Coastal provinces. Pentagon formed a unified opposition to the Kibaki government and the Kikuyus.

Against this background, the two former allies contested for the presidency in the 2007 election. While political campaigns did address cross-cutting themes like poverty reduction, land rights, and crimes; the campaign of both parties often appealed to ethnic grievances, with PNU attempting to consolidate support amongst Kikuyus and ODM rallying support from Luo, Luhya and Kalenjin communities (Sherbut, 2009). Furthermore, since the two candidates represented not only their ethnic groups, but also other ethnic groups, the election polarized the political support along ethnic lines. The 2007 parliamentary and presidential elections were concluded peacefully, with the ODM and its affiliated allies winning a slim plurality of the vote.

¹ Due to new constitution in Kenya, provinces are no longer used as the provincial administration and demarcations. They were replaced with counties.

² After about four months of civil unrest in Kenya, Raila Odinga joined the Kibaki government in drafting a new constitution. It was completed and promulgated on August 27th, 2010.

The resulting voting pattern as surveyed in an exit poll, described by Gibson and Long (2009) predicted Odinga to be slightly in the lead for the presidential seat. The exit poll suggested that Odinga had won the seat, registering 46.1 percent of total votes against Kibaki's 40.2 percent. However, on the evening of December 30th, 2007, three days after the voting, the Electoral Commission of Kenya (ECK) reported that Kibaki won 46.4 percent, while Odinga received 44.1 percent of the total votes (Gibson and Long, 2009). Odinga's consistent lead in pre-poll opinion surveys cast a serious doubt on the validity of Kibaki's victory. In the immediate aftermath of what was nationally and internationally considered a rigged election, supporters of both parties engaged in random acts of violence against one another. Extortions, forced displacement, land occupation, murder and rape were all employed as weapons through-out the post-election violence. Anti-Kikuyu violence was particularly strong in Rift Valley province where the Kikuyus had been encouraged to purchase land and settle amongst Luo, and (especially) Kalenjin communities under the post-independence Kenyatta government (Yamano et al., 2010).

The violence which broke out throughout the country quickly worsened the public order that was not restored for over two months (Human Right Watch, 2008). The final death toll which emerged out of the roughly four-month duration of post-election violence was placed at 1,000 (Human Right Watch, 2008). Economically, the post-election violence proved to be severely damaging. At the national level, tourism plummeted by 34.7 percent and FDI stagnated (Nabutola, 2009). In addition, it was estimated that the post-election violence cost the Kenyan economy U.S \$3.7 billion (Voice of America, March 04, 2008).

2.2. Remittance Flows and Mobile-Money in Kenya

Remittance flows to developing countries have increased substantially during the last decade to reach \$325 billion in 2010 (World Bank, 2011). Remittances sent by 31 million international African migrants reached nearly \$40 billion in 2010, equivalent to 2.6 percent of Africa's gross domestic product (GDP). Kenya, the largest economy in East Africa, receives an average of 60.0 percent of the remittances to East Africa and an average of 10.0 percent of all the remittances to the Sub-Saharan region. In 2009, the amount of inward remittances to Kenya was US\$1.7 billion, representing 5.4 percent of Kenya's GDP (World Bank, 2011).³

Regarding domestic remittances, mobile-money transfer services have transformed the landscape of domestic remittances in several African countries. In Kenya, the introduction of M-PESA⁴, a mobile money transfer service launched by Vodafone through its subsidiary Safaricom in March 2007, has changed the domestic remittance landscape in the country.⁵ The availability of M-PESA and other mobile-money services has brought a profound change in the types of domestic remittance channels used by Kenyans (Pulver, Jack and Suri, 2009). Surveys by the Financial Sector Deepening (FSD) in Kenya found that, the most commonly used means of sending money within Kenya in 2006 were by hand (58 percent), bus (57 percent), post office and money order (24 percent), direct deposit (11 percent) and money transfer service (9 percent). By 2008, M-PESA had come to dominate domestic remittances with 47 percent of Kenyans using the service. As a result, the share of remittances sent by hand decreased from 58 percent to 26 percent, and the share of remittances sent by transport companies decreased from 57 percent to just 9 percent.

The use of mobile phones to transfer money has also enabled users to send smaller amounts of money more often (and collectively more) because of greater accessibility of service agents. For instance, in the case of M-PESA, the average transaction size decreased by 30 percent between March 2007 and March 2009, from Kshs 3,300 (about \$41 at the prevailing exchange rate) to Kshs 2,300 (about \$29) (Pulver, Jack, and Suri, 2009). Mobile-money transfer services have provided a remittance channel throughout Kenya that competes, among the unbanked, not only with the semi-formal and informal sector but also with financial institutions. M-PESA, for example, has about 23,397 agents with new outlets being added daily; 60 percent of which serve rural areas. The mobile money technology is being used for domestic transfers in Kenya and other regions, but the use of cross border remittances is still incipient.

³ The corresponding GDP percentages for all developing countries and Sub Saharan Africa during the same period were 1.9 percent and 1.6 percent respectively.

⁴Pesa is a Swahili word, a national language in Kenya meaning money, hence M-PESA means Mobile-money. M-PESA operates an electronic float e-float, and the M-PESA agents are required to buy a certain amount of e-float when they join the network, usually a minimum of about \$640. The e-money purchased by a registered user can be sent to other registered or non-registered users, and withdrawn at any M-PESA agent.

⁵ There are other mobile-money transfer services on Kenyan markets such as Zap, Orange-Money, and YuCash, but M-PESA is the most wide spread and commonly used mobile-money service.

M-PESA, however, in partnership with Western Union has moved to capture the international remittance market especially from the United Kingdom to Kenya (Business Daily, Wednesday April 6, 2011).

3. Data and Descriptive Statistics

3.1. Source of Data

The study used pooled data of 295 households from Rift Valley and Nyanza provinces of Kenya interviewed in 2007 and followed up in 2009, and Annex 1 shows the ethnic composition of the sampled households. The households are sub-samples of 800 households that participated in 2004 surveys as part of the Research on Poverty, Environment, and Agricultural Technology Project (RePEAT)⁶. The original 2004 survey did not anticipate any political violence, yet it collected detailed information on non-labor income and remittance receipts at monthly level, in addition to questions on agricultural production and poverty.

In March 2009, about 15 months after the onset of post-election violence, all sampled households in the 2004 survey were surveyed in Rift Valley province, where the post-election violence was intense in rural areas, and all sampled households in two districts in the adjacent Nyanza province were also surveyed for comparison. The households that had been affected by post-election violence and were living away from their original places due to violence were also traced and interviewed. The five districts surveyed in March 2009 were: Nakuru, Narok and Nandi in Rift Valley province, and Kisii and Nyamira in Nyanza province. Nakuru, the largest town in Rift Valley, is around a 4 hour drive from the capital city of Nairobi, and Nyanza Province lies to the west of Rift Valley. Although the sampled households in Nyanza were included in the survey for comparison to the households in the Rift Valley region, this does not mean that all the sampled households in Nyanza province were free of the violence. At the same time not all the households in Rift Valley province experienced the violence. There is heterogeneity regarding the scale of damage among districts as well as among households and individuals within a district.

3.2. Descriptive Statistics

Table 1 shows the proportion of household members that were directly affected by the post-election violence. Among male and female household members, 12.0 percent of male members and 10.3 percent of female members indicated that they experienced violence during the post-election violence. Especially in Nakuru district, 18.4 percent of males and 17.8 percent of females answered that they had experienced violence.⁷ In Kisii district of Nyanza province, 7.2 percent of men and 5.0 percent of women were victims of violence. These statistics show the sheer scale of violence, and the slight difference in violence experienced among males and females.

Concerning the hosting of post-election violence victimized individuals, the average hosting period is about 3.9 months for the entire sample, while it is almost 5 months in Nakuru district. In addition, the proportion of hosting households was highest in Nakuru district, implying that Nakuru district was the most affected among the sampled districts. Regarding remittances, the proportion of household receiving remittances is also shown in Table 1. It was high among hosting households at 25.9 percent on average, while it is 33.3 percent in Nakuru district. Because victimized persons escaped from politically hot conflict zones, the household hosted post-election violence affected persons in and out of the conflict zones (Yamano et al., 2010). The proportion of households receiving remittances is lowest among the victimized individuals at 6.3 percent, and is as low as 1.7 percent in Nakuru district.

Table 2 shows the summary data based on post-election violence status for the whole sample and for Nakuru district; since violence was predominant in Nakuru district. The descriptive statistics show that non-victims, in all sampled households, received more remittances, about 18.5 percent as compared to the 13.9 percent that were received by the victims. However, in Nakuru district, victims reported to have significantly received more remittances than non-victims. About 22 percent of the victims received some remittances, while only 17 percent of non-victim received some remittances.

⁶ RePEAT is funded by GRIP's 21st century Center of Excellency (COE) and Global COE projects (Yamano et al., 2005). Questionnaires and other detailed information can be obtained from <http://www3.grips.ac.jp/~21coe/j/index.html>.

⁷ In the sample, 63.7 percent of the households in Nakuru district reported to have experienced post-election violence.

These results suggest that in the conflict hot zones of Nakuru district, remittance flows increased to affected households to help them, presumably, secure against the overall loss of income from vigilante groups during the violence mayhem. Regarding mobile phone ownership at the household level, the results show that, on average the mobile phone ownership was higher among victims than non-victims. There is no difference in the mobile phone ownership between victims in the whole sample and Nakuru district: It is about 80 and 82 percent for victims in the whole sample and Nakuru district respectively.

Table 3 gives the proportion of remittances received between victims and non-victims with and without mobile phones per year in the whole sample. The statistics show that victims with mobile phones received less remittance than victims without mobile phones in each year. On the other hand, non-victims with mobile phones received more remittances than non-victims without mobile phones. These statistics suggest that mobile phones were more useful among non-victims than victims during the post-election violence havoc. Overall, the summary statistics show that victims received more remittances in 2007 than in 2009 while non-victims received more in 2009 than those received in 2007. Table 4 shows that, in Nakuru district, remittance flows to affected households increased after the post-election violence: victims received about 25.5 percent of remittances in 2009, while it was 18.6 percent in 2007.

These descriptive statistics confirm figures from other reports (e.g. Human Rights Watch, 2008; Yamano et al., 2010) that the post-election violence existed on a considerable scale particularly in Nakuru district. The descriptive findings also suggest that in the whole sample, non-victims received more remittances than victims, while in Nakuru district victims received more remittances than non-victims, especially in the year 2009. This implies that remittance flows to Nakuru district, the conflict hot zone, increased to affected families in the aftermath of the post-election violence. In addition, the descriptive statistics show that mobile phone ownership at the household level was high among victims particularly in Nakuru district. However, victims with mobile phones received less remittance than victims without mobile phones. Although the results suggest that mobile phones were not useful to victims at least in remittance receipts, they could be associated with other variables not controlled in Table 3 and Table 4. To clearly identify the impact of the post-election violence and mobile-money transfer systems on remittance flows in Kenya, the paper now turn to a detailed analysis.

4. Methodology

4.1. Econometric Models and Empirical specifications

Descriptive statistics are suggestive but do not provide rigorous tests; they do not control for other factors that can affect remittances. To more rigorously explore the relationship between remittances and post-election violence shocks, the study analyze the effects of post-election violence on remittances received by households on a monthly basis by using econometric models. First, the paper estimate the determinants of the probability of remittance receipts at the household level. The model is defined as:

$$Pr(R_{ijt} = 1) = \beta_0 + \beta_1 P_i + \beta_2 X_{it} + \beta_3 M_j + \beta_4 T_{2009} + \delta_i + \varepsilon_{ijt}, \quad (1)$$

where R_{ijt} is a dummy variable which takes one if household i received some remittances in month j at time t ($t=2007$ and $t=2009$); P_i is the post-election violence index, indicating if at least one member of the sampled households was a victimized individual; X_{it} are a set of basic individual and household characteristics; M_j is the monthly dummy; T_{2009} is the time dummy for 2009; δ_i are unobserved household characteristics and ε_{ijt} is the error term. The study estimate this model using Probit because the dependent variable is a dummy variable. In order to have a more precise estimation of the impact of post-election violence and mobile ownership on probability of remittance receipts; Fixed Effects (FE) and Ordinary Least Squares (OLS) models were also applied in equation (1). By estimating the household FE model, any bias caused by time-invariant unobserved household characteristics is eliminated.

Next, the paper estimate the impacts of post-election violence on the amount of remittances received by households. Remittances are defined as the total amount of transfers in cash received by households from international and internal household migrants, friends and relatives, and posit that remittances consist of permanent and transitory components. The permanent component is influenced by household characteristics, and the transitory component depends on the state of the world (Fafchamps and Lund, 2003; Yang and Choi, 2007; Agnes and Scott 2010).

As Deaton (1997) emphasizes, heteroscedasticity is a problem in income survey data. To reduce this problem, the study use the log transformation of the monthly remittances received. The dependent variable, therefore, is the log of the total amount of remittances received by households on a monthly basis in Kenya shillings (KSH). It is a limited dependent variable bounded from below. Thus, many households do not receive remittances in both 2007 and 2009. The log transformations, consequently, cause a problem of undefined value of zero. To address this issue, the paper add a value of one to all monthly remittances before log transformations.

In the model, the study assumes that changes in remittances can be explained as a function of post-election violence experienced by households and other household characteristics. The regression model is therefore defined as;

$$y_{ijt} = \begin{cases} y_{ijt}^* & \text{if } y_{ijt}^* > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

$$y_{ijt}^* = \beta_0 + \beta_1 P_i + \beta_2 X_{it} + \beta_3 M_j + \beta_4 T_{2009} + \delta_i + \varepsilon_{it} , \quad (3)$$

where y_{it}^* is the latent log of monthly remittances received by household i in month j at time t ($t=2007$ and $t=2009$), and other variables are as defined in equation (1).

The RePEAT survey data, nonetheless, did not include any information on the remitters. Because of this data limitation, the focus is on the receipt of remittances by households rather than on the persons sending the remittances. To control for this data limitation in the regression model, a Random Effects specifications is applied in the Tobit model. As Cameron and Trivedi (2009: 617) note, the unobserved household characteristics and error term are assumed to be normally distributed given as, $\delta_i \sim N(0, \sigma_\delta^2)$ and $\varepsilon_{it} \sim N(0, \sigma_\varepsilon^2)$ respectively. The model is estimated using maximum likelihood techniques with standard errors obtained by clustering using households. In order to have precise estimates of the impacts of post-election violence on remittance flows, household Fixed Effects (FE) and OLS are also applied on the following model:

$$y_{ijt} = \beta_0 + \beta_1 P_i + \beta_2 X_{it} + \beta_3 M_j + \beta_4 T_{2009} + \delta_i + \varepsilon_{ijt} , \quad (4)$$

where y_{ijt} is the log of monthly remittances received by household i in month j at time t ($t=2007$ and $t=2009$), and other variables are as defined in equation (1). By estimating the FE model, time invariant household heterogeneity that may confound the estimated parameters are eliminated.

4.2. Variables

In the regression equations described above, the variable of interest is the post-election violence index, described as if at least one of the household members was a post-election violence victim. If this index is positive and statistically significant, then it suggests that post-election violence leads to an increase in remittances received by sampled households and may indicate that remittances act as insurance during and in the aftermath of the violence. On the other hand, a negative and statistically significant index implies less remittance received by post-election violence victims. The study also includes a mobile-phone ownership dummy at the household level. As Donner (2004) ascertains, a drastic change in Information Technology has been taking place across African markets, and mobile phone networks and technology have been expanding rapidly in most developing countries. In addition, mobile phones and mobile-phone networks are sometimes not affected by conflict dynamics, so systems that rely on them may be more robust. The study, therefore, expect to find a positive and significant coefficient on this variable.

Other regression variables included in the regression equations with month, year, regional and ethnic dummies are; individual and household characteristics which include: age of the household head, years of schooling for the household head, number of household members out searching for a job, household size, a dummy variable indicating if there are children below 15 years of age, dummy variable indicating if there elderly persons (above 60 years of age) in a household, a dummy variable indicating if a household head is married, number of male adults in a household, number of female adults in a household, years of schooling for male adults, years of schooling for female adults; and assets and wealth variables which include: log of farm assets and log of per capita consumption as a proxy of income. The summary statistics of these variables are provided in Table 2.

5. Econometric Results⁸

In this section the econometric results based on the models described in section 4.1 are presented. First, the results on the probability of remittance receipts by households at the monthly level are presented based on equation (1) in section 4.1. Table 5 shows that; probability of receiving remittances is reduced by 2.8 percentage points (column (1)) for a victim from the whole sample, while the probability increases by about 6.4 percentage points in Probit model (column (4)) for a victim in Nakuru district. These findings confirm the descriptive statistics which showed that victims in Nakuru district received more remittances. Regarding mobile phone ownership; having a mobile phone in the whole sample significantly increases the probability of remittance receipts by about 2.2 percentage points (column (1)).⁹ However, in Nakuru district, having a mobile phone at the household level reduces the probability of remittance receipts, though insignificantly.¹⁰ These results suggest that, in conflict hot zones, mobile-money transfer services such as M-PESA and Zap, may have been disrupted by the violence, hence reducing the probability of receiving remittances through mobile phones.

Next, the paper present the estimation results of the effect of the post-election violence on the log amounts of remittance received by households in Table 6 and Table 7 for the whole sample and Nakuru district respectively. The Tobit results in Table 6 (column (1)) suggest that victimized household received about 33.3 percentage points less remittance relative to non-victims in the whole sample.¹¹ Furthermore, the results show that, having a mobile phone at the household level significantly increase the amounts of remittances receipts. Households with mobile phones received about 26.3 (column (1)) percentage points more remittances relative to households without mobile phones. However, as shown in all the estimated models of Table 6, post-election violence victims with mobile phones received less remittance compared to victims without remittances. These findings suggest that, mobile phone services were more useful among non-victims than victims and more useful to less violence prone regions.

Considering Nakuru district, where violence was more prevalent, Table 7 shows that post-election violence victims received significantly more remittances compared to non-victims. For instance, the Tobit results column (1) show that the victims received about 51.2 percentage points more remittances relative to non-victims in the hot conflict zones. These results imply that, in Nakuru district, being a conflict-affected household induced greater remittances received by these households. The remitters, presumably, unaffected family members and friends from within and outside the country increased remittance flows to affected family members in hot conflict zones, presumably, to smooth out consumption. Hence, remittances acted as insurance against the overall loss of income especially from greedy mobs during post-election violence in hot conflict zones.

Regarding remittance transfer mechanisms, mobile phone ownership at the household level had no impact on remittances received by households in Nakuru district. Victimized households with mobile phones, moreover, significantly received fewer remittances in all models of Table 7, relative to victimized households without mobile phones. Since mobile phone ownership at the household level among victims was high in Nakuru district as revealed by the descriptive statistics, these results imply that the mobile-money transfer systems may have been disrupted during the post-election violence. As a result, the services were not helpful to victimized households in remittance receipts. Therefore, the significant amounts of remittances received by these households were through other means such as: bus, post office and money order that were, presumably, not affected by the post-election violence. It is not clear, however, from the results if the mobile-money transfer services were quickly restored after the violence.

6. Conclusion

The purpose of this study is to primarily examine if remittance flows increased during and in the aftermath of the 2007-2008 post-election violence in Kenya, and if remittances acted as insurance for the conflict affected households. The evidence herein from Kenya following the 2007-2008 post-election violence suggests that remittances protected households against the post-election violence.

⁸ The estimation of the results was done using STATA version 10.

⁹ The magnitude increases to 2.8 percentage points in the FE model as shown in (2) of table 5

¹⁰ It significantly reduces by about 18.1 percent points using OLS in the cross-sectional data column (8)

¹¹ The results from FE and OLS also show that victims received significantly fewer remittances compared to non-victims in all sampled regions.

Evidence from the results indicates that conflict-affected households received more remittances at the monthly level than unaffected households, particularly in the conflict hot zones of Nakuru district. The unaffected family members and friends from within and outside the country increased remittance flows to affected family members to help them smooth out consumption, and hence act as insurance against the overall loss of income especially from greedy mobs during post-election violence. An overarching conclusion from this study, therefore, is that remittances seem to act as insurance against losses due to political unrest.

Given the paucity or non-existence of government sponsored social insurance in Kenya that can help households mitigate risks in occurrence of disasters or crisis, the Kenyan government should consider formulating policies that encourage household-level risk sharing arrangements. Thus, the government should consider enacting migration policies that encourage migrants living abroad unaccompanied by family members. This may include but not be limited to the provision of tax incentives to returning married immigrants who lived without families for a period of two years, for example. Regarding remittance transfer mechanisms, having a mobile phone significantly leads to an increase in remittances received, but was more responsive to non-victimized households as opposed to conflict affected households. Remarkably, victimized households in Nakuru district received significantly more remittances, but those with mobile phones received significantly less remittances compared to victims without mobile phones. Thus, although mobile-money transfer systems such as M-PESA, Zap, and YuCash, provide for a safe, fast and affordable way to transfer money by mobile phones in Kenya, these systems may be disrupted during disasters and crises, and may be rendered not useful to crisis affected households. The procedures used by these services, especially the use of agents for remittance transfers are vulnerable to interruption since the agents may have been victims of violence as well, and had to escape from conflict hot zones for their own safety.

Although the rapid adoption of innovative money transfer services through mobile phones is increasing access to remittances and broader financial services for the poor, there is a need for the Kenyan government to strengthen other remittance service providers, especially post offices and banking institutions, particularly in rural areas. The merger between mobile phones service providers and these institutions should be considered for these innovations to be helpful, especially during crises. This study, however, applied the Random Effects Tobit model as the main econometric model to estimate the impacts of post-election violence on remittances. This model may not effectively and simultaneously control for censoring and time-invariant unobserved household characteristics which may bias the estimated parameters. Using the household Fixed Effects Tobit model to estimate the effects of disasters on remittances in developing countries especially Africa will be the next research topic.

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Table 1: Post-election violence, Remittances and Sampled households

Province District	Victimized Persons		Hosting households		Proportion of remittance received	
	Male (A) %	Female (B) %	Percentage (C) %	Period ¹ (D) Months	victimized persons (E) ² %	hosting households (F) %
<i>Riftvalley</i>						
Nakuru	18.4	17.8	27.5	4.8	1.7	33.3
Narok	2.0	1.3	11.8	4.4	-	-
Nandi	2.4	1.9	17.4	2.5	14.8	14.8
<i>Nyanza</i>						
Kisii	7.2	5.0	23.0	2.3	9.7	29.0
Nyamira	5.4	2.4	24.2	2.5	5.0	20.0
TOTAL	12.0	10.3	23.7	3.9	6.3	25.9

Note: ²⁾ Represents average period of hosting among hosting households. This figure is the person-month figure, i.e. if the household hosted two people for 3 months; it is counted as 6 months. ²⁾ Is the proportion of household receiving remittances given that they were post-election violence victims to the total number of households receiving remittance.

Table 2 : Descriptive statistics of households based on post-election violence status

	All sample						t-test	Nakuru District						
	All		Victims		Non-victims			All		Victims		Non-victims		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Remits (=1)	0.17895	0.38334	0.13924	0.34638	0.18509	0.38841	3.43***	0.21075	0.4079	0.21839	0.41323	0.17045	0.37639	2.478**
Total remits in KSH	498.65	2265.59	499.156	2350.32	498.571	2252.41	0.0074	570.673	2397.53	507.386	2302.26	582.676	2415.39	0.662
Mobile phone (=1)	0.60847	0.48813	0.79747	0.4021	0.57926	0.49372	12.9598***	0.66667	0.47148	0.81818	0.38606	0.63793	0.48069	8.133***
ln(farm assets)	8.56852	2.00493	8.42859	2.44521	8.59015	1.92724	2.31**	8.94	2.22271	8.42669	2.82991	9.03735	2.07408	5.817***
ln(per capita consumption)	8.09192	1.20244	8.21144	1.39883	8.07344	1.16818	3.291***	8.24386	1.09946	8.27766	1.10802	8.23745	1.09791	0.771
Household size	6.80678	3.15014	6.78481	3.24177	6.81018	3.13599	0.231	6.25362	3.40248	6.54546	3.62442	6.19828	3.35655	2.151**
Age of household head	56.6678	13.7532	57.9747	13.2486	56.4658	13.8196	3.146***	60.058	13.5015	59.8636	13.9262	60.0948	13.4217	0.361
Year of schooling for household head	7.77797	9.53526	7.59494	6.66441	7.80626	9.90523	0.635	6.90217	5.72532	6.54546	4.47869	6.96983	5.93053	1.562
Number of members out for a job	0.31356	0.6877	0.3038	0.8016	0.31507	0.66843	0.47	0.3442	0.73806	0.31818	0.82022	0.34914	0.72148	0.884
There are children below 15 years (=1)	0.77627	0.41677	0.75949	0.42762	0.77887	0.41505	1.332	0.69203	0.46172	0.68182	0.46621	0.69397	0.46093	0.554
There are elderly people (=1)	0.45593	0.49809	0.49367	0.50022	0.4501	0.49754	2.508**	0.53986	0.49848	0.5	0.50047	0.54741	0.49784	2.004**
Number of males	2.14407	1.32185	2.24051	1.41689	2.12916	1.30603	2.414**	2.09058	1.30339	2.06818	1.2516	2.09483	1.31316	0.431
Number of females	2.1339	1.27728	1.88608	1.24323	2.17221	1.27829	6.437***	1.99638	1.2323	1.90909	1.27718	2.01293	1.22314	1.776*
Year of schooling for males	10.1797	8.83727	10.2785	6.53271	10.1644	9.14219	0.37	9.46015	4.55255	9.65909	4.09902	9.42241	4.63327	1.095
Year of schooling for females	8.65085	6.53019	7.96203	4.32603	8.75734	6.8016	3.493***	7.92391	5.99287	7.25	4.13872	8.05172	6.27552	2.821***
Sample size	7080		948		6132			3312		528		2784		

Source: Estimates based on RePEAT survey, 2007 & 2009 in western Kenya. *** indicates significant at 1% ** indicates significant at 5% * indicates significant at 10%

Table 3 : Post-election violence, Mobile phones¹ and Remittances : Whole sample

		Percentage ² of remittances		Absolute amount of remittances received	
		2007	2009	2007	2009
<i>Victims</i>	With mobile phone	9.8	7.3	KSH 128,450	KSH 176,100
	Without mobile phones	12.9	13.2	169,000	297,100
	<i>Total</i>	22.7	20.5	297,450	473,200
<i>Non-victims</i>	With mobile phone	43.7	43.7	623,100	981,650
	Without mobile phones	30.0	35.8	393,670	796,970
	<i>Total</i>	73.7	79.5	1,016,770	1,778,620

Note: ¹ Mobile phone ownership was restricted to the base year (2007) for 2009 estimations. ² Represents the proportion of the total amount of remittances received by the post-election violence victims to the total amount of remittances received in each year.

Table 4 : Post-election violence, Mobile phones¹ and Remittances : Nakuru District

		Percentage ² of remittances		Absolute amount of remittances received	
		2007	2009	2007	2009
		%	%	KSH	KSH
<i>Victims</i>	With mobile phone	8.6	12.6	86,500	134,500
	Without mobile phones	10.0	12.7	133,400	133,400
	<i>Total</i>	18.6	25.5	219,900	267,900
<i>Non-victims</i>	With mobile phone	54.8	52.3	471,700	551,200
	Without mobile phones	26.6	22.2	229,100	234,470
	<i>Total</i>	81.4	74.5	700,800	785,670

Note: ¹) Mobile phone ownership was restricted to the base year (2007) for 2009 estimations. ²) Represents the proportion of the total amount of remittances received by the post-election violence victims to the total amount of remittances received in each year.

Table 5 : Determinants of probability of household remittance receipts

	<i>Whole Sample</i>			<i>Nakuru District</i>			
	RE Probit	Fixed Effects	OLS	RE Probit	Fixed Effects	OLS	OLS 2009 Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year = 2009	-0.0226*** (0.00827)	-0.0311*** (0.00955)	-0.0205 (0.0245)	-0.0830*** (0.0194)	-0.0896*** (0.0145)	-0.0665 (0.0408)	
Victim (=1)	-0.0283*** (0.0106)	-0.0276* (0.0163)	-0.0481 (0.0311)	0.0649** (0.0319)	0.0575** (0.0229)	0.0178 (0.0478)	0.0116 (0.0460)
Mobile phone (=1)	0.0226** (0.0104)	0.0285** (0.0145)	0.00367 (0.0287)	-0.000567 (0.0179)	-0.0262 (0.0236)	-0.0490 (0.0462)	-0.181** (0.0746)
Constant		0.188*** (0.0149)	0.0719 (0.229)		0.270*** (0.0239)	-0.167 (0.313)	-0.631* (0.334)
# of observations	7080	7080	7080	3312	3312	3312	1656
R-squared		0.027	0.107		0.053	0.150	0.188

Note: Numbers in parentheses are robust standard errors (clustered at household level). *** indicates significant at 1%. ** indicates significant at 5%. * indicate significant at 10%. Other household level variables with monthly and ethnic dummies were included in the analysis

Table 6: Determinants of log amounts of household remittance receipts for the WHOLE SAMPLE

	RE Tobit		Fixed Effects		OLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Year = 2009	-0.0541 (0.0957)	-0.102 (0.0928)	-0.139* (0.0713)	-0.145** (0.0715)	-0.0608 (0.184)	-0.0841 (0.184)
Victim (=1)	-0.333** (0.139)	0.255 (0.264)	-0.211* (0.122)	-0.0154 (0.277)	-0.391* (0.234)	0.410 (0.586)
Mobile phone (=1)	0.263** (0.119)	0.373*** (0.116)	0.261** (0.109)	0.281** (0.111)	0.134 (0.222)	0.231 (0.230)
Victim*Mobile phone		-0.750*** (0.241)		-0.247 (0.294)		-1.016 (0.625)
Constant			1.322*** (0.112)	1.313*** (0.112)	0.977 (1.883)	1.063 (1.889)
# of observations	7080	7080	7080	7080	7080	7080
# of left censored observations	1267	1267				
R-squared			0.028	0.029	0.106	0.109

Note: Numbers in parentheses are robust standard errors (clustered at household level). *** indicates significant at 1%. ** indicates significant at 5%. * indicate significant at 10%. Other household level variables with monthly and ethnic dummies were included in the analysis.

Table 7: Determinants of log amounts of household remittance receipts for NAKURU DISTRICT

	RE Tobit		Fixed Effects		OLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Year = 2009	-0.694*** (0.130)	-0.692*** (0.127)	-0.576*** (0.110)	-0.588*** (0.110)	-0.409 (0.308)	-0.453 (0.313)
Victim (=1)	0.512** (0.231)	1.145*** (0.417)	0.433** (0.171)	1.065*** (0.382)	0.0584 (0.358)	1.530** (0.752)
Mobile phone (=1)	-0.0971 (0.181)	-0.0165 (0.173)	-0.154 (0.176)	-0.0971 (0.178)	-0.301 (0.350)	-0.107 (0.361)
Victim*Mobile phone		-0.714** (0.358)		-0.779* (0.399)		-1.803** (0.783)
Constant			1.938*** (0.178)	1.906*** (0.179)	-1.490 (2.423)	-1.586 (2.502)
# of Observations	3312	3312	3312	3312	3312	3312
# of left censored observations	698	698				
R-squared			0.052	0.054	0.145	0.151

Note: Numbers in parentheses are robust standard errors (clustered at household level). *** indicates significant at 1%. ** indicates significant at 5%. * indicate significant at 10%. Other household level variables with monthly and ethnic dummies were included in the analysis.

Annex 1: Ethnicity and Sampled Households

Province District	Ethnicity						
	Sample size (A)	Kikuyu (B)	Kisii (C)	Kalenjin (D)	Luhya (E)	Masaai (F)	Other ¹ (G)
	Number	%	%	%	%	%	%
<i>Rift Valley</i>	201						
Nakuru	138	75	1	19	4		1
Nandi	46			80	20		
Narok	17	18				82	
<i>Nyanza</i>	94						
Kisii	61		97		2		1
Nyamira	33		100				
<i>TOTAL</i>	295	35	32	22	5	5	1

Note: 1) The ethnic group named "Other" include: Embu, Luo and Kamba. The arrangement is in descending order from the largest sampled to the least sampled groups.