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Causes and Consequences of Civil Strife

Micro-Level Evidence from Uganda

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Abstract

To bridge the gap between case studies and highly aggregate cross-country analyses of civil unrest, Deininger uses data from Uganda to explore determinants of civil strife (as contrasted to theft and physical violence) at the community level, as well as the potentially differential impact of these variables on investment and nonagricultural enterprise formation at the household level. He finds that distance from infrastructure (a proxy for scarcity of economic opportunities and government investment), asset inequality (social tension), the presence of cash crops (expropriable wealth), and lower levels of human capital (ability to take advantage of opportunities in the "regular" economy) all increase the propensity for civil strife. Furthermore, civil strife, in marked contrast to violence and theft, reduces investment and nonagricultural enterprise start-ups.

Causes and consequences of civil strife:

Micro-level evidence from Uganda[1]

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World Bank

Causes and consequences of civil strife:

The case of Uganda

1. Introduction

Ethnic diversity, war, and civil conflict have recently been "re-discovered" by economists as important determinants of economic outcomes and overall development (Stewart 2000). One of the key reasons is that it is now realized that "state failure" or weakness, often brought about by civil unrest, can be an important impediment to social and economic development. However, empirical support for the relevance of these factors largely rests on cross-country regressions which generally provide insufficient detail on the factors at work in order to support policy conclusions. Limitations of data-availability and -quality are of particular relevance for crisis-torn states in Africa where dealing with this phenomenon is of particular urgency. In-depth analysis of the factors causing civil strife, the scope for policies to prevent it, and the potential economic consequences of this phenomenon in Africa would be of great importance.

In this paper we use micro-data for Uganda to explore causes of civil conflict in an attempt to gain insight into both causes and economic consequences of civil strife. We use a stylized model that assumes that rebels decide whether or not to initiate activity in a given community based on the potential tax revenue, the pre-existing level of "resistance", the presence of economic infrastructure, and the wage rate they need to offer to potential recruits. Based on these parameters, individuals decide on whether or not to join the rebels and, subsequent to receiving their income for the period, make decisions on investment. Even though the model requires an abstraction from the complex history of armed struggle in Uganda and the intricacies of changing coalitions, it provides policy-relevant predictions that can be tested empirically.

For example, the model implies that rebel activity will be higher in areas with high levels of pre-existing grievance, a high level of assets that can be taxed easily, limited alternative economic opportunities as proxied by a lack of infrastructure, and availability of a large pool of uneducated potential recruits. Also, since individuals' investment decisions are affected by the presence of civil strife, our model predicts that communities with higher levels of civil strife will be characterized by lower investment and a lower level of non-agricultural business startups, factors that are often assumed to be crucial for broader economic growth.

These predictions are tested with community-level and household level data from Uganda spanning the 1992-2000 period which include information on the incidence of civil strife (as well as physical violence and theft) and possible determinants of these phenomena at the community level. This allows to probe for determinants of these phenomena and, by using the panel element of the data, changes over time. Replicating the cross-sectional regressions regarding incidence of civil strife performed in most of the cross-country literature confirms the basic validity of the model. Lack of human capital, presence of taxable and immobile wealth, infrastructure access, and to some extent ethnic fractionalization, emerge as the main factors contributing to higher levels of civil strife. Use of the panel element in a subset of the communities, and exploration of factors leading to increases in the incidence of civil strife, confirms the validity of this finding but also points towards strong persistence of conflict over time, a clear conflict-reducing impact of government provision of infrastructure, and a strong role of households' perceptions.

This overall finding, as well as the quantitative magnitude of the estimated coefficients, suggest that, somewhat contrary to traditional models that focus on "greed" as a key determinant of civil strife, lack of economic development is a key factor that increases the incidence of civil strife, contrary to what is found for theft and physical violence. Government policies to raise the opportunity cost of labor e.g. by improving education and infrastructure would have a clear negative impact on the propensity towards civil strife, in addition to their direct economic benefits.

A second and related question that has been difficult to address with aggregate data relates to the economic impact of civil conflict. Our model predicts that, by reducing households' investment and their diversification into non-farm businesses, civil strife would have a decidedly negative impact on an economy's growth performance. This is confirmed by the data at hand, both at the individual and the community level. In addition to standard factors including household characteristics such as initial human and physical capital endowments, civil strife (again in contrast to theft and physical violence) emerges as a significant impediment to investment that is of significant magnitude. Moreover, in line with the hypothesis that violence will bias individual producers and the economy as a whole towards subsistence and against activities that require integration into broader markets, we find that presence of civil strife reduces the propensity to start up new enterprises and makes it more likely that those which had already been established go out of business.

These results support the view that, in Uganda as well as other African countries that have successfully emerged from a long period of conflict, politically motivated internal violence continues to pose a danger to sustained economic recovery. The scope for persistence of civil conflict imply that failure to contain such violence may well lead to a downward spiral whereby, in some areas, lack of economic development and productive infrastructure increase the propensity towards violence which in turn increase the region's attractiveness for rebel activity and recruitment, providing further disincentives to investment and broader economic growth.

The paper is structured as follows: Section two reviews the literature, provides a conceptual model, discusses definitions and sources of data, as well as a number of descriptive statistics. The empirical approach is discussed in section three. Section four discusses the results obtained and some possible implications. Section five concludes by highlighting some avenues for further research.

2. Literature, conceptual background, and descriptive statistics

Determinants of violence and its impact on economic variables have recently become of increased interest in both the theoretical and empirical literature. Two questions are of central relevance in this context. One is how to define civil strife, as distinct from other forms of violence. This includes an assessment of the extent to which civil strife responds to economic incentives and thus may be amenable to government policies aiming to reduce its incidence. A second question is to what extent civil strife is of economic relevance and how its impact on economic behavior can be identified at more disaggregate levels of analysis than have been applied in the past, not only at the aggregate but also at the household level. Uganda is of interest in this respect not only because of its long history of civil conflict but primarily because the availability of household data allows us to develop indicators for the incidence of violence at lower levels of aggregation that provide a basis for more specific answers to these questions.

2.1 Review of the literature

The economic profession has recently not only re-emphasized the importance of institutions (e.g. Aron 2000) but also re-discovered civil conflict, violence and crime as factors that may have important repercussions on economic growth. One strand of the literature focuses on determinants and impact of personal crime, focusing on causes such as inequality in the distribution of resources, the possible impact of government deterrence efforts, and the broader economic relevance of these phenomena (see Lederman et al, 1998; Bourguignon 1999; Gavirira 2000). A second strand emphasized internal wars and civil strife, a category of conflicts that appears to be particularly endemic in poor African countries, with potentially very negative consequences for economic growth. To this date, most of the literature in the second category has focused on indicators of violence at the national level such as these by Singer and Small (1994) which may be appropriate from a political science perspective but can be improved upon considerably from an economic point of view.[2]

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[2] Singer and Small define conflicts as a civil war if (i) at least one of the parties involved is the national government; (ii) there is some harm inflicted on the stronger forces (at least 5% of the fatalities suffered by the weaker forces); (iii) there are at least 1,000 battle-related deaths, and

In this second context, the literature has identified three key variables affecting the incidence of civil war, namely (i) the conflict technology; (ii) the value of the prize, i.e. the amount of resources that are associated with "winning" the conflict and which could then be used to sustain fighting; and (iii) the presence of non-economic factors such as tribal identities, historical injustices, and ideologies that can to motivate fighters, thereby reducing the cost of continuing conflict on either side. Contributions to the theoretical literature have used these parameters to provide a general model of civil conflict and predict conditions under which different outcomes will be observed in practice, to distinguish between central and decentralized rulers, when rebellions are likely to occur, and to highlight when it is likely that "victory" by one party will end a conflict rather than have it continue to linger under the surface, and what factors can reduce the risk of a re-ignition of conflict after a truce had been established (Bigombe et al. 2000; Grossman 1991 and 2001; Kuran 1993, Horowitz 1993).

Concerning the impact of violence, four possible channels through which civil strife might affect economic outcomes have traditionally been identified. First, and most immediately, there is destruction of private and public physical capital such as factories, roads, and other assets. Through reduced capital formation as well as diversion of scarce resources from more productive activities, these factors would contribute to a direct decline in output (Bourguignon 1999; Skaperdas 1992). A second factor is that, by contributing to social disorder and promoting the destruction of social capital, civil strife is likely to increase the transaction costs involved in economic exchange, thereby either forcing households into greater autarky or reducing the size of trading networks. This often leads to a shift of economic activity from "war vulnerable" to "war invulnerable" sectors (Collier, 1999). Third, at a more aggregate level, the insecurity that goes along with civil strife leads to dis-investment or diversion and expatriation of assets by private households (Collier et al. 2001). Finally, to the extent that government will have to spend resources to deal with internal uprising, doing so will divert public spending from activities such as

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(iv) the war is internal to the country, i.e. excluding a country and dependent territories. This definition limits the scope for analyzing variation in the incidence of violence within one country.

education and the provision of infrastructure which directly enhance the economy's capital stock towards relatively unproductive purposes such as maintaining armies and procuring weaponry.

While the conceptual basis for these relationships is relatively straightforward, empirical work has been constrained by the problem of finding appropriate proxies for the variables of interest and the limited scope to account for possible interactions.[3] The most comprehensive empirical model to date combines three factors, namely (i) economic or "greed" factors such as the presence and size of primary exports, population density, and the availability of a financially potent diaspora that can finance the sustenance of at least one of the warring parties; (ii) social factors causing "grievance" or making it easier to feel and express grievance such as ethnic dominance, social fractionalization, demography, and inequality in the access to resources; and (iii) factors relating to "conflict technology" or "cost" in the widest sense (Collier and Hoeffler, 2000). Estimation of such models at the cross-country level suggests that all three categories are relevant but that "greed" and the desire to appropriate economic resources appears to be a key element underlying the majority of civil wars. The explanation is that, of the "grievance"-related variables, only ethnic dominance turns out to be relevant. If true, this would imply that there is little in terms of outside intervention that can be done to reduce the scope for civil conflict, in particular that efforts to promote economic development through measures such as better access to markets and infrastructure would appear rather futile.

A major concern regarding cross-country regressions is that the number of variables that can be considered is limited and that many of those available are likely to suffer from endogeneity and prone to mis-specification to the extent that many country-specific variables that are of relevance (and correlated with other regressors) may in fact be unobservable (e.g. Durlauf and Quah, 1999). One example would be country policies or historical factors. To the extent that these variables do not vary over time, fixed effect estimators could in principle be used to deal with the problem but are limited by two other factors. First, many of the variables hypothesized to cause civil strife (e.g. rich endowments with mineral resources,

lack of infrastructure, and ethnic diversions) are also time-invariant or change only very slowly over time and may thus not easily be distinguished from country level fixed effects. Secondly, even then, cross-country time series data are still relatively rare, especially for (African) countries and for "non-standard" factors such as violence. In fact, countries with high incidence of civil strife are normally also characterized by lack of data or by notoriously bad quality of whatever data might be available.

A second issue that is of great importance, especially if the goal is to ascertain the impacts of civil strife, is the potential for reverse causation. To take one example, low secondary enrollment is at least as likely to be a cause as it is a consequence of civil strife (e.g. because schools have been destroyed, teachers are absent or have been prohibited to teach, and the expected returns to acquiring education in a war-like environment are low). The same is true for low investment and GDP growth, and, to a lesser degree, even an economy's dependence on primary exports. While time series data of sufficiently high frequency would allow to distinguish between the two (as in Asteriou and Siriopoulos, 2000), these are rarely available in practice. It is of interest that, in cross-country regressions dealing with this question, deleting one or two influential observations can completely change the nature of the results obtained, especially insofar as Africa is concerned (Arcand et al, 2000). This has led scholars to exhibit considerable skepticism with regard to results from cross-country regressions. Case studies can normally provide an adequate *description* of the main issues, but are often not sufficiently detailed to allow generalization of the conclusions.

Both of these problems have not only limited the policy relevance of existing research but also given rise to the argument that existing data sets are insufficient to facilitate the in-depth analysis that would be needed to support more far-reaching policy conclusions, especially for Africa (Herbst 2000; Ali 2000). It is therefore of interest to assess the extent to which existing results from cross-country analysis hold up to the more rigorous scrutiny that is possible within individual countries and there is general agreement that data at a lower level of aggregation would be desirable (e.g. Dreze and Reetika 2000). We use a similar

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[3] In existing models, potential non-linearities, which may arise from increasing returns to military activity (e.g. Gaviria, 2000) or from

approach, looking first at the variation in levels of civil strife across communities within the same country. One advantage of doing so is that, since the policy regime is the same throughout the country by definition, a large set of possibly influential factors that are generally unobservable in cross-country regressions, is eliminated even if cross-sectional estimation is used. Second, availability of two or more observations per community further allows us to explore determinants of changes in the incidence of civil strife over time, thereby providing a more rigorous test of the underlying model. In addition, our data allow to have a more precise definition of the variables of interest, e.g. by distinguishing civil strife from other forms of physical violence and theft, and by identifying more precisely the nature and magnitude of government interventions, e.g. in the provision of public goods. Finally, by linking indicators of civil strife to household level information from the same communities, we can measure the impact of civil strife on investment and economic diversification at the household level where the variables discussed earlier are clearly exogenous.

2.2 Uganda: Historical background and relevance

Uganda, a landlocked country with a 2000 population of about 21 million, is of interest for our topic in a number of respects. First, it is characterized by ethnic, linguistic, and religious divisions that are deeply rooted in colonial history. The country is home to 53 officially recognized ethnic groups and inhabitants of different regions speak languages that are completely incomprehensible to each other. Economic disparities between the North, traditionally in control of the army, and the South and West, whose population generally enjoyed greater material wealth, run partly along similar lines. Ethnic affiliations which continue to be of relevance for a wide range of household decisions and external conflicts in other African countries such as in Sudan and more recently in the Congo, appear to have had a significant impact on the regional incidence of violence.

Political violence is deeply rooted in the country's history. Following independence in 1962, the government became increasingly authoritarian and, in the late 1960s, politically motivated riots and

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asymmetric investor behavior (Collier, 1999), are generally dealt with by including squares of the parameters of interest.

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mutinies led to the death of about 2,500 people. From 1970 to 1986, under the governments of Idi Amin (1971-79), Milton Obote (1980-85), and a subsequent military interlude, between 800,000 and 1,000,000 individuals (or more than 5% of the total population) are estimated to have been killed in state terror, civil strife, and ethnically motivated assaults (Klugman et al. 1999). When the government of Yoweri Museweni came to power in 1986, it managed to establish a more integrative political regime, to repatriate some of the Asians that had been expelled during Amin's "Economic War", and to compensate for the precipitous drop of GDP with growth rates which, at about 7%, were among the highest in Africa. At the same time, politically motivated conflict, partly sponsored by outsiders, continued in parts of the North and has, more recently, also erupted in the West. Existing models would predict that, in view of the long history of conflict, the risk of renewed violence remains high (Collier, 2000; Elbadawi and Sambanis 2000). Before turning to this issue and a description of the data used for our empirical analysis, we briefly characterize the underlying conceptual model. Indeed, it will be of interest to see how civil unrest has affected economic activity at the household level during the 1990s.

2.3 Conceptual model

The key difference between our analysis and those that are available in the literature is that we analyze determinants of conflict at the community level and resort to a model of household-level decision-making to motivate the investigation of the impact of civil strife. We assume that rebels' decision to conduct civil strife in a given community is mainly motivated by the revenue that can be obtained from explicit or implicit taxation of the local populace. The magnitude of such revenue and thus the incentive to initiate rebel activity, will depend on community characteristics determining the size of the tax revenue that can be obtained. Individuals respond to rebels' imposition of taxes by reducing investment or, in extreme cases, outmigration. Assuming that rebels' forces and physical assets are immobile and location-specific, whereas labor is mobile, yields estimable reduced form equations for the determinants and the impact of civil strife which we will explore in more detail in the empirical part of the paper.

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Let economic agents be endowed with a stock of human capital E as well as physical assets A. They can allocate their labor endowment (set equal to 1 without loss of generality) either to productive activities (l_P) or to participation in rebel activities (l_R) so that $l_R + l_P = 1$. Wages in the productive sector depend on A and E according to a function $w_P (A, E)$ with positive first derivatives, i.e. $\frac{\partial w_P}{\partial A} > 0$ and $\frac{\partial w_P}{\partial E} > 0$. It is immediate that, in order to have individuals devote time to rebellion, i.e. to have $l_R > 0$, they have to be offered a wage that is at least equal to what they could obtain in independent productive activity.

To understand the rebels' problem, note that communities are characterized by a public good endowment G and a pre-existing level of cleavage or grievance such as ethnic fractionalization or social problems and grievances C. Rebel forces select communities that provide them with a "sufficient" economic base, i.e. allow them to finance themselves by imposing a tax t on the amount of assets available in the community.[4] To be able to enforce this tax, it is necessary to maintain a certain fraction n of people employed by the rebel forces (fighters, informants, or other agents) in the community. We assume that $n = n(G, C)$ with $\frac{\partial n}{\partial G} > 0$ and $\frac{\partial n}{\partial C} < 0$. The sign of the first partial derivative arises from the fact that better infrastructure makes it more difficult to hide from government forces and increases asset owners' ability to take preventive measures to avoid taxation, e.g. by deploying guards. The second partial derivative is justified by the fact that higher levels of pre-existing grievance will pre-dispose community members towards collaboration with rebels, therefore reducing the cost of initiating and sustaining violence for the latter.[5]

From individual households' contemporaneous utility maximization, it is immediate that, to attract the necessary labor force, rebels will have to set the wage paid to their recruits w_R, at least equal to w_P, the competitive wage in the rest of the economy. Also, since the wage needed for recruitment into the rebels' forces depends on physical and human capital assets $w_R (A, E)$, the rebels will always chose to recruit

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[4] To keep the discussion simple, we abstract from other sources of revenue, e.g. mining of diamonds in Congo, which would allow the rebels to cross-subsidize their operations in specific locations which strategically or otherwise be of importance. It is easily seen that, by introducing a fixed term into equation (1), this will neither affect the rebel group's marginal decision nor the substantive conclusions of the model.
[5] To illustrate, one can think that with higher levels of grievance, rebels would be able to sustain a given level of warfare with a lower number of combatants or collaborators.

households with endowments at the bottom of the distribution, i.e. with levels of assets and education A_B, E_B.[6] Taking these elements together, we note that, in any community i with public good endowment G_i, a level of pre-existing conflict C_i, and average asset level $\overline{A}_i$, the rebels' profit π_R will be given by

$$(1)\ \pi_R\ (\overline{A}, G, C, A_B, E_B) = t\overline{A} - n(G, C)\ w_R\ (A_B, E_B).$$

where the subscript i has been suppressed for notational clarity. In light of the above, it is not difficult to show that these profits will increase in the average asset endowment, $\frac{\partial \pi_R}{\partial \overline{A}_i} > 0$, decrease with higher levels of infrastructure $\frac{\partial \pi_R}{\partial G} < 0$, and with the lowest income groups' endowments of assets as well as education $\frac{\partial \pi_R}{\partial A_B} < 0, \frac{\partial \pi_R}{\partial E_B} < 0$. We require that, in each of the communities, the rebels' activities are at least self-financing, i.e. $\pi_R \geq 0$.[7]

These predictions can be tested in a reduced form framework where, for every community i, the incidence of rebel activity R_i will depend (positively) on the mean level of assets $\overline{A}_i$, the presence of infrastructure G_i (negative), the level of pre-existing grievances C_i (positively), the mean endowment with education E_i (negative), and equality of asset distribution A_{Bi} (negative).[8]

$$(2)\ R_i = f(C_i,\ G_i,\ \overline{A}_i,\ E_i,\ A_{Bi})$$

This equation can not only be implemented with existing data but, if confirmed empirically, has also clear implications for government policy that go far beyond the role that has accorded to such intervention by traditional "greed" models. If the predicted relationships and signs were confirmed, measures to improve access to infrastructure and ensure that the poor enjoy adequate education would be important to reduce the risk of civil conflict, in addition to the more direct economic benefits that can be expected from them.

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[6] Again, we abstract from the possibility of dominating a community completely based on imported mercenaries on the grounds that at least some local presence will be required.

[7] While this can be relaxed, thereby allowing rebels to cross-subsidize, doing so would require a more detailed model of rebels' internal decision-making process, something on which very little is known at present.

[8] While some of the literature uses enrollments, this variable is likely to be highly endogenous and, especially at the country level, affected by the presence of civil strife.

Having specified the factors determining rebel activity at the community level, we shift to households' reaction to such taxation. As indicated earlier, households take their endowment of human capital as given and receive a full income of $Y_t = l_R w_R (A, E) + l_P w_P (A, E) + [r-t(S)] A_t$ where S is a 0/1 dummy indicating rebel presence in the community and $t(0) = 0$ while $t(1) = t$, i.e. a tax will have to be paid only if there is rebel activity. Based on the income received at point t, the household chooses c_t and I_t, consumption and investment, to maximize the value function $V_t (Y_t)= c_t - I_t + \beta V_{t+1} (Y_{t+1})$. There are thus two ways in which rebel activity will affect the equilibrium level of investment. On the one hand, households living in areas with rebel activity obtain lower total income since they have to pay taxes on their asset endowment. In addition, under the assumption of persistence over time, i.e. that rebel activity will continue in the future, the return to assets received will also be lower due to the expectation of future taxation. Both imply that $\frac{\partial I}{\partial S} < 0$, i.e. that rebel activity will reduce investment. Substituting back the factors that have been shown to affect rebel activity earlier provides the basis for a second reduced form equation for household level investment.

$$(3) \quad I_i = f(C_i, G_i, \overline{A}_i, E_i, A_{Bi})$$

where I_i is the level of investment at the household level and the remainder of the variables are as defined earlier. The intuition is clear – we expect that civil strife would decrease households' incentive to invest, thus reducing capital accumulation, establishment of new enterprises, diversification of the economy, and overall economic growth.

2.4 Data, definitions, and descriptive statistics

To test the hypotheses discussed above, we use community- and household-level information from two large household surveys, the 1999/2000 Uganda National Household Survey (UNHS) and the 1992 Uganda Integrated Household Survey (IHS). Both surveys include household as well as community

information on slightly less than 10,000 households in about 1000 communities each.[9] More importantly, about 370 communities were visited in both periods, allowing us to have a moderately sized panel of communities that can be used to make inferences on changes in the variables of interest. We first focus on the dependent variables, civil strife and measures of households' investment behavior, before turning to the right hand side variables.

Information on whether households were affected by *civil strife*, theft, and violent attacks, was collected in the UNHS for 1999 and for 1992 retrospectively. In line with the literature which uses different definitions to distinguish civil strife from violence directed at specific persons (Singer and Small 1994), enumerators were instructed to differentiate between civil strife and other forms of violence using two characteristics. On the one hand, civil strife is primarily addressed at groups rather than individuals. Furthermore, the main motive for civil strife is normally not individual economic gain even though economic factors at the group level may play a role.[10] The information thus collected was used to construct two variables measuring the incidence of civil strife, theft, and physical attacks. The first is a simple 0/1 dummy indicating whether a community is affected by civil strife, theft, or attacks implying that the incidents in question is reported by at least one household in the sample without making reference to how widespread it was. The second measure uses the share of households in any community who reported to have been affected by civil strife, attacks, or theft.[11]

To measure households' *investment* behavior we rely on two indicators. The first one is the increase in enterprise assets, defined to include agricultural assets, structures, and transport equipment but excluding household durables and other consumer goods. This is based on questions on current endowments and the

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[9] For purposes here we take enumeration areas as a "community". This is certainly justified in the large majority of cases (especially in rural areas) where enumeration areas correspond to natural villages.

[10] The phrasing of the three questions was as follows: (i) "Has your production of crops/cattle or livestock rearing/trading activities been harmed by civil strife over the last 12 months?"; (ii) "How many incidents of theft of property has the household suffered in the last 12 months?"; and "How many incidents of physical attacks on members of the household have there been over the last 12 months?". In the interviewer training, it was highlighted that civil strife refers to violence that is not directed at any specific person but rather at a group. All of the questions were asked retrospectively for 1992 as well. Based on this information we classify a community as affected by civil strife, theft, or attacks, if it is reported by at least one household.

[11] Unfortunately, the survey does not contain information on the magnitude of the damage inflicted on individual households, something that would have allowed to measure the severity of violence in a given location.

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amount owned in 1992 of 20 categories of such assets included in the survey.[12] A second variable of interest, especially in an agrarian economy such as Uganda, is whether the household expanded and/or initiated non-farm economic activities during the period under concern. This variable, which was defined as the household having spent time and received income from an own non-farm and non-livestock enterprise, allows to test the extent to which civil strife affects processes of economic diversification. It corresponds directly to the hypothesis advanced by Collier (1999) that civil strife leads to a shift of economic activity towards subsistence and autarky which are relatively less sensitive or vulnerable to the disruptions caused by such strife. To the extent that, in agrarian African economies, growth in off-farm investment is generally viewed as a critical pre-condition for broader growth (Reardon *et al.* 2001), such a shift of the asset and activity portfolio towards subsistence could be associated with a significant reduction in the growth potential.

Definitions of other right-hand side variables are reported below. To proxy for the level and inequality of education (E) and asset ownership (A), we use the mean level of schooling for household members above 15 years of age as well as their initial asset endowments, as discussed above. The distribution of assets is measured as the log deviation of asset ownership within each of the communities under concern. In addition, whether or not coffee or cotton are grown in a particular area is taken as a proxy for taxable or expropriable wealth in the short to medium term.[13] Although cash crops may not be suitable to sustain rebels during prolonged periods of civil conflict, they are relatively immobile and can be established only in regions with certain agro-climatic characteristics, thus being less subject to problems of endogeneity than other variables that might be used to proxy for pre-existing wealth.

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[12] As it was impossible to obtain precise retrospective information on the value of each of the assets, respondents were asked to provide a qualitative rank for the value of the asset in question in 1992. Based on experience in the field, the 5 rankings (about equal, somewhat more, somewhat less, none, and much more) were transformed into percentage increases (0, + 25%, -25%, -100%, + 50%) to be able to obtain the value of assets in 1992.

[13] As rightly pointed out by an anonymous reviewer, coffee is quite different from taxable mineral wealth (e.g. diamonds) on which insurgencies can easily thrive insofar as it is a relatively bulky and will easily degenerate into bush if not properly tended. To the extent that what is observed during the period under concern is not a full-scale guerilla war but rather incidents of violence and other forms of conflict, using this variable, together with asset endowments, as a measure for resource availability, is still defensible. Note that cotton, which requires higher levels of purchased inputs, is even less able to provide even temporary sustenance to the participants in civil conflict and would therefore be expected to be of much lower significance than coffee.

Availability of infrastructure (G) is measured differently in the static and the dynamic model. In the former, we use the distance to the next municipality, expressed in hours of travel time using the most common means of transport. This variable also proxies physio-geographic conditions such as ruggedness of the terrain or forest cover which, as pointed out in the literature, can make it easier for rebels to operate. To measure changes over time in the availability of infrastructure, we include information on whether or not a road was constructed during the last 4 years within 50 km of the community, an intervention that is clearly exogenous to the individual household.

Proxies for pre-existing grievances (C) are also constructed in two number of ways. First, in line with the literature, we use an index of ethnic fractionalization from the percentage share of population belonging to the four most important ethnic groups.[14] A second measure is the perception (as derived from the community survey) on the most pressing problem preventing development in the community. While the large majority of communities pointed towards specific issues (e.g. market access, schooling, health, agricultural technology), about one fourth of communities mentioned pervasive poverty as the key issue, pointing towards a generalized feeling of destitution and lack of perspective in the community which is likely to make it easier for rebels to obtain recruits.

Descriptive statistics on the incidence of civil strife, theft, and attacks, at the community level, are presented in table 1. Surprisingly, the share of households who were affected by civil strife increased during the 1992-99 period, from 5.9% to 9.7%. This is in line with an increase in the share of communities from which such activity is reported from 38% in 1992 to 69% in 1999/2000. Regional disaggregation illustrates that the increase was particularly pronounced in the West where the share of households suffering from civil strife more than doubled, from 5.5% to 12.4%, reaching almost the level of the North (13%) which shows a more modest increase from 9.6% since 1992. While the Center is consistently characterized by the lowest incidence of civil strife (4.3% and 2.5%) in both perods, it is

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[14] Data on ethnicity are available only at the community level, preventing us from performing further and more disaggregated analysis (e.g. by differentiating between households who had been born in the locality and those who migrated in subsequently). The information given is the share of the population that belongs to the four most important ethnic groups i, E_i. Summing E_i^2 for all i, subtracting it from 1, and normalizing the result so that all values fall between 0 and 1 gives the measure used in the analysis.

remarkable that even there the incidence of conflict has increased. Similar increases are also reported for the incidence of thefts (from 8.5% to 14.7%) and violent attacks (from 2.6% to 4.2%). Even though both are highest in the North, theft is also quite high in the Central region and personal attacks in the East. This provides some support for the notion that these variables measure in fact different phenomena.

Other variables of interest are the total value of assets, measured in constant 1999 US $ equivalents as well as the share of communities where coffee or cotton are grown. The mean value of assets at the community level increased by about 40% in real terms during the period. It is lowest in the North where, in 1992, it was less than one third of the national average, followed by the East, the Center and the West. At the same time, the estimated increase in mean asset levels for the North was quite high, from the equivalent of US $ 550 to US $ 1144. Most likely as a response to increasing coffee prices during the period, the share of communities where coffee is grown has more than doubled between the two periods, from about 14% to about 33%. While coffee production remains negligible in the North, about one fourth of communities in the West and the East and almost two thirds in the Center reported, in 1999, cultivation of this commodity, up from 15%, 10%, and 26%, respectively. By contrast, the share of communities growing cotton has remained virtually stagnant, with a slight decline in the West offset by a modest increase (from 8% to 12%) in the Northern part of the country.

3. Estimation strategy

This section describes the estimation strategy for determinants of levels as well as, using changes in the variables of interest, increases in the level of civil strife at the community level. In addition, we discuss the methodology for measuring the impact of civil strife on household level investment and enterprise start-up decisions.

3.1 Determinants of civil strife

The earlier discussion leads us to model the probability of civil strife in any community as a function of the parameters $\overline{A}$, G, C, A_B, E_B, i.e. mean level of assets, infrastructure, grievances, and the distribution of

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human as well as physical capital in a community. To do so empirically, we define a vector of mean household level characteristics X_i as well as community level variables Z_i that correspond to the parameters discussed above. Adding an error term allows to estimate a cross-sectional equation for the incidence of civil strife as follows.

$$(4) \quad S_i = \alpha + \beta X_i + \delta Z_i + \varepsilon_i$$

Pooling the observations from 1992 and 1999/2000 allows us to test for structural changes in the contribution of some of the right hand side variables by interacting them with a year dummy. In a similar manner, we explore whether, after controlling for other factors, there has been a net increase in civil strife either in the aggregate or for specific regions of the country.

Although estimation of this relationship within a given country will avoid many of the issues associated with unobservable policy factors in cross-country regressions, cross sectional estimates are still likely to omit unobservable factors (e.g. households' party affiliations or historical incidents) which might affect the level of civil strife. To deal with this and at the same time use the availability of two observations per community in part of our data we complement this with an estimation of determinants of changes in the incidence of civil strife according to

$$(5) \quad \Delta S_i = \beta' (X_{it} - X_{it-1}) + \delta' (Z_{it} - Z_{it-1}) + \gamma S_{it-1} + \varepsilon_{it}$$

where ΔS_i is the change in the incidence of civil strife in community i between the two periods, S_{it-1} is the level of such conflict in the same community during the initial period, and the expressions in brackets are changes in the independent variables. Under the condition that one can find variables the change of which is exogenous to the community, this can be estimated using standard techniques.[15] Specifically, we will estimate a probit equation with an indicator for increases in the level of civil strife as the dependent variable and changes of the variables discussed earlier on the right hand side.

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[15] Note that changes in education will be endogenous because households decide whether or not children stay in school. Also, with high levels of decentralization, even supply of schooling infrastructure can no longer be considered completely exogenous, contrary to, for example, roads.. Similarly, changes in movable asset endowments are likely to be endogenous and can thus not be used as a right-hand side variable.

3.2 The economic impact of civil strife

The prediction that civil strife would, by imposing a tax t on all assets in the community, reduce incentives for investment and enterprise startups, is testable with available data. To do so, let A_{jt} be the asset stock held by household j (in community i) in period t. Then households' investment, $A_{jit} - A_{jit-1}$, can be regressed against a set of exogenous variables and initial conditions similar to equation (3) above.

$$(6) \quad A_{jit} - A_{jit-1} = \beta X_{jt-1} + \gamma Z_i + \delta S_{it-1} + \varepsilon_{jit}$$

where $A_{it} - A_{it-1}$ is the net investment between 1992 and 1999 and X is a set of initial household level conditions including the level of education and age of the household head, Z is a set of time invariant community-level characteristics, especially urban and regional dummies, and S_{it-1} is a variable indicating the presence and intensity of civil strife at the community level. Use of the community-level variable on civil strife is appropriate because, even in if they are not directly affected, presence of civil conflict in a given community will affect households' behavior and lead them to adopt precautionary strategies. The fact that, for any given household, the amount of civil strife is exogenous allows us to overcome the endogeneity problem that affect attempts to recover the impact of civil unrest from more aggregate data. While the range of right hand variables is constrained to those that could be obtained retrospectively in the 1999/2000 survey, the ability to include almost 10,000 households more than compensates for this shortcoming.

If civil war has led to significant changes in the composition of economic activity, one might be interested not only in the total amount of investment but also the sector in which such investment was undertaken. To do so, we use a probit regression with an indicator of non-agricultural enterprise startups as the dependent variable

$$(7) \quad ES_{jit} = \beta X_{jit-1} + \gamma Z_i + \delta S_{jit-1} + \varepsilon_{jit}$$

where ES_i is a dummy variable that takes the value of one if, during the 1992-2000 period, household i started a new non-agricultural enterprise and zero otherwise. The remainder of the right hand side

variables are as explained earlier. Although we can use only about 1200 panel households, these are located in almost 400 different communities, implying not only wide variation in the variables of interest but also a number of observations that is much larger than what is generally available in cross-country type regressions. This would, in particular, allow us to deal better with the problem of endogeneity and improve on the rather indirect evidence that is available in the literature (e.g. Collier 1999) by giving some quantification and comparing the impact of civil strife to that of other variables of interest.

4. Results

Concerning the *causes* of civil strife, our results support the general significance of the economic variables considered in Collier and Hoeffler (2000) even though additional factors, such as access to education and infrastructure, emerge as quite important. At the same time, we note that variables of high statistical significance are not necessarily the ones that are quantitatively the most important. In particular if looking at changes, this implies greater importance of policy-related variables such as infrastructure provision. In addition to providing insights into factors underlying civil strife, the regressions also demonstrate that higher levels of this phenomenon also reduce aggregate investment and drive individuals into greater reliance on subsistence and less integration into markets, implying that in communities affected by high levels of civil strife, both investment and diversification will remain stunted.

4.1 Determinants of civil strife

Results on determinants of civil strife are reported in table 2. To avoid spurious conclusions, we use both a zero/one indicator for the presence of civil conflict at the community level in a probit regression as well as the share of community members reporting to have been affected as a measure of the severity of such conflict for a tobit specification. As noted earlier, information on the level of civil conflict in 1992 was obtained retrospectively in the 1999/2000 survey. This implies that the independent variables needed for the 1992 regression are available only for the 371 "panel" communities that were included in both

surveys. We therefore report results for two samples, the pooled sample that contains 980 observations from 1999/2000 plus 371 observations from 1992 (columns 1 and 2) as well as the "panel" with information on 371 communities in both periods (columns 3 and 4). As indicated in the bottom row, about 44% of communities had at least one household affected by civil strife (column 1) while on average only about 8% of the population was affected by this phenomenon (columns 2-4). In addition, we use the fact that we have a panel to estimate a random effect tobit model (column 4). Furthermore, column 5 gives the means of the independent variables used in the regression. As the regressions do not indicate significant changes over time in the coefficients for individual right hand side variables, we report the regression where only regional dummies are interacted with the year dummy.

The results can provide insights as to more general patterns and are generally in line with the predictions from our model, even though more in-depth case study may be needed to adapt these to the specific conditions of Uganda. Higher human capital endowments by households are estimated to significantly reduce the likelihood of civil strife. The quadratic specification suggests that higher levels of education decrease individuals' propensity to engage in civil strife at a declining rate up to an absolute minimum is between 8.1 and 5.9 years of schooling per household, depending on the specification. With a mean attainment of less than 5 years, there appears scope for reducing the potential for violence by further increasing aggregate levels of human capital. At the same time, the impact is estimated to be greatest in communities where current endowments with human capital are very low. For example, increasing the level of education by a community in the second decile from 2.5 years to the mean of 4.9 would, according to the probit regression, reduce the risk of civil conflict by than 10.5% while a similar addition of 2.4 years for a community at the mean would reduce the risk of conflict only by 4.8%.[16]

In addition to human capital, endowments with physical capital are also estimated to be important in the tobit regression with panel communities (though not in the pooled tobit). The presence of coffee at the community level, as a immobile asset the returns of which can be expropriated in the short, is very

significant. Furthermore, and in line with the prediction that presence of infrastructure and other public goods decreases the cost of policing and thus the probability of civil strife, higher distance to infrastructure has indeed a marked positive impact on the probability of civil strife while location in urban areas reduces this probability, at least according to some of the specifications.

As is suggested by the descriptive statistics in table 1, there are pronounced differences across regions. While the Center has the lowest level of civil strife, the East and North have continuing high levels of violence and there has been a marked increase in civil conflict in the West, something that is likely to be related to broader regional patterns and a spillover from conflicts in Rwanda and military engagement in the Republic of Congo. While civil strife in the West was significantly lower than in the East or the North in 1992, it is now on a level equal to these regions and only the Central region continues to display a markedly lower level of civil strife than the remainder of the country.[17]

Table 1 in the appendix reports results from conducting exactly the same tobit regressions with incidence of theft and physical attacks as the dependent variables. Comparing these to what was obtained for civil strife suggests that these are indeed very different phenomena. Only very few of the coefficients discussed earlier turn out to be significant. For the ones that do, signs obtained are generally opposite from what has been observed for the case of civil strife. For example, the incidence of theft is higher close to the center of the municipality, i.e. increases directly with the availability of infrastructure in addition to being much more prevalent in the North, and its it is also estimated to have increased significantly over time. Physical attacks are estimated to increase with levels of education and wealth inequality, contrary to what was observed for civil strife, and to be more prevalent in the North and the West, as well as in coffee growing areas. This supports the notion that politically motivated violence and civil strife respond to factors that are different from those that underlie theft and violence aimed at individuals.

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[16] The result on human capital is very similar to what is found by Dreze and Khera who, using district level data on murder rates in India, find a significant negative correlation between education and murder.

[17] Testing for equality of the coefficients on the different dummies rejects equality of the Western with the Eastern and Northern dummies (F = 6.59 and 11.51 both suggesting significance at the 1% level) but can not reject such equality for the same dummies plus the dummy*year interaction (F = 1.11 and 0.81). Similarly, equality between North and East can not be rejected at the 5% level for either period (F = 1.59 and 3.11). Note that the test statistic for all of these tests is distributed $F(1,727)$.

4.2 What causes increases in the incidence of civil strife?

As variously noted in the literature, static analysis of civil strife in a cross section can provide interesting insights but may fail to point towards possible causal links that could provide the basis for specific policy interventions. The fact that, for a subset of communities, information is available on two periods, allows us to go beyond the cross-sectional determinants to identify factors that have contributed to increased levels of civil strife and which could, by implication, be used as policy instruments to reduce the incidence of this phenomenon.[18]

To do so, we estimate equation (5) using as a dependent variable a zero/one indicator that assumes a value of one for all communities where the share of respondents who indicated that they have been affected by civil strife is higher in 1999/2000 than it was in 1992. This was the case for 31% of the panel communities. Independent variables include the lagged value of civil strife to capture the impact of historical conditions, as well as proxies for changes in levels of infrastructure (G), assets (A), and grievances (C), respectively. The first is proxied by a dummy equaling one for communities who reported that after 1997, a road was built within 50 km from the community, thereby improving infrastructure access for inhabitants; as illustrated in table 3 this had been the case in 7.5% of communities. Changes in the endowment with immovable assets are proxied by the change in the share of producers growing coffee. Finally, to account for households' perceptions on the scope for economic development, we include a dummy indicating that the community perceived poverty rather than more specific issues as the most pressing problem, something that is taken as an indicator for a general lack of perspective and economic opportunities. Descriptive statistics in column 4 of table 3 illustrate that 24% of communities viewed poverty as the main issue.

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[18] We assume that the reverse (i.e. reducing) will also hold, but note that our sample does not contain a sufficiently large number of communities where civil strife decreased in order to make more precise inferences on this subject which remains an important area for future research.

Results from probit regressions for 371 panel communities offer interesting insights, in addition to confirming the significant increase of civil strife in the West.[19] Table 3 illustrates the results for three specifications, in addition to providing means for the independent variables and we directly focus on the full model (column 3) in interpreting results. First, we note a tendency towards persistence or even escalation; in fact the higher the share of the population who were affected by civil strife in 1992, the more likely is it for this phenomenon to have spread further in the intervening period. To get an idea of the magnitude of the associated effect, note that a 20 percentage point increase of the population affected by civil strife, which corresponds to the move from the 75th to the 95th percentile of the distribution, would be equivalent to an increase in the probability of observing increased levels of civil strife by 13.6%. Second, the regression confirms that exogenous changes in infrastructure access do indeed have a powerful impact on breaking the tendency towards higher levels of civil strife; according to the estimates building of a road within 50 km from the community would reduce the probability of observing increased levels of civil strife by about 18%. Third, the high significance of the coefficient on the increase in the number of coffee growers suggests that this variable, either through an increase in taxable income, or through a spread in the wealth distribution, indeed increases the propensity towards civil conflict. At the same time, the magnitude of the predicted effect is small; even increasing the share of coffee growers by 50% would increase the risk of increased violence by less than one percentage point. Finally, we note that perceptions are of major importance; the community not being able to pinpoint specific interventions or problems that impede development is estimated to increase the propensity towards escalation of conflict by almost 22%.

Taken together these results suggest a lower importance of "greed", and a much increased relevance of issues related to poverty and availability of public goods than would be suggested by existing cross-country regressions. From a methodological perspective, this suggests that extrapolation from results obtained at the country level to sub-national aggregates may not be warranted without checking of the

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[19] Note that the coefficients given are the marginal effects at the mean of all other variables, allowing to make inferences in terms of the probability of civil strife in a given community.

underlying assumptions. From a substantive point of view, it would imply that policy factors are more important than traditionally assumed.

4.3 Impact of civil strife on asset accumulation

One of the advantages of using evidence on civil strife in the context of a household survey is that, in addition to exploring determinants of politically motivated conflict at the community level, the data also allow to examine the impact of civil strife on economic outcomes, at both at the community and the individual level. As the incidence of civil strife at the community level is not a choice variable for individual households, and since migration as is a response that is not only associated with very high costs but also not open to all households in a community, doing so is less affected by problems of endogeneity than use of aggregate or cross-country data.

Table 4 reports the results of a probit equation using a 0/1 dummy indicating that a given household increased its asset stock (something that was the case for 81% of households, as indicated in the bottom of the table), as well as a tobit equation for the net increase in households' assets at constant prices, between the two periods 1992 and 1999.[20] In line with our hypothesis, presence of civil strife at the community level is estimated to have had a highly significant impact on investment, both for the probit and the tobit equation. The probit equation suggests that an increase of 10% in the proportion of households affected by civil strife is equivalent to about one year of schooling. Moreover, neither theft nor violent attacks (constructed as explained above) have any impact on household level investment (column 3 of table 4), again reinforcing the difference between these phenomena.

In addition to highlighting the investment-reducing impact of civil conflict, the regressions provide a number of other insights. First, the negative coefficient on the head's age supports the life-cycle dimension of investment. Younger households are estimated to be both more likely to invest and to make larger investments, in line with accumulation of assets over the life-cycle, with investment reaching a

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[20] The independent variable for civil strife (as well as theft and physical attack) is the share of households within any given community reporting to have been affected by civil strife.

peak at about 49 years. We also find evidence for a catch-up phenomenon whereby households with lower initial asset levels are characterized by a higher propensity to invest than those who already owned significant amounts of assets at the beginning of the period, similar to the convergence in growth rates and asset levels that is found in contributions to the growth literature (e.g. Barro 1991). We also note that more educated households have higher rates of investment even once the initial asset endowment is taken into account. The marginal impact of education reaches its maximum at about 13 years of schooling and decreases thereafter. Availability of additional labor at the household level is estimated to increase investment, suggesting not only that more family labor constitutes an important addition to households' endowments but also that formal labor markets in Uganda may be characterized by significant rationing. Even once other factors are controlled for, investment is estimated to be systematically lower in urban areas than in the rural sector. This suggests that any possible bias against rural areas that might have reduced investment incentives in the past is likely to have been eliminated by the policy reforms undertaken since the early 1990s. The coefficient in the probit equation suggests that a household living in rural areas would be 5% more likely to have invested during the period under concern than an urban dweller.

Not surprisingly, in view of differences in the type of assets available and the returns that can be obtained from these assets, as well as variation in cultural attitudes towards saving and asset accumulation, the propensity to invest varies considerably across regions. A household in the North, for example, is estimated to be 12 percentage points less likely to invest than one in the center. The propensity to invest is 4% higher in the West than in the Center.

4.4 Impact of civil strife on startup of non-farm enterprises

In a predominantly rural economy such as Uganda where opportunities for wage employment are quite limited, start-up of non-farm enterprises in the informal sector is of great importance for broad economic

growth in rural areas.[21] Table 5 illustrates that almost 40% of the households in the sample have, during the period under concern, either started up a new non-farm enterprise or expanded on an existing one. At the same time, mortality of these enterprises was high as well; almost 19% of households closed down an existing enterprise. The underlying hypothesis is that individuals who have been affected by civil strife in the past will reduce their exposure to the non-farm economy. Results from estimating a probit regression for equation (7) where the dependent variable is a dummy for expansion or disappearance of non-farm enterprises are reported in table 5 where the coefficients reported are marginal probabilities at the mean of other variables. We first discuss the results for non-farm enterprise startups, comparing them to the investment equation, and finally shift to a brief consideration of the factors underlying shrinkage and disappearance of enterprises.

In general, results are consistent with expectations as to the variables not referring to civil conflict. As noted in the investment equation, higher levels of education, higher endowments with assets, and lower age all increase the propensity to start non-farm enterprises. Similarly, the propensity to do so is significantly higher, by more than 20 percentage points, in urban than in rural areas, possibly reflecting the scope for accessing informal finance and to link into trading networks. Having been affected by civil strife reduces the propensity to establish such an enterprise by almost 10%. Comparing the estimated coefficient to those of other variables helps to illustrate the importance of this effect; to compensate one would have to increase the head's level of education by at least 4 years or to increase the initial value of asset endowments by more than double the mean observed in the sample. Again, the estimates suggest that it is only civil strife but not theft or physical violence where such an impact is observed. Also, it is of interest to note that, finding an impact of violence on asset accumulation mainly at the community level and on non-agricultural enterprise startups at the individual level is consistent with the hypothesis of civil

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[21] In fact, the household survey data allow us to confirm that, as emphasized in a number of recent contributions to the literature (Reardon et al, 2001), non-farm enterprises make an increasing contribution to the livelihood of the rural poor. Non-farm enterprises are quantitatively more important than wage income of the rural poor and, in contrast to overall stagnation of rural wage earnings during the 1992 to 1999 period, have shown a considerable increase, from about 9% of household income to more than 15% (Deininger and Okidi, 2001).

conflict shifting individuals towards subsistence, even though it may not significantly affect their overall rate of asset accumulation as compared to others in the village.

The literature notes that the flip-side of high levels of enterprise startups is in many cases a significant amount of enterprise mortality. For this reason, it is useful to complement our analysis of startups with an assessment of the factors associated with shrinkage and/or closure of non-farm enterprises even though the numbers involved are slightly smaller. Doing so reveals that, albeit to a smaller extent than in the case of startups, civil strife increases the probability of firms going out of business. The corresponding regressions are illustrated in the second half of table 4. In addition to illustrating the impact of civil strife, the figures reported there allow a number of conclusions. First, while education seems to have a negligible impact, age of the household head, a variable that is closely related to experience, emerges as very important. Higher levels of assets also reduce the risk of enterprise failure, not too surprising in an environment where credit markets are likely to be highly imperfect and where it is therefore the ability to draw down own assets that enables households to self-ensure. While urban communities are characterized by significantly higher levels of enterprise startups, urban areas show a marginally (though significant) lower rate of failures.[22] The opposite is true for areas that are more distant to the municipality. Presumably as a result of the higher potential profits but also risks associated with doing business more distant from urban centers, these areas are also characterized by both higher levels of startups and higher levels of failure.

5. Conclusion and policy implications

This is one of the first discussions of civil strife and violence for Africa that relies on micro-level data and thus can be directly linked to economic models of household behavior. Use of household level information, rather than aggregate data, allows us to demonstrate empirically the difference between civil strife and "ordinary" theft or physical violence and to show that these two phenomena arise for different

reasons and have vastly different consequences. We also provide empirical support for the hypothesis that civil strife has a significant and quantitatively important impact on investment decisions at the household level and for the broader diversification of the economy. The fact that it is cross-community and inter-regional differences in the incidence of civil conflict that affect economic outcomes highlights that, beyond the much-emphasized effect on international investors' confidence, civil violence may be equally important for the investment and business choices made by the domestic population.

Our results on the determinants of civil strife suggest that the presence of sufficient resources or "greed"-related factors is an important determinant of the emergence of civil conflict, thus confirming hypotheses from the cross-country literature. At the same time, we also find that there are other factors more amenable to government policy that provide a basis for policy interventions aiming to reduce the potential for civil strife. Finding that the probability of civil strife increases with lower levels of education and infrastructure access as well as asset endowments suggests that interventions to improve economic opportunities could have an important impact on reducing the potential for civil conflict. This is supported by the finding that provision of infrastructure, as well as households' perceptions, can greatly reduce the propensity for increased civil strife. While this suggests that "destiny", in the form of pre-existing endowments and factors such as location, ethnic differences, and landlocked status, may be less important than has often been suggested by the literature, it also implies that policy, especially activities that aim to increase poor people's access to assets in the widest sense, may be more effective as a means to reduce the scope for civil conflict and violence than has been thought traditionally. Further research on this issue would certainly be warranted.

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[12] Of course, one would want to distinguish more clearly the time of enterprise establishment to make a definite conclusion on this.

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Table 1: Regional incidence of civil strife in Uganda, 1992 and 1999

	1992				
	All Uganda	Central	Eastern	Northern	Western
Households affected by civil strife	5.9%	2.5%	8.4%	9.6%	5.5%
... theft	8.5%	6.9%	9.1%	13.6%	7.1%
... personal attacks	2.6%	1.5%	2.6%	4.0%	2.9%
Communities affected by civil strife	35.8%	20.5%	45.3%	47.6%	38.2%
Total value of assets	1828.08	2138.67	1369.41	552.03	2628.21
Share of communities growing coffee	13.7%	26.3%	10.9%	0.9%	14.1%
Share of communities growing cotton	5.3%	0.2%	11.1%	8.1%	2.1%
	1999				
	All Uganda	Central	Eastern	Northern	Western
Households affected by civil strife	9.7%	4.3%	10.7%	13.0%	12.4%
... theft	14.7%	13.5%	17.1%	17.5%	11.8%
... personal attacks	4.2%	2.8%	5.3%	6.3%	3.2%
Communities affected by civil strife	51.2%	32.3%	53.8%	54.1%	69.7%
Total value of assets (US $)	2490.55	3181.98	1827.47	1144.91	3261.03
Share of communities growing coffee	32.6%	62.5%	26.8%	1.6%	27.3%
Share of communities growing cotton	5.4%	0.6%	11.0%	12.3%	0.3%

Source: Own computation from the 1992 and 1999 Uganda National Household Surveys

Table 2: Determinants of civil strife, Uganda 1992 and 1999

	All communities		Panel communities only		Means of
	Probit	Tobit	Tobit	RE tobit	indep. var.
Mean education (> 15 a)	-0.081***	-0.044***	-0.047***	-0.031***	4.93
	(3.39)	(4.29)	(3.52)	(2.77)	
Education squared	0.005***	0.003***	0.004***	0.002**	30.07
	(2.66)	(3.42)	(3.20)	(2.21)	
Total asset value (log)	0.039*	0.015	0.028**	0.026	14.35
	(1.79)	(1.53)	(2.27)	(1.60)	
Coffee growing area	0.204***	0.125***	0.123***	0.108***	25.07%
	(3.85)	(5.26)	(3.59)	(3.42)	
Cotton growing area	-0.035	0.032	0.058	0.077	5.26%
	(0.34)	(0.69)	(0.91)	(1.52)	
Urban area	-0.110*	-0.074**	-0.063*	-0.011	14.08%
	(1.85)	(2.57)	(1.73)	(0.37)	
Distance to municipality	0.136***	0.057***	0.061***	0.054**	0.59
	(3.33)	(3.09)	(3.26)	(2.45)	
Wealth inequality	1.650	0.424	0.197	0.062	0.55%
	(1.26)	(1.27)	(0.53)	(0.23)	
Ethnic fractionalization index	0.093**	0.043**	0.045	0.022	48.83%
	(1.99)	(1.99)	(1.56)	(0.89)	
Eastern region	0.400***	0.218***	0.221***	0.215***	25.95%
	(5.38)	(5.77)	(5.66)	(5.53)	
Northern region	0.431***	0.260***	0.273***	0.267***	15.18%
	(5.08)	(5.84)	(5.75)	(5.90)	
Western region	0.236***	0.124***	0.126***	0.132***	26.81%
	(3.09)	(3.27)	(3.24)	(3.44)	
Eastern Region*Year	-0.083	-0.029	-0.045	-0.053*	13.0%
	(0.96)	(0.68)	(0.91)	(1.88)	
Northern Region*Year	0.105	0.036	-0.025	-0.035	7.6%
	(1.04)	(0.77)	(0.44)	(1.05)	
Western Region*Year	0.228***	0.107**	0.086*	0.063**	13.4%
	(2.65)	(2.53)	(1.77)	(2.25)	
Year of survey	0.061	0.034	0.063*	0.078***	50.0%
	(0.95)	(1.07)	(1.68)	(3.23)	
Constant		-0.362***	-0.566***	-0.559**	
		(2.59)	(3.10)	(2.40)	
Observations	1351	1351	742	742	
Censored observations		711	412	412	
Pseudo=R^2	.108	.257	.256		
Log-likelihood	-834.11	-339.29	-190.82	-95.02	
Mean of dependent variable	43.8%	8.6%	8.3%		

Absolute value of t- or z-statistics in parentheses

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

Table 3: Determinants of increases in civil strife

	Specification/model			Means of
	Persistence	Public goods	Perceptions	indep. var.
Pct. of pop. affected by strife in 1992	0.608**	0.733***	0.682***	5.7%
	(2.44)	(2.86)	(2.69)	
Road building within 50 km after 1997		-0.185**	-0.177**	7.5%
		(2.21)	(2.11)	
Percentage increase in coffee growers		0.007***	0.008***	4.6%
		(2.89)	(3.42)	
Poverty is a major problem			0.216***	24.0%
			(3.51)	
Eastern Region	-0.001	0.017	0.020	28.2%
	(0.02)	(0.26)	(0.29)	
Northern Region	-0.068	-0.065	-0.059	14.5%
	(0.82)	(0.79)	(0.72)	
Western Region	0.270***	0.315***	0.349***	26.0%
	(4.03)	(4.54)	(4.79)	
Observations	371	371	361	
Pseudo-R^2	0.067	0.105	0.148	

Robust z-statistics in parentheses

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

	Specification			Means of
	Probit	Tobit		indep. var.
Head's age (years)	-0.009***	-0.147***	-0.147***	43.32
	(5.36)	(5.64)	(5.64)	
Head's age squared	0.000***	0.001***	0.001***	2134
	(3.14)	(2.92)	(2.91)	
Head's education (years) in 1992	0.019***	0.367***	0.367***	5.27
	(6.78)	(8.09)	(8.09)	
Head's education squared	-0.001***	-0.014***	-0.014***	48.15
	(4.03)	(4.34)	(4.34)	
Assets in 1992 (log)	-0.031***	-0.221***	-0.220***	13.28
	(10.79)	(5.10)	(5.08)	
No of members between 14 & 60	0.015***	0.367***	0.366***	2.54
	(5.38)	(8.44)	(8.41)	
No of members less than 14	0.011***	0.236***	0.236***	2.56
	(5.03)	(6.89)	(6.90)	
No of members older than 60	-0.002	-0.030	-0.030	0.26
	(0.21)	(0.16)	(0.16)	
Urban dummy	-0.048***	-0.641***	-0.638***	22.0%
	(3.59)	(3.24)	(3.22)	
Presence of civil strife in 1992	-0.142***	-2.091***	-2.133***	6.1%
	(3.21)	(2.87)	(2.91)	
Presence of theft in 1992			-0.008	7.3%
			(0.01)	
Presence of attacks in 1992			1.309	2.5%
			(1.05)	
Eastern region	-0.022*	-0.466***	-0.484***	26.8%
	(1.87)	(2.58)	(2.67)	
Northern region	-0.124***	-2.361***	-2.383***	16.8%
	(8.19)	(10.72)	(10.75)	
Western region	0.037***	0.664***	0.656***	27.3%
	(3.31)	(3.79)	(3.74)	
Constant		14.877***	14.857***	
		(20.48)	(20.44)	
No of observations	9248	9248	9248	
Log likelihood	-4340.83	-25972.18	-27298.66	
Mean of dependent variable	81.4%	9.807		

Absolute value of t-statistics in parentheses

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

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Table 5: Impact of civil strife on enterprise starts and disappearance

	Enterprise expansion or startup		Enterprise disappearance	
Education (years)	0.028***	0.027**	-0.001**	-0.001*
	(2.59)	(2.53)	(2.06)	(1.93)
Education squared	-0.002***	-0.002***	0.0002**	0.0002**
	(2.71)	(2.66)	(2.16)	(2.06)
Age of household head	-0.005***	-0.005***	0.0003***	0.0003***
	(4.83)	(4.85)	(3.20)	(3.30)
Assets in 1992 (log)	0.029***	0.029***	-0.002***	-0.002***
	(3.36)	(3.39)	(2.88)	(3.04)
Affected by civil strife in 1992	-0.094**	-0.097**	0.016**	0.015**
	(2.04)	(2.13)	(2.10)	(2.25)
Urban community	0.216***	0.218***	-0.005***	-0.005***
	(5.25)	(5.30)	(4.66)	(4.83)
Eastern region	-0.034	-0.036	0.005*	0.005*
	(0.99)	(1.03)	(1.70)	(1.75)
Northern region	0.167***	0.162***	0.003	0.003
	(3.87)	(3.74)	(0.74)	(0.84)
Western region	-0.118***	-0.119***	0.001	0.002
	(3.71)	(3.76)	(0.51)	(0.69)
Affected by theft in 1992		0.011		0.003
		(0.27)		(0.95)
Affected by attacks in 1992		0.080		-0.003**
		(1.06)		(2.09)
Non-farm income 1992 (log)			0.004***	0.004***
			(14.46)	(14.19)
Log likelihood	-684.905	-684.234	-152.86	-150.592
Pseudo R^2	0.082	0.094	0.737	0.741
No of observations	1248	1248	1248	1248
Mean of dependent variable	39.77%		18.69%	

Robust z-statistics in parentheses

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

Appendix table 1: Determinants of theft and physical attack, Uganda 1992 and 1999

	Theft		Physical attack	
	Cross section	Panel	Cross section	Panel
Mean education (> 15 year olds)	0.008	0.005	0.022**	0.039**
	(1.03)	(0.54)	(2.01)	(2.44)
Education squared	-0.000	-0.000	-0.002**	-0.004***
	(0.48)	(0.11)	(2.02)	(2.88)
Total asset value (log)	0.008	0.005	-0.011	-0.011
	(1.17)	(0.60)	(1.25)	(0.96)
Coffee growing area	0.015	0.021	0.050**	0.057*
	(0.89)	(0.84)	(2.13)	(1.75)
Cotton growing area	0.023	-0.001	0.056	0.050
	(0.67)	(0.02)	(1.26)	(0.86)
Urban area	0.009	0.015	0.003	0.027
	(0.48)	(0.59)	(0.12)	(0.83)
Distance to municipality	-0.048***	-0.055***	-0.006	-0.017
	(3.56)	(3.96)	(0.34)	(0.96)
Wealth inequality	-0.146	-0.293	0.691**	0.589*
	(0.53)	(0.92)	(2.30)	(1.90)
Ethnic fractionalization index	0.010	-0.004	0.029	0.031
	(0.64)	(0.20)	(1.37)	(1.15)
Eastern region	0.043*	0.040	0.061	0.057
	(1.65)	(1.49)	(1.60)	(1.51)
Northern region	0.128***	0.121***	0.135***	0.137***
	(4.13)	(3.66)	(3.11)	(3.08)
Western region	0.011	0.009	0.086**	0.083**
	(0.44)	(0.35)	(2.31)	(2.30)
Eastern Region*Year	0.012	-0.006	0.047	0.038
	(0.41)	(0.18)	(1.13)	(0.83)
Northern Region*Year	-0.052	-0.020	0.007	-0.017
	(1.55)	(0.50)	(0.16)	(0.32)
Western Region*Year	-0.030	0.008	-0.039	0.022
	(1.02)	(0.24)	(0.94)	(0.49)
Year of survey	0.097***	0.097***	0.048	0.040
	(4.68)	(3.92)	(1.54)	(1.13)
Constant	-0.128	-0.072	-0.122	-0.132
	(1.28)	(0.55)	(0.92)	(0.78)
Observations	1351	743	1351	743
Pseudo R^2	0.88	0.64	0.10	0.13
Mean of dep. variable	13.02%		3.71%	

Absolute value of t-statistics in parentheses
significant at 10%; ** significant at 5%; *** significant at 1%

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