

**FINANCIAL DECISION-MAKING IN THE
FOXHOLE: THE EFFECTS OF CONFLICT ON
SAVING BEHAVIOUR IN KENYA**

BY

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1. INTRODUCTION

The goal of this paper is to investigate the effects of conflict in countries experiencing high levels of violence and insecurity. In particular, the focus is on the potential existence of a cost of violence that operates through reduced participation in financial systems or a negative impact on savings. How does exposure to violence affect financial decision-making? I undertake this analysis in Kenya, where mobile money services, discussed at length in Section 2.2, have been hugely popular. Kenya has been deeply affected by violence in the recent past, and is still rife with conflict. Going forward, we would like to have a better idea of how violence impedes, or does not impede, the continued development of the financial sector in Kenya. Any insights gained in the course of this analysis may be applied to the study of financial inclusion and poverty alleviation in other countries experiencing conflict, especially nations like Nigeria where mobile money companies have been floundering. As we will see in Section 2.1, it is widely believed that financial inclusion matters for economic welfare. Financial instruments help the poor manage the great amount of risk they face in their daily lives. However, even when they have access to finance which they would likely benefit from, they may choose not to use their accounts because of a perceived increase in the probability of being affected by conflict. The risk of such instability, leading to total loss or changing the convertibility of their savings into consumption, could counteract the precautionary saving motive. We would like to know if expectations of violence cause people to save less and reduce their overall participation, thereby hindering the development of financial systems.

When searching for this effect in mobile money and bank account use separately, I detect dissimilarities in how it operates on the two different savings instruments. The empirical part of this paper uses basic regression methods to

analyze household survey data, provided by the Financial Inclusion Insights (FII) program which is sponsored by the Bill and Melinda Gates Foundation, and conflict data sourced from Uppsala Conflict Data Program's (UCDP) Georeferenced Event Dataset. I look for evidence of a statistically significant relationship between financial activity and expectations of violence, and find that conflict is associated with an increase in the number of bank deposits but has no discernible impact on mobile money use. In this case, it may be more beneficial to place a policy emphasis on expanding access to bank accounts or the formalization of mobile money services in areas with high levels of violence instead of relying on the widespread adoption of mobile money accounts in Kenya. Kenyans may not consider mobile money accounts to be safe enough to hold their savings. Because there has been so much attention fixed on the growth of mobile money in Kenya, and those services have been lauded as a replacement for bank accounts as discussed in Section 2.2, it is important that we determine how changes in the level of conflict in each county affect usage. Identifying whether violence expectations have a positive or negative impact on savings could help us understand how Kenyans respond to risk, and which financial instruments they most want access to in times of instability. If they want to save less, or substitute away from a certain asset, then that is a distinct problem that necessitates a different approach to policymaking.

In Section 3, I propose a variation on an existing model presented in Blumenstock et al. (2015) which links exposure to conflict to changes in saving behaviour. There are two key changes I make. The first is adding a choice variable which extends the model to a savings problem with two assets, in this case a balance held in a bank account or a mobile money account, so that in response to an increase in violence an individual may not only substitute away from savings but also between

the two assets. The second is the incorporation of two different manifestations of risk, represented by an additional scenario that an individual anticipates with positive probability. In a sense, this extra parameter reflects the fact that different forms of violence may lead to different outcomes, and accounts for the precautionary saving motive that dominates in the data. The implications of the model provide the theoretical foundation for the analysis, suggesting that an increase in expectations of violence may in fact increase the incentive to save with a formal financial institution.

2. BACKGROUND

2.1 FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH

Financial sector development has been identified as fundamental to the improvement of growth and poverty outcomes. From an economy-wide perspective, the financial system promotes growth through capital accumulation and technological progress “by increasing the savings rate, mobilizing and pooling savings, producing information about investment, facilitating and encouraging the inflows of foreign capital, as well as optimizing the allocation of capital” (World Bank, 2012).

Empirical work on the determinants of economic growth largely supports this theory; one of the strongest findings in the macroeconomic literature is the explanatory power of financial sector development. Levine and King, in their seminal paper “Finance and Growth: Schumpeter Might Be Right” (1993), find that higher levels of financial development are positively correlated with faster rates of economic growth, physical capital accumulation and economic efficiency improvements, even when controlling for country and policy characteristics. Moreover, this relationship is believed to be causal. Post-financial crisis, the attitude of economists has tended towards a more cautious endorsement of financial liberalization in particular, but the conventional

wisdom is that access to finance matters for development.

Although the microeconomic mechanisms by which financial sector development contributes to the reduction of poverty are not crystal clear, we recognize that access to financial services is necessary to create and sustain a livelihood, build assets, and smooth consumption. Enhancing financial inclusion of the unbanked global poor is an official goal of the G20. The role of finance, in the context of development, is to help the poor maintain a household and plan certain investments – such as in shelter, education, or enhanced productivity – in the face of erratic income and disruptive events (Dermish et al. 2011). Often working as casual laborers, farming or operating small and precarious enterprises, and without a social safety net, the global poor face more risk and must take on more responsibility for their lives than the rich. The financial system facilitates risk management by reducing their vulnerability to shocks. Yet, in 2011, only 24% of adults in low-income countries reported having an account at a formal financial institution (Demirguc-Kunt, Klapper, and Peria, 2012). In Kenya, this proportion is currently about 29%.

In the book *Poor Economics* (2011), Banerjee and Duflo relate the story of Jennifer Auma, a market vendor in the town of Bumala in western Kenya, who – though the withdrawal fees are too high for her to use her formal savings account, living on less than \$2 a day – makes use of no less than a dozen alternative financial instruments, ranging from six rotating savings and credit associations (ROSCAs)¹ of different sizes and frequencies of meetings, to shares in the village bank, to loans she had issued herself, to stashes of money hidden around the house to deal with minor

¹ Also called “merry-go-rounds” or *tontines*, and quite popular in Africa, members of a ROSCA meet regularly to deposit the same amount of money into a common pot. Each time, it is one member’s turn to take home the pot. Other savings arrangements include paying deposit collectors to take their deposits and put them in a bank, depositing savings with local moneylenders, leaving them with “money guards,” or slowly building a house (Banerjee and Duflo, 2011, p. 186).

emergencies. Despite her ingenuity and discipline in finding and maintaining them, these financial instruments are more complicated and costly than a proper bank account that accumulates interest. As noted by the authors, the poor would be much better off if it were much cheaper to start a bank account, and perhaps would save more if they had access to conventional savings methods. Formal access to finance for the poor is hindered by the high cost of physical and informational infrastructure; small and infrequent transactions are not profitable for banks (Dermish et al., 2011). As will be discussed in the following section, the role of new financial technology mobile money could be bridging the gap between formal banking and informal savings mechanisms.

2.2 MOBILE MONEY

The advent of mobile money services – the first of which appeared about fifteen years ago, although it was the success of Kenya’s M-PESA, launched in 2007, that brought mobile money to international prominence – has generated excitement among economists and development workers and garnered a lot of study already. In 2011, about 2.6 billion people did not have access to formal financial services. However, almost half of that disadvantaged group did own a cell phone (Dermish et al., 2011). Advocates see in mobile money the opportunity to build a new financial system without the investment in physical infrastructure required by traditional banks, who do not find it profitable to maintain a sufficient number of bank branches in poorer and rural areas.

An individual in Kenya, and in many other countries, may obtain a mobile money account simply by purchasing a SIM card containing the mobile money

application, registering with a retail agent² using his or her phone number and an identifying document, and depositing cash in exchange for electronic money. The electronic money can then be stored, withdrawn as cash from the mobile money agent, or transferred to others using SMS text messaging. In Kenya, it can even be sent to non-account holders, authorizing a retail agent – all accomplished via text – to exchange electronic money from the remitter’s account into cash for the recipient. Transactions are recorded, secure, instantaneous and relatively cheap.³ Given the widespread adoption of mobile phones, mobile money provides a promising alternative to bank or cash transfers for moving funds across large distances at low cost using existing technology, and in places where physical transport is expensive and unreliable.⁴ It gives people convenient access to secure means of transferring money as well as a safe and private place to store funds. For employers, mobile salary payments offer a means to address concerns around physical security, logistics and corruption associated with cash salary payments. Furthermore, as will be discussed, mobile money systems can facilitate credit ratings, micro-loans, micro-insurance platforms, and international transfers which are all important in developing economies. Remittances are common, yet very costly, in Sub-Saharan Africa.

² In Kenya, M-Pesa has both “retail agents” who use their own cash or electronic money to meet customer demand and “wholesalers” – banks or non-bank merchants – that have higher limits on electronic money stored in their M-Pesa accounts and with whom retail agents usually transact with daily.

³ Withdrawal fees ranged in 2015 from 0.5% (for larger amounts) to 20%; transfer fees from 2% to 10% (Aron, 2015). There are no costs associated with depositing money.

⁴ The FinAccess (2013) survey indicates that for 85% of urban dwellers and 58% of rural dwellers, the nearest mobile money agent (“human ATM”) is within walking distance. Furthermore, Jack and Suri (2014) conservatively estimate the cost of sending money from Nairobi to the western provinces via M-PESA as half the cost of sending through Western Union, about 30 percent of the cost via the postal bank, and a third of the bus delivery cost.

Dermish et al. (2011) identify two ways in which mobile money could spur financial sector development: clients can use it to collect and repay loans efficiently from more distant credit providers, and mobile money accounts can be used to create a payment and financial history that might be used by credit providers to evaluate repayment prospects. In fact, Banerjee and Duflo (2011) identify the main roadblock to providing credit products to the poor as a lack of information. Beyond the basic fact of providing the poor with a safe, convenient and affordable way to save, mobile money services can build a history of financial transactions that can be used to develop credit scores or ratings for unbanked users (or users who use their mobile money account far more often than their bank account). In this way, mobile money may help overcome the obstacle of asymmetric information faced by banks in lending to those who do not have sufficient collateral to compensate for their lack of history.

The first big mobile money success story is that of Safaricom, a subsidiary (40% Kenyan-owned) of British telecoms company Vodafone which created the mobile money service M-PESA in March 2007. M-PESA experienced high growth almost immediately – evidence that mobile money was fulfilling a need that was not being met by banks, the global money transfer service Western Union, or the common practice of paying bus drivers to transport money. As explained by Aron (2015), within seven months M-PESA had over a million customers, and by the end of 2010 over half of the adult Kenyan population had an account. As of September 2014, there were almost 20 million registered M-PESA customers. Now, there are six main platforms in Kenya, backed by a network of more than 127,000 agents according to the Central Bank of Kenya. Kenyan legislation allows for both bank and non-bank providers of mobile money services, but stipulates that deposits must be invested in regulated financial institutions. This means that Safaricom is licensed to issue mobile

money without a formal partnership with a bank, whereas guidelines in, for example, Uganda stipulate such a partnership between a telecoms company and a regulated financial institution and grant the license to the bank.

Researchers investigating mobile money usually bring up the question: Why is mobile money succeeding in Kenya where it fails in so many other countries? Dermish et al. (2011) note that M-PESA's success was thought to be driven by Safaricom's market dominance. In M-PESA's early days, Safaricom committed significant operational resources to smooth out the challenges around liquidity management to build reliability in the system (Hughes and Lonie, 2007). Advertising also played a significant role. Evans and Pirchio (2014) find that mobile money services are more likely to take off in countries with lighter regulation, poorer infrastructure and less income per capita in general. For instance, it has not been very successful in South Africa, Nigeria or Madagascar, but very successful in Zimbabwe, Uganda, Tanzania, Kenya, and recently Cote D'Ivoire.

Skeptics like to point out that the advantages of electronic money in and of itself are not necessarily obvious. However, the future of mobile money systems looks promising. Safaricom has been trying to evolve into a business use and payments platform with some success. M-SHWARI, launched in November 2012 by the Commercial Bank of Africa and Safaricom in partnership, is a savings and loan service operated over the mobile money network. Millions of Kenyans are using this product already; M-PESA users with accounts over 6 months old may apply for a loan without fees or paperwork – an algorithm based on their transactions history creates an initial credit score and loan limit. In January 2014, an affordable M-PESA health micro-insurance product was launched in partnership with an investment firm. In late 2014 Safaricom was granted a cash remittance operating license, enabling the transfer

of money internationally for the first time. Vodafone Group and MTN Group announced in spring 2015 they would interconnect their mobile money services enabling affordable international remittances between customers in Kenya, Tanzania, Democratic Republic of Congo, Mozambique, Uganda, Rwanda and Zambia. The expansion of mobile money services into the realms of business, insurance, credit and international transfers suggests that they may provide a real alternative to traditional banks for Kenyans.

There have been plenty of investigations into the economic benefits of mobile money in the economics literature, with many implications for growth in Sub-Saharan Africa in particular. A World Bank paper analyzing the African financial sector development gap found that population density matters more for banking sector development in Sub-Saharan Africa than elsewhere (Allen et al., 2012). Jack, Suri and Townsend (2010) posit that, according to Townsend's model of financial deepening, mobile banking may spur economic activity by compensating for poor infrastructure. By effectively reducing the distances that separate individuals, M-PESA changes the financial connectedness of individuals in the economy, "lessening the frictions that characterize models of incomplete intermediation, relaxing liquidity constraints, and reducing the need for monetary interventions" (Jack, Suri and Townsend, 2010, p. 85). The mobile money technology can reduce transaction costs in remittances and help enable efficient risk sharing, reducing inefficiencies for payer and payees (Jack and Suri, 2014; Blumenstock et al., 2011; Aker et al., 2011).

Some research has dealt specifically with saving behaviour in the context of mobile money. Demombynes and Thegeya (2012), using survey data collected in 2010, find that M-PESA users are 32% more likely to report bank-integrated (i.e. interest-accumulating) savings, even when controlling for characteristics such as sex,

rural or urban residence, levels of education, reported income and wealth. Using an instrumental variable approach to account for endogeneity of M-PESA usage, they still find a coefficient of 20%. Furthermore, they conclude that the use of mobile money accounts simply as funds storage is widespread, including among those who are otherwise unlikely to save at all. Kim Wilson, in the book *Financial Promise for the Poor* (2010), tells the story of Jipange Sasa, a group savings organization that helps residents of Kibera, a slum in Nairobi home to over a million people, save regularly, self-insure against the death of a family member, start joint businesses and invest in securities through the Nairobi Stock Exchange.⁵ The elected treasurer of the group deposits all the cash into an M-PESA account. Members can “move the money out of their pockets ... without the cost of a long commute” (Wilson, Harper, and Griffith, 2010, p. 104) and the fees associated with transfers decrease with the amount held in the account, so it is both cost- and time-effective.

Financial sector development requires broad participation from the population and long-time horizons from account holders. Mobile money especially is associated with network externalities (Mas and Radcliffe, 2011). Just as with a formal bank account, the value of a mobile money account depends on the number of people with whom the account holder can transact. Moreover, mobile money agents will not operate unless they achieve a certain volume of customers, another parallel drawn with traditional banks. If we accept the premise that mobile money systems can aid in economic development, it is important that we encourage the widespread adoption of the technology, and conduct more studies so that we may better understand any factors which might affect it. In this paper, the focus is on conflict and the effect that

⁵ See footnote 1 in Section 2.1 on ROSCAs.

exposure to violence might have on individual participation in the mobile money and formal financial systems.

2.3 CONFLICT AND FINANCIAL DECISION-MAKING

Recall the story of Jennifer Auma, as recorded in *Poor Economics* (2011) and retold in Section 2.1. Banerjee and Duflo follow up their discussion of the problem of financial inclusion with a question: How do we reconcile Ms. Auma's sophisticated financial planning with the fact that often the poor do not take full advantage of the instruments that are available to them? Their answer is rooted in psychology.

Participation in the financial system depends crucially not only on convenient access to financial instruments but on people's expectations of the future. Put simply, people who believe that they will have opportunities to realize their aspirations will have more incentive to invest in their future, and delay the gratification of current consumption. Cutting out small "luxuries" like caffeine or snacks – that Banerjee and Duflo found the poor will often "waste" any extra money on – takes a degree of self-control that is difficult for anyone, let alone for someone who does not feel that they have a fair or realistic chance of reaching their goals.

With this view in mind, it is easy to see how people who are exposed to conflict, which has a destabilizing effect on their everyday lives and leads them to expect insecurity and the threat of violence, will save less even if it would help them accumulate more income in the long run. This simple idea is formalized in a paper by Blumenstock, Callen and Ghani, "Violence and Financial Decisions: Evidence from Mobile Money in Afghanistan" (2015). The mechanism, as they describe it, is hard to find fault with: as the probability decreases that you will be able to convert savings into consumption in the future, you are less likely to save. The model as presented in

Blumenstock et al. is a two-period model with uncertainty where an individual chooses the fraction of their salary, endowed in period 1, that they will save and hope to consume in period 2. With some positive probability the individual expects to lose all savings, which in the context of the model Blumenstock et al. describe as the probability that the individual will not survive into the next period. They show that as the probability of survival decreases, which they assume happens when expectations of violence rise, the fraction of an individual's salary that he or she choose to save should decrease, given an increasing utility function.

In their empirical analysis, Blumenstock et al. find evidence to support this hypothesis. Their main result is that violence causes individuals to withdraw funds from their mobile money accounts and increase their cash holdings. Furthermore, they argue that this preference for liquidity is driven by expectations of future violence, even when controlling for general optimism, risk aversion, discount factors and present bias. Their dataset combines a complete and high frequency history of M-Paisa⁶ transactions over a 6-year period with administrative records of all violent incidents recorded by international forces in Afghanistan. Blumenstock et al. approximately locate each individual on each day they have data using the geo-tagged mobile phone records of each M-Paisa user, and measure exposure to violence by counting the conflict events within a certain radius of the individual in a given day. In the regression model they include individual fixed effects, district fixed effects and time fixed effects. The authors find that exposure to violence is associated with a decrease in a user's average daily M-Paisa balance by about 12%. The coefficient on

⁶ Afghanistan's first mobile money transfer service. In 2008, Vodafone – the British multinational telecommunications company behind Safaricom in Kenya and Vodacom in Tanzania – partnered with Roshan, Afghanistan's primary mobile operator, to provide M-Paisa services.

the violence indicator for withdrawals is 9% of the mean of the dependent variable, whereas it is 62% for deposits. They also find a negative correlation between violence and M-Paisa use in the cross-section, however decline to discuss the result in detail due to the omitted variable problem (other factors which drive violence may also explain lower mobile money account usage).

Using monthly administrative and survey data from an experiment, Blumenstock et al. also run a difference in differences regression and find that the average effect of the treatment, which is receiving salaries as payments into their mobile money accounts instead of in cash, on mobile savings balances during periods of high violence beliefs is consistently negative in sign, large in magnitude and statistically significant. This finding constitutes strong evidence that expectations of violence provoke a more urgent reaction – faster withdrawals from mobile money accounts in the treatment sample immediately following pay day. Both exposure to violence and expectations of violence dramatically lowered mobile money usage. In the household survey data, Blumenstock et al. find a strong positive correlation between an individual's subjective expectations of future violence and the amount he saves in cash relative to other technologies.

So the effect of exposure to violence on individuals is that they are less likely to adopt and use mobile money and are more likely to retain cash on hand. Blumenstock et al. are able to demonstrate this effect using M-Paisa's data on mobile money transactions in Afghanistan, monthly panel data from an experiment as well as financial survey data. My empirical work, unfortunately, relies solely on financial survey data (see Section 4.1). Their findings remain constant across the three data sets: violence-affected individuals have a clear preference for liquidity. Expectations of violence, the authors note, appear to have more explanatory power than actual

violence exposure. In my analysis, I am not able to differentiate between the two and instead assume that recent exposure to violence provides an adequate proxy for expectations. Furthermore, Blumenstock et al. are able to control for heterogeneity at the individual level since they have information on the complete history of transactions on the M-Paisa mobile money network – the same person is less likely to use mobile money in the immediate aftermath of violent events. I am able to control for unobserved heterogeneity at a subnational level, but must aggregate within counties.

Ultimately, the work of Blumenstock et al. suggests that conflict substantially reduces the financial involvement of Afghans, and as a consequence violence poses a substantial barrier to the development of financial networks. The authors are able to show that there is an economic cost of violence that operates at the level of individual decision-making. The impact is significant enough, they posit, to seriously impede the development of financial systems in areas experiencing conflict. Conflict may or not may not influence the general economy, transaction costs or the mobile money system, but they make a very convincing empirical argument that violence has a negative effect on individual savings.

There are, however, other ways of looking at the relationship between violence and savings behaviour. Undoubtedly, conflict affects decision-making in the sense that it brings more uncertainty; current violence leads people to expect more instability in the future. Blumenstock et al. suggest that as a consequence of these updated beliefs individuals will have a higher preference for liquidity, which they frame in terms of flexibility in case of emergencies, and will therefore want to hold more cash. However, households are also thought to respond to shocks by adopting consumption smoothing strategies and risk-sharing arrangements. Jack and Suri (2011), give the reasons recorded in 2008-2009 household survey data as to why users

would store funds in mobile money account:⁷ improved security, (including safety of cash during travel), greater privacy, ease of use, reduced transactions costs, and for precautionary saving against emergencies.

Blumenstock et al. do acknowledge that mobile money accounts – and this logic also applies to banks – offer security advantages over holding cash. The explanation they give as to why this competing mechanism does not dominate in the evidence is quite specific to Afghanistan and to mobile money. It may therefore be the case that these reasons do not hold up in the Kenyan context. The violence they measure represents general and political instability. Conflict events are not inclusive of forms of violence such as theft or bribery, whereas the ACLED dataset I use to measure violence in Kenya does include that type of conflict if perpetrated by an informally organized group. The nature of conflict, on a broader scale, is different and will be discussed in Section 2.4. Kenya is not currently involved in a declared war, and violence may be less randomized. Secondly, migration may play a bigger role in Afghanistan than in Kenya. Mobile money is not convertible outside Afghanistan, whereas displaced Kenyans may be more likely to remain in the country or move somewhere where they still have access to mobile money operators. Anecdotally, Wilson (2010) relates how the December 2007 post-election violence in Kenya (see Section 2.4) caused many people to flee Kibera, a slum in Nairobi, where fires threatened whole streets, market stalls and homes. Unfortunately, many members of a certain group savings club were forced to leave their cash contributions behind. The founder of the group savings organization Jipange Sasa notes that with M-PESA, group members that had to migrate out of Nairobi would still have been

⁷ Jack and Suri also find that by 2009, an estimated 90 percent of early adopters used M-PESA for saving (amongst other savings instruments and continued use of cash).

able to access their savings. In this case, we can see how mobile money in fact offers an advantage over cash in the kind of scenario proposed by Blumenstock et al.

Lastly, as the authors explain, liquidity of mobile money may be influenced by levels of violence in Afghanistan; agents in many regions refuse to operate altogether, so an increase in violence may increase the cost of withdrawing mobile money and decrease the probability that it may be withdrawn at all. Since the Kenyan mobile money system is much more established, the liquidity of mobile money may be much less sensitive to such an effect. The reality is that “...the same type of conflict, or indeed the same conflict, may affect people in quite different ways, leaving some households displaced, others dispossessed of their assets, others with dead, disabled, or wounded family members, and others worried or scared but physically unaffected” (Justino, Bruck and Verwimp, 2013, p. 5-6). It is necessary, therefore, that we continue to examine whatever evidence we have on the dynamics of conflict and the lives of individuals, households, and communities affected by violence.

Verwimp and D’Aoust (2013), in their chapter “Risk, Security, and Coping Mechanisms in Contexts of Violent Conflict: Evidence from Rwanda and Burundi” from the Oxford publication on the microeconomics of conflict, violence and development, divide household strategies into “ex ante” and “ex post” categories. When they expect violent events, they may reduce risky activities or try to form a safety net in case of economic losses following shocks. In the aftermath, they may deplete savings, turn to friends and family for support, change consumption behavior, redistribute labour or migrate. They state that “asset depletion under conflict is a likely result” (Verwimp and D’Aoust, 2013, p. 166). Some economists have found that exposure to conflict may result in increased political and social participation (Bellows and Miguel, 2006; Blattman, 2009). Voors et al. (2012) set up economic

experiments in 35 villages in Burundi to study the effect of risk of violence on people's social, risk, and time preferences, and find that individuals exposed to violence display more altruistic behavior towards their neighbours, are more risk-seeking, and have higher discount rates. Verwimp (2003, 2005) finds that households in Rwanda were forced to reduce the amount of livestock they owned, a traditional substitute for financial assets in rural areas, because they were targeted for looting. In that case, violence caused dissavings. Although self-insurance through savings is viewed as the usual mechanism, a drop in the asset's expected rate of return produced by covariate shocks may work against the incentive to save.

The takeaway lesson here is that there are many conflicting and overlapping accounts of how conflict may affect saving behavior. As a last example, I would like to introduce the paper "Household Investment under Violence – The Colombian Case" (2008) by Rebekka E. Grun at the World Bank. Grun proposes a two-asset model where a risk-averse individual may allocate their income to consumption and investment into either fixed and mobile assets. She models the effect of violence on optimal investment and portfolio makeup as a reduction in expected returns, since failure is more likely. She predicts that households exposed to exogenous violence will invest less overall, and a higher proportion of their investment will be in mobile assets, which would be more secure in case of displacement. Common delinquency would result in a shift towards fixed assets which are less vulnerable to theft. Grun acknowledges that savings from the precautionary motive may arise, since violence can be perceived as an increase in risk. The empirical evidence from Colombia, however, strongly supports her initial hypothesis. Grun runs tobit and OLS regressions using Colombian micro-data to investigate whether the share of fixed assets in a household's investment portfolio is explained by the presence of the

guerrilla and paramilitaries. She finds that the significance of her results is robust to different asset definitions and empirical specifications.

In Section 3, a model is presented that incorporates the structure of both Blumenstock et al. (2015) and Grun (2008), while trying to account for some of the differences between the Afghan and Kenyan contexts and other insights in the economic literature regarding the impact of conflict on individual behaviour. The nature of conflict in Kenya is discussed in detail in the following section.

2.4 VIOLENCE IN KENYA

Kenya is among the top ten most conflict-affected countries included in the ACLED (Armed Conflict Location and Event Data) Project dataset according to the number of documented conflict events between 1997 and September 2013, when the first wave of survey data used in this analysis was collected (Dowd and Raleigh, 2013). Sources of conflict in Kenya, as identified by Ombaka (2015), are the external threat of terrorism and internal insecurity of two types: rampant theft and robbery experienced by individuals, and violence directed toward groups of people.⁸ Factors cited by Rohwerder (2015) as contributing to this sort of regional conflict include ethnic intolerance and revenge attacks, border conflicts, political party zoning, competition over land and other resources, proliferation of small arms, and weak security. The Rift Valley, Nairobi, the peripheral pastoralist drylands, and the Coast province are among the areas most affected, with some parts of the country experiencing low levels of persistent communal violence and more acute conflicts often arising during elections. It is in Nairobi, the capital, that a good portion of

⁸ Kenya is home to members of over 70 different ethnic groups. The Kikuyu are the largest ethnic group, though they make up only one-fifth of the Kenyan population.

events involving state forces take place. Conflict in neighbouring Somalia and jihadist mobilisation has driven unrest in the northeast.

Much of the discussion surrounding conflict events in Kenya's pastoral drylands – arid and semi-arid areas which comprise more than 80% of the country, concentrated in the Rift Valley – focuses on competition over access to resources, such as water and pasture, and political power. Cattle raids and banditry are common; the situation is exacerbated by migration driven by drought, as well as poor infrastructure and insufficient funding which make policing and securing rural areas very difficult. The decentralization effort in Kenya, which aims to give more voice and resources to regions, “though it promises to bring government and power closer to marginalised populations, risks exacerbating tensions among communities with competing claims on ethnic homelands, right to land, and political representation” (Dowd and Raleigh, 2013, p. 5). The common view is that conflicts involving pastoralists have become increasingly widespread and severe. Communal militias are the most active violent actor category in Kenya, involved in almost one-third of all conflict events recorded in the ACLED dataset (Dowd and Raleigh, 2013) and often involving high numbers of fatalities; overall, levels of communal militia activity are comparable to states such as Somalia and Nigeria.

Violence associated with Islamic extremists, in particular the jihadist terrorist group Al-Shabaab, is especially prevalent in the northeastern counties near the Somali border, coastal areas in the southeast, and in Nairobi. Opinions differ as to the role of the “spill-over” effect from Somalia's state collapse. In 2011, Kenya implemented Operation *Linda Nchi* in coordination with the Somali military, sending ground troops into Somalia to combat the violent activities of Al-Shabaab. Kenya's formal military involvement has been seen as a factor in the marked increase in

terrorist attacks in recent years, including the September 2013 siege of Nairobi's Westgate shopping centre, the June 2014 attack on hotels and bars in Mpeketoni, village massacres, assassinations of judicial and religious figures, and the April 2015 mass murder of 150 people at Garissa University College (Rohwerder, 2015). Since 2012, there have also been more targeted killings of Muslim citizens, which some believe to have been handled with deliberate negligence by the police, leading to more mistrust of the country's institutions and further risk of radicalization. Operation *Usalama (Peace) Watch*, launched in 2014 and consisting of heightened police presence in Somali-dominated neighbourhoods, more control over refugees, new security laws and more freedom for the Anti-Terrorism Policing Unit, also contributed to the further marginalisation of ethnic Somali and Muslim citizens. There have many reports over the past couple of years that suggest that Al-Shabaab is recruiting heavily in Kenya even as they suffer military setbacks in Somalia.

Kenya experienced a peak in violence in between January and March 2008, often referred to as the "2007-08 postelection violence," which resulted in over 1,100 deaths and widespread population displacement, estimated at around half a million people (Elder, Stigant and Claes, 2014). Following this period of elevated conflict, Kenya implemented constitutional reforms aimed at preventing violence. An ambitious peace agenda was set – the coalition government, including the Party of National Unity (PNU) led by President Mwai Kibaki and the Orange Democratic Movement (ODM) led by Raila Odinga, instituted a National Accord to ease tensions and lay out plans for a campaign of political reforms aimed at addressing the root causes of violence (Kituku, 2012). Given this history, the experience of the Kenyan general election which took place in March 2013 was described by Kenyans as a "tense calm" or "unstable peace" (Elder, Stigant and Claes, 2014). The events of

2008 were not repeated, however the risks for politically motivated violence remained, as well as comparably high levels of tension and uncertainty. Overall, there has been an increase in the incidence, gravity and intensity of violence since 2010 (Rohwerder, 2015). Going forward, conflict risk, as well as extreme ethnic and political polarisation, persists. Although most counties experienced a decrease in violence between fall 2013 and fall 2014 as measured in this analysis (see Section 4.2), commentators are already heralding signs of increased violence ahead of Kenya's 2017 general elections. In the near future, conflict will continue to be a part of many Kenyans' daily lives, and it therefore continues to be important to understand how violence affects Kenya's economic development.

3. MODEL

Drawing from the theoretical approaches of both Blumenstock et al. and Grun, I set up a basic two-period, two-asset model. An individual may allocate m share of their salary y to mobile money savings, fraction b to savings in a bank account, and whatever is left to current consumption. In period 2, they expect three different scenarios with varying probabilities.⁹ With probability θ they will not be able to convert savings into consumption (i.e. θ represents the expected probability that they will not survive into the next period, as characterized by Blumenstock et al.). With probability π , they expect to lose all of their mobile money savings to emergency needs, theft or some kind of disaster. With probability $1 - \theta - \pi$ they will have access to all their savings. Electronic money, in this model, functions essentially as cash – a relatively liquid, non-interest-paying asset. Mobile money is the more

⁹ Chosen to reflect the fact that households experiencing violence face risk at many levels: “physical investments may be destroyed or lost, returns on savings may become riskier, and people's own lives may be endangered” (Grun, 2009, p. 4).

flexible and less secure option. Prices p_m and p_b ($1 < p_m < p_b$) represent the costs of mobile money and banking services respectively. Here a bank account is more expensive, but earns interest r . $(1 - p_m m - p_b b)y$ is the amount allocated to first period consumption, taking prices into account. $my + (1 + r)by$ is the amount shifted to second period consumption through savings: the proportion of salary allocated to mobile money savings plus the proportion of salary allocated to bank savings and the interest earned on that amount.

$$\max_{b, m} u(c_0 + (1 - p_m m - p_b b)y) + \beta * E\{u(c_1 + ms + (1 + r)by)\}$$

Assume $\theta + \pi < 1$, $p_m m + p_b b < 1$, and $b, m > 0$. Letting $\beta = 1$ and specifying a functional form for utility yields the following optimization problem:

$$\begin{aligned} \max_{b, m} & \frac{(c_0 + (1 - p_m m - p_b b)y)^{1-\sigma}}{1-\sigma} + \pi \frac{(c_1 + (1 + r)by)^{1-\sigma}}{1-\sigma} \\ & + (1 - \theta - \pi) \frac{(c_1 + my + (1 + r)by)^{1-\sigma}}{1-\sigma} \end{aligned}$$

First order conditions with respect to share of salary allocated to bank savings:

$$\begin{aligned} -p_b y * (c_0 + (1 - p_m m - p_b b)y)^{-\sigma} + \pi(1 + r)y * (c_1 + (1 + r)p_b by)^{-\sigma} + (1 - \theta - \pi)(1 + r)y \\ * (c_1 + p_m my + (1 + r)p_b by)^{-\sigma} = 0 \end{aligned}$$

Which simplifies to:

$$\begin{aligned} F_b(m, b; \theta, \pi) \equiv -p_b(c_0 + (1 - p_m m - p_b b)y)^{-\sigma} + \pi(1 + r) * (c_1 + (1 + r)by)^{-\sigma} \\ + (1 - \theta - \pi)(1 + r) * (c_1 + my + (1 + r)by)^{-\sigma} = 0 \end{aligned}$$

Using the Implicit Function Theorem:

$$\begin{aligned} \frac{\partial b^*}{\partial \theta} &= -\frac{F_{b\theta}}{F_{bb}} \\ &= \frac{(1 + r) * [c_1 + my + (1 + r)by]^{-\sigma}}{-\sigma y(p_b^2 [c_0 + (1 - p_m m - p_b b)y]^{-\sigma-1} + (1 + r)^2 * (\pi [c_1 + (1 + r)by]^{-\sigma-1} + (1 - \theta - \pi) * [c_1 + my + (1 + r)by]^{-\sigma-1}))} \\ \frac{\partial b^*}{\partial \pi} &= -\frac{F_{b\pi}}{F_{bb}} \end{aligned}$$

$$= \frac{-(1+r) * [c_1 + (1+r)by]^{-\sigma} + (1+r) * [c_1 + my + (1+r)by]^{-\sigma}}{F_{bb}}$$

$$\sigma > 0 \text{ and } my > 0$$

$$\Rightarrow [c_1 + (1+r)by]^{-\sigma} > [c_1 + my + (1+r)by]^{-\sigma}$$

Therefore we have that $\frac{\partial b^*}{\partial \theta} < 0$ and $\frac{\partial b^*}{\partial \pi} > 0$. First order conditions with respect to share of salary allocated to savings in mobile money:

$$-p_m y * [c_0 + (1 - p_m m - p_b b)y]^{-\sigma} + y * (1 - \theta - \pi)[c_1 + my + (1+r)by]^{-\sigma} = 0$$

Which simplifies to:

$$F_m(m, b; \theta, \pi) \equiv -p_m * [c_0 + (1 - p_m m - p_b b)y]^{-\sigma} + (1 - \theta - \pi)[c_1 + my + (1+r)by]^{-\sigma} = 0$$

$$\frac{\partial m^*}{\partial \theta} = -\frac{F_{m\theta}}{F_{mm}} = \frac{[c_1 + my + (1+r)by]^{-\sigma}}{-\sigma y(p_m^2 [c_0 + (1 - p_m m - p_b b)y]^{-\sigma-1} + (1 - \theta - \pi)[c_1 + my + (1+r)by]^{-\sigma-1})} < 0$$

$$\frac{\partial m^*}{\partial \pi} = -\frac{F_{m\pi}}{F_{mm}} = \frac{[c_1 + my + (1+r)by]^{-\sigma}}{F_{mm}} < 0$$

The results are summarized in the following proposition.

PROPOSITION 1

- A. *The optimal share of salary allocated to bank account savings increases with a rise in expectations of violence associated with theft or emergency spending, and the optimal share of salary allocated to mobile money savings decreases.*
- B. *The optimal shares of bank account savings and mobile money savings decrease with a rise in expectations of violence that threatens loss of life.*

As in Blumenstock et al. (2015), an increase in expectations of death as well as savings loss are shown to lead to a reduction in the fraction of current salary allocated to mobile money savings. However, the result in Proposition 1(A) is compatible the precautionary savings motive. An increase in expectations of conflict more in the vein of theft or emergency spending leads to an increase in bank savings,

which offer more security. This effect may reflect a type of violence that is more prevalent in Kenya during the period that the evidence used in this analysis covered (2013 – 2014, see Section 4.2), where Kenyans were still exposed to everyday banditry but saw a lull in politically motivated violence. Although an election did take place in early 2013, the memory of violence during the 2007-2008 elections meant that there was a conscious effort on the part of many opposition groups to maintain a relative peace. Thus, the Kenyan experience may have tended more towards increased expectations of theft and loss of savings rather than loss of life. Section 2.4 presents more detail on the state of conflict in Kenya, which may provide more insight into the nature of violence expectations.

4. DATA DESCRIPTION

4.1 MOBILE MONEY AND BANK ACCOUNT USE

To measure mobile money and bank account use, I rely on self-reported information sourced from a survey of Kenyan households. The Financial Inclusion Insights (FII) program, which began in 2013 in partnership with the Bill and Melinda Gates Foundation, collects survey data from eight countries in Africa and Asia. Their mission is to expand financial inclusion and gather information on financial awareness, access and use in developing countries. The questionnaire is extensive, covering mobile phones, banks, mobile money and nonbank financial institutions. Thus far, InterMedia has conducted two waves of surveys, and intends to continue with yearly sampling and reports on their findings. Wave 1, which was conducted from September 13th, 2013 to October 4th, 2013, consists of a nationally representative sample of 3000 Kenyan citizens over 15 years of age. Wave 2 ran from September 9th, 2014 to September 30th, 2014 and sampled 2995 Kenyan adults.

Since I am looking for the difference in mobile money and bank account use from one year to another in a given Kenyan county, I take the county average of each measure of interest. The number of observations per county vary from 20 to 220 with a mean of approximately 64. The values of the dependent variable are calculated using the responses, averaged at the county level, to the following questions:

In the past 30 days, how many times did you use a mobile money account to...

...deposit money? ...withdraw money?

In the past 30 days, how many times did you use a bank account to...

...deposit money? ...withdraw money?

I then take the difference in the county averages between Wave 2 and Wave 1 to create proxy variables for the changes in mobile money use and bank account use from September 2013 to September 2014.

Self-reported information on deposits and withdrawals is not a perfect record of financial decision-making, and opens the door to all kinds of measurement error. Ideally, the mobile money companies themselves would provide access to data on financial transactions. Blumenstock et al. (2015), as discussed in Section 2.4, use a complete history of M-Paisa transactions over a 6-year period together with geo-tagged mobile phone records in Afghanistan to analyze the impact of conflict on financial decision-making at an individual level. They are able to track individuals through both time and space to gauge their reactions to violent events. Similarly, though in the context of demand and price discrimination, Economides and Jeziorski (2015) obtain access to a data set of all mobile financial transactions in Tanzania for a 2-year period that enables them to analyze individual behaviour. In the future, replicating this type of analysis in Kenya would be a productive way forward.

4.2 CONFLICT EVENTS DATA

For the data on armed conflict events, I use the Uppsala Conflict Data Program's (UCDP) Georeferenced Event Dataset (version 4.0). An event, as defined by the authors of the codebook, is an "incident where armed force was used by an organised actor against another organised actor, or against civilians, resulting in at least 1 direct death at a specific location and a specific date" (Croicu and Sundberg, 2015). As such, recorded incidents are related to organised violence, crisis-related conflict, and political instability; they do not include crimes such as local thefts or homicides. Violence perpetrated by an informally organized group or a group without an announced name is, however, included in the dataset. The majority of event data are derived from global newswire reporting. Otherwise, data are collected via the global monitoring and translation of local news performed by the BBC, as well as secondary sources such as local media, NGO and IGO reports, field reports, and books (Croicu and Sundberg, 2015).

Each record is temporally and spatially precise, down to the day and geographical coordinates of the event. For the purpose of my analysis, I need to capture exposure to violence at the county level. I create a "Conflict Measure" by weighting each conflict event based on how many fatalities were involved and then counting the events within a given time range and for each county. I weight each event using the transformation $Event\ Weight = \ln(e + Fatalities)$ before summing to take into account the fact that a conflict event with more fatalities may have a larger impact on a household's expectations for future violence or the level of violence a household experiences in their area. For example, a conflict event with 0 fatalities is assigned a weight of 1.00, a conflict event with 10 fatalities is assigned a weight of 2.54, and a weight of 3.96 is assigned to a conflict event with 50 fatalities.

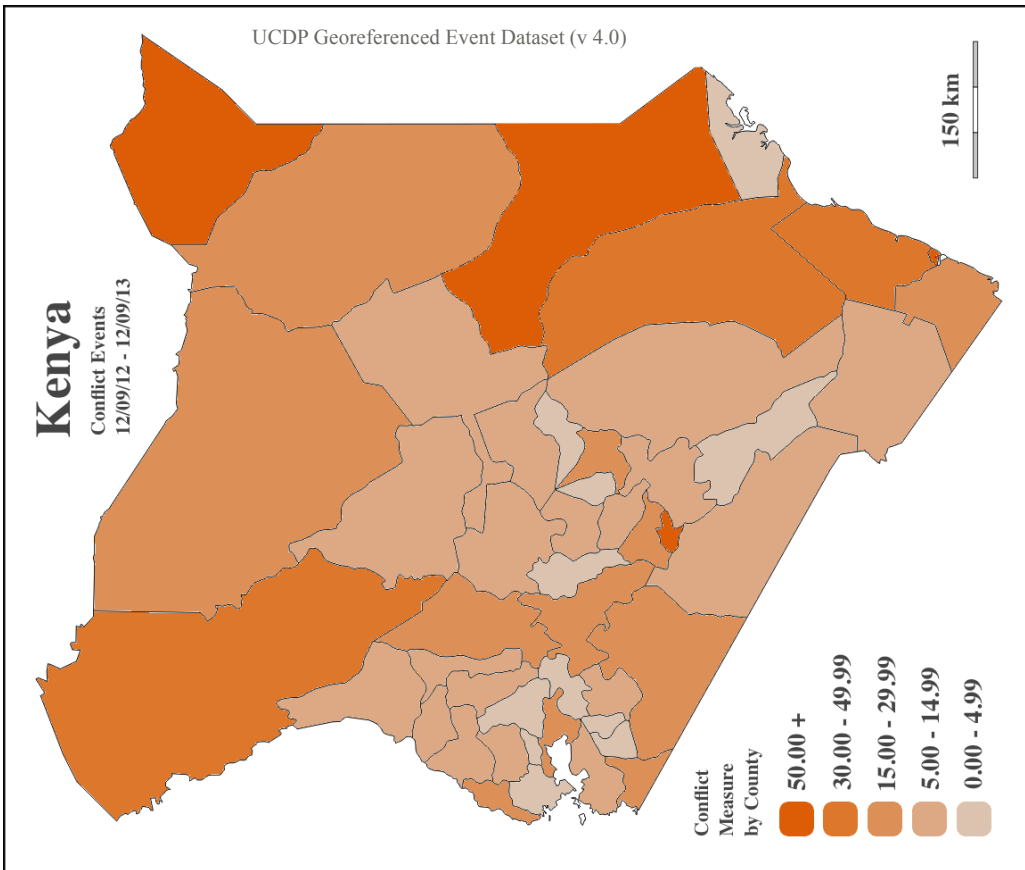


Figure 1

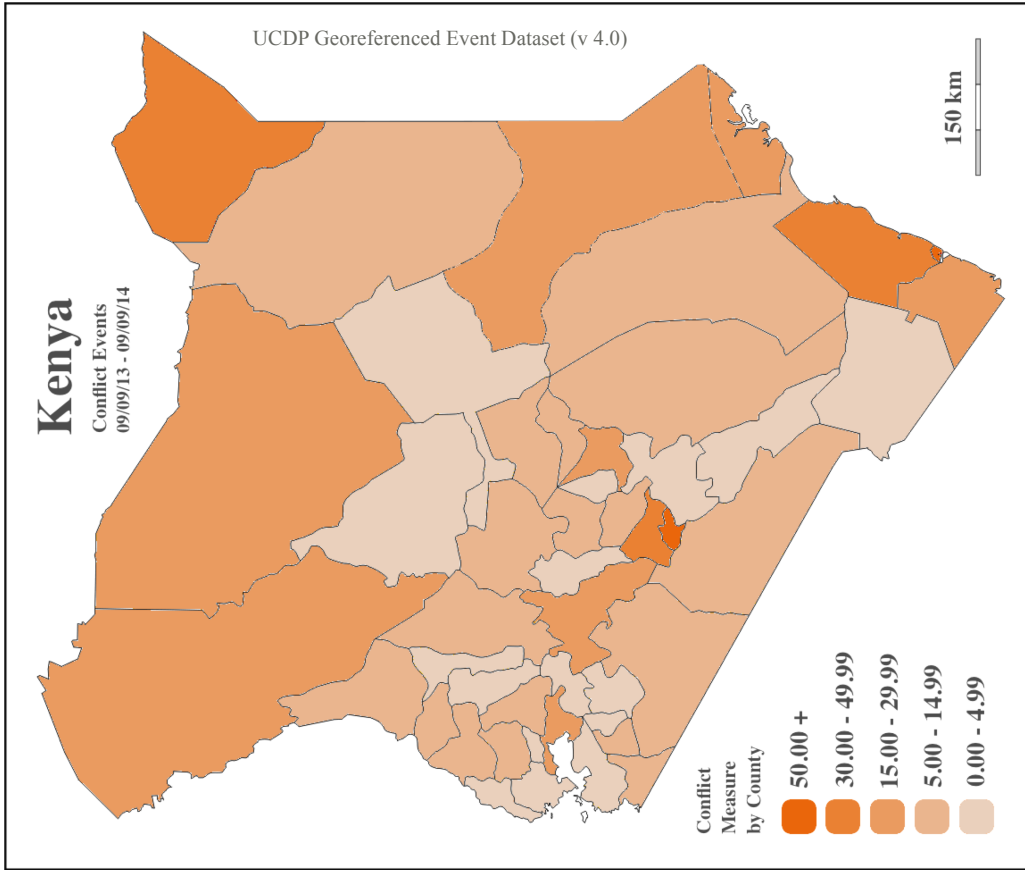


Figure 2

The Conflict Measures (CMs) for each county are then constructed for each of the following periods:

CM_{A1} : March 12th, 2013 to September 11th, 2013 (6 months prior to Wave 1)

CM_{A2} : March 9th, 2014 to September 8th, 2014 (6 months prior to Wave 2)

$$\Delta CM_A = CM_{A2} - CM_{A1}$$

CM_{B1} : September 12th, 2012 to September 11th, 2013 (1 year prior to Wave 1)

CM_{B2} : September 9th, 2013 to September 8th, 2014 (1 year prior to Wave 2)

$$\Delta CM_B = CM_{B2} - CM_{B1}$$

The lengths of the time periods were chosen in an attempt to reflect the household's perception of the current level of violence and instability in their region. I use the six months prior to the surveys and then repeat the analysis using Conflict Measure B, i.e. the year prior to the surveys. Out of the 47 countries, 32 experienced a decrease in Conflict Measure B and 34 experienced a decrease in Conflict Measure A (see Section 2.4 for more detail on regional variations in conflict).

5. RESULTS

5.1 SURVEY DATA

Dermish et al. (2011) ask the question: Is M-PESA benefiting the poor? Some have pointed out that mobile money services may not be as likely as we think to be adopted by the poor or the unbanked. To supplement the regression analysis, I selected some survey elements to highlight in order to gain a bit of insight into how Kenyans use mobile money and bank services. First of all, the estimated rate of mobile money usage in Kenya – based on how many Wave 2 (2014) survey respondents said that they had access to mobile money services before – is approximately 77%. Furthermore, of the three-quarters who have used mobile money services, 42.4% are below the poverty line and 31.7% are classified as the rural poor.

In comparison, of the 31% of the Kenyan population with access to formal bank accounts, only about a quarter are below the poverty line and a fifth are classified as the rural poor.

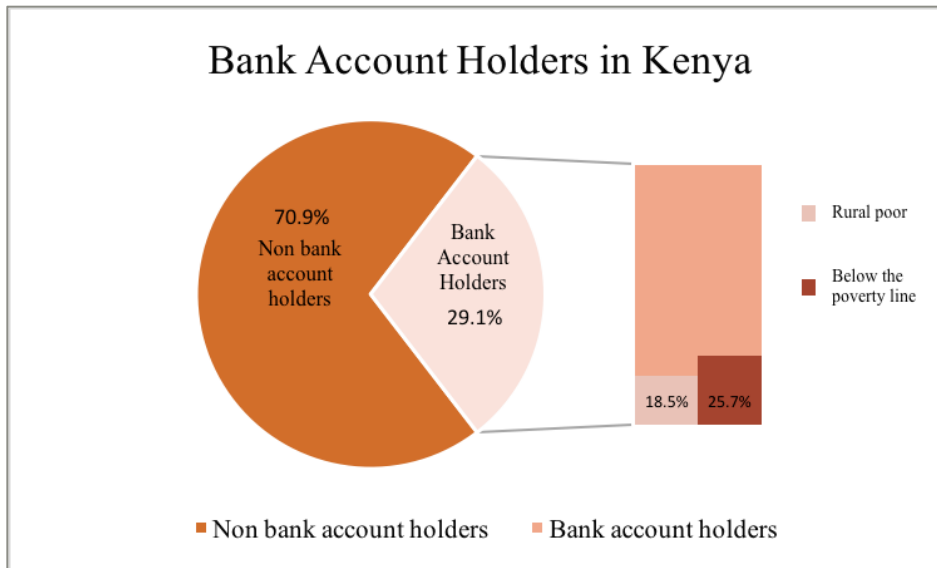


Figure 3

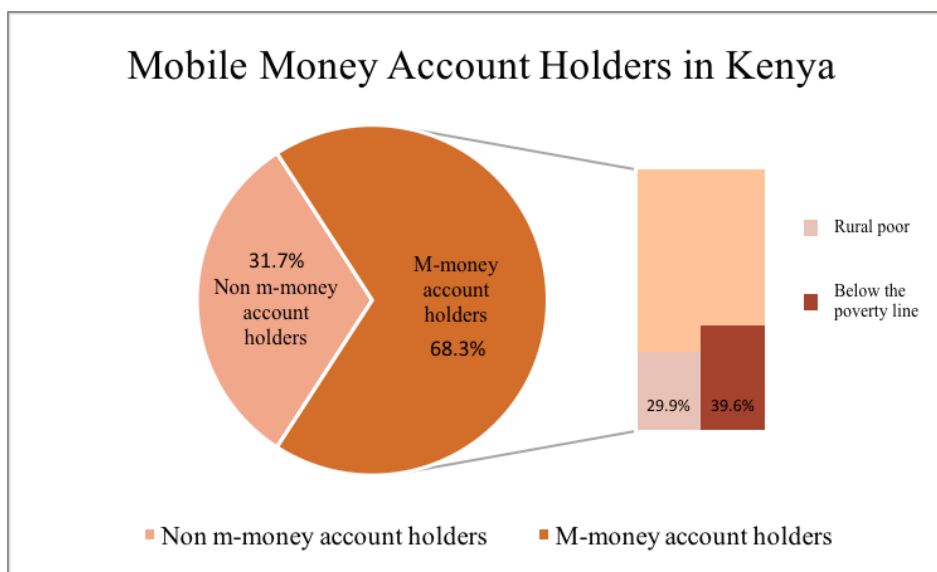


Figure 4

There is some debate surrounding the claim that mobile money services will help lift people from poverty and narrow the gap between urban and rural opportunities; a few critics contest that mobile money accounts predominantly advantage and are used by the urban elite. According to this survey data, Kenyans

below the poverty line and the rural poor are better represented among mobile money account users, at least, than they are in the bank account owner population (see Figures 3 and 4).

From 2013 to 2014 there was a significant increase in bank account use across the board. Most categories saw a roughly 100% increase in the number of Kenyans who had used a bank account to perform that activity. The very large increases in the number of people who have used a bank account to make insurance-related payments; pay and save for big purchases; make investments; and contribute to pensions – all decisions made with thought to the future – may be associated with decreased levels of violence as per Blumenstock et al (2015). However, as we will see, that relationship is not necessarily supported by the quantitative analysis.

Using data from Wave 2 of the survey, Figure 8 illustrates the gap between the use of mobile money services and formal bank services in Kenya. Roughly two thirds of respondents had used mobile money to withdraw and deposit money; the third most popular service, after buying mobile airtime top-ups, was sending and receiving money. Mobile money then facilitates such transactions by eliminating the need to travel and to have cash on hand. Bank account services are more likely to have been used as a formal savings mechanism; the data do not suggest that mobile money is poised to completely replace traditional banking. Kenyans are taking advantage of the network more to connect with others than to access more sophisticated financial instruments.

Responses to the survey question “Why did you start using mobile money?” support such an interpretation. 65% of mobile money users opened an account because they needed to send or receive money from someone else – clearly network effects at work. A sizeable 7% of respondents cited wanting a safe place to store their money as the reason they began using M-PESA, which speaks to the idea that those without

access to formal bank account but with a desire to save benefit hugely from access to services like mobile money.

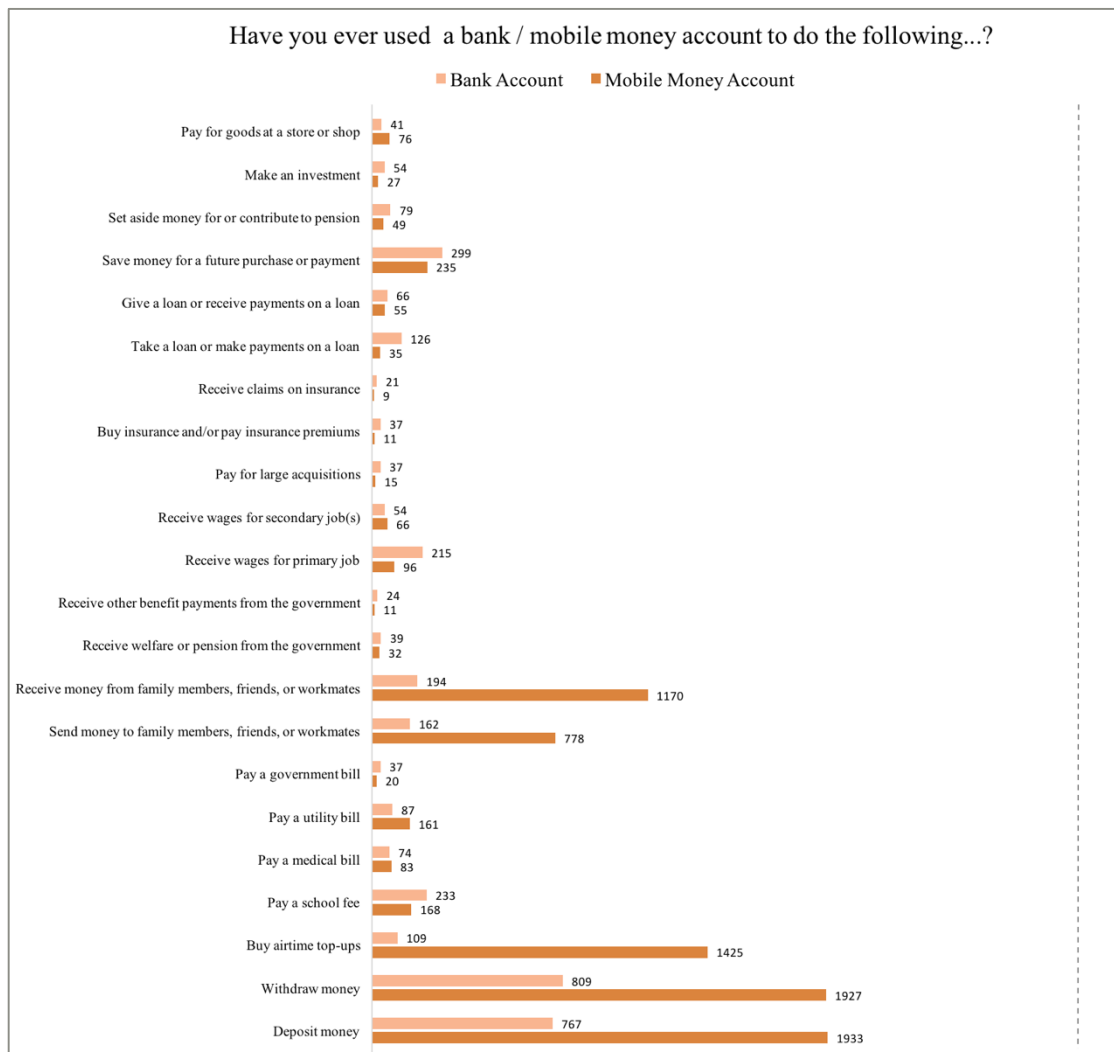


Figure 5

5.2 RELATIONSHIP BETWEEN CONFLICT AND ACCOUNT USE

First of all, I run a cross-sectional regression to see whether the difference in rates of mobile money adoption could be explained by different levels of conflict across counties. The regression returned a p-value of 0.057 associated with the Conflict Measure, suggesting a negative relationship between violence and the rate of mobile money adoption as would be intuitively expected. However, there is a serious endogeneity problem that limits the import of these results. There are many factors

besides different levels of violence across counties that could account for variation in mobile money adoption, meaning that the estimation is subject to bias from omitted variables such as income, population density, existing infrastructure and time of implementation of mobile money services. Furthermore, there is a problem of two-way causality if we acknowledge poverty to be a cause of both violence and low financial inclusion.

To help mitigate these issues, I take the change in the average measure of financial activity for each county as the dependent variable. A significant relationship between a change in the number of conflict events and a change in the average number of deposits or withdrawals, while still not accounting for what could have also changed within a county, is not seriously undermined by county-level heterogeneity in income.

Mobile Money Account Activity vs. Conflict Measure B

VARIABLES	(1) Δ Deposits	(2) Δ Withdrawals
Δ Conflict Measure	-0.0769 (0.107)	-0.0773 (0.112)
Constant	-2.270 (1.410)	-2.289 (1.478)
Observations	47	47
R-squared	0.011	0.010
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 1

According to Blumenstock et al.'s simple model, an increase in violence, which they assume corresponds to an increase in expectations of future violence, should decrease a household's incentive to save, borrow and lend (see Section 2.4 for more

detail). The reason the financial system exists is so that people can make intertemporal economic decisions. Theoretically, since they affect households' beliefs about whether they will be in a position to benefit from the financial decisions they make now, conflict and instability hinder the development of the financial sector. According to my interpretation, this hypothesis should play out in the data as follows: an increase in violence leads to a decrease in deposits and an increase in withdrawals. However, taking into account the theoretical results summarized in Proposition 1, there is reason to expect that bank account savings may increase with violence exposure.

The results from the first round of regressions are summarized in Table 1. Conflict appears to have an impact neither on the amount of deposits into mobile money accounts nor the number of withdrawals from mobile money accounts. However, the change in Conflict Measure B is significant at the 10% level when asked to explain the variation in bank account deposits. Contrary to Blumenstock et al.'s findings,

Bank Account Activity vs. Conflict Measure B

VARIABLES	(3) Δ Deposits	(4) Δ Withdrawals
Δ Conflict Measure	0.0215* (0.0127)	-0.0133 (0.0322)
Constant	0.253 (0.168)	-0.119 (0.426)
Observations	47	47
R-squared	0.060	0.004

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2

higher levels of conflicts in Kenya are in fact correlated with more frequent use of a formal savings mechanism. Typically, as seen in Section 5.1, Kenyans use bank accounts to invest, save and borrow, whereas they use mobile money accounts to shop and send money to family and friends. This result supports the hypothesis outlined by the two-asset model, where an increase in violence expectations – specifically, expectations that households could lose their more liquid savings to theft or emergency – would spur an increase in bank account savings.

Mobile Money Account Activity vs. Conflict Measure A

VARIABLES	(5) Δ Deposits	(6) Δ Withdrawals
Δ Conflict Measure	-0.0314 (0.131)	-0.0978 (0.136)
Constant	-2.070 (1.522)	-2.481 (1.588)
Observations	47	47
R-squared	0.001	0.011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3

Using Conflict Measure A, which counts conflict events during a period of six months prior to the survey date, both regressions returns insignificant results with respect to mobile money account activity. However, corroborating the evidence in Table 2, Conflict Measure B has explanatory power with respect to the change in bank account deposits. Once again, an increase in conflict corresponds to an increase in bank deposits in a given county. Furthermore, according to the results in Table 4, the change in conflict explains about 15% of the variation in the change in bank deposits. It should

be noted that both Conflict Measures retain their significance in explaining the change in bank deposits when robust standard errors are used.

Bank Account Activity vs. Conflict Measure A

VARIABLES	(7) Δ Deposits	(8) Δ Withdrawals
Δ Conflict Measure	0.0415*** (0.0147)	-0.00976 (0.0393)
Constant	0.391** (0.171)	-0.110 (0.458)
Observations	47	47
R-squared	0.151	0.001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4

6. CONCLUSION

Blumenstock et al.'s model uses a perceived decrease in the probability of survival as the only mechanism via which conflict affects individual behavior. According to their theoretical and empirical results, the decrease in the probability that an individual will be able to convert savings into consumption leads to a decrease in savings. I discuss a few possible reasons, rooted in differences in the political situations as well as a more nuanced interpretation of how expectations of violence affect beliefs about the future, for why the opposite effect is found in the Kenyan survey data. One explanation is the precautionary saving motive. Instability causes people to want to store their money in a safer place, and they may be more willing to accept the fees and liquidity constraints associated with saving with a formal

institution. When accounting for degrees of risk, or differentiating between risk of loss of life and theft as proposed in my variation of the model, we can discern preferences for savings instruments.

All-in-all, I find evidence that exposure to violence actually increases the average number of deposits into bank accounts. The data do not yield any firm results regarding the effect on mobile money account use. It may, therefore, be more beneficial to focus on expanding access to bank accounts or the formalization of mobile money services in areas with high levels of violence instead of relying on the widespread adoption of mobile money accounts in Kenya. To improve upon the outcomes of this research, better data – sourced directly from mobile money companies, were they willing to provide such financial histories to researchers – would be the most beneficial addition. An avenue for further research could be incorporating changes in risk preferences, or other behavioural insights regarding the effects of experiencing violence, into a theoretical model of savings decisions in the presence or aftermath of conflict. For instance, the precautionary saving motive may dominate even when the perceived probability of survival is low if individuals are very risk-averse. In Blumenstock et al., individuals are thought to throw all caution to the wind when they expect to be affected by violence. In light of this paper's findings, it is not clear that individuals react to conflict by consuming more today and saving less for the future. There is a need for a more thorough understanding of the impact of violence on economic decision-making, as war continues to be an everyday reality, and safety a concern, for households in many of the poorest countries of the world. There is a strong, two-way causal relationship between conflict and failures in development, and there should be no end to the attention paid or resources devoted to finding answers to these questions.

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