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Effect of Conflict on Dietary Energy Supply: Evidence from Cote d'Ivoire

by

Andrew L. Dabalen and Saumik Paul

Abstract

In this paper we estimate the causal effects of conflict on dietary energy supply in Côte d'Ivoire. To identify the true impact of conflict, we use pre-war and post-war household data bracketing the conflict period and the spatial variation in the prevalence of conflict between the North and South regions. Our second identification strategy uses the specific counts of conflict events across departments. For our third identification strategy, we employ self-reported victimization indicators at the individual level. Combining data from household surveys (Households Living Standards Surveys) and the conflict database (ACLED), we find robust and statistically significant evidence of households in the worst-hit conflict areas and individuals who are the direct victims of the conflict having lower dietary energy supply. The propensity score matching estimates do not alter the main findings. Other robustness checks including firstly, subsamples of households with children and secondly, alternative estimation of conflict intensity provide mixed but encouraging evidence that supports the impact of conflict on food security.

JEL Classification: I20, I3, D12, C40, H43, O15

Keywords: Conflict, Food security, Nutrition, Evaluation, Africa

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Outline

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I. Introduction

Recent studies report the problems caused by conflict on people's health outcomes in Cote d'Ivoire. According to the study by Minoiu and Shemyakina (2011), the average height for children in the war affected regions is .41 standard deviations lower than that of children who are less exposed to war. Another study by Furst et al. (2009) documents that health concerns are one of the worst conflict outcomes reported by households in the conflict affected regions of Cote d'Ivoire. The rate of stunting (lower height for age) for children aged less than five years old increased by 12.1 percentage points in two years, reaching 32.9 percent in 2006 (UNICEF MICS, 2006). For the same age group the mortality rate also increased from 117 per 100,000 live births in 2004 to 125 per 100,000 live births in 2005 with a maternal mortality rate of 690 deaths per 100,000 live births FAO-SOFI (2010). While some studies draw a negative causal relationship between conflict and health indicators, a majority of these findings do not establish any causal mechanism.

In this article, we examine one of the channels through which conflict might have increased concerns about health. As Flores (2004) points out, in the absence of adequate food security, conflict and post-conflict outcomes of mass migration, starvation and death due to hunger and disease become more likely as opposed to combat-induced death. In the present context, we attempt to find whether the Ivoirian conflict resulted in a decrease in households' nutritional status in the conflict affected regions. In particular, combining data from two *Households Living Standards Surveys (HLSS)*[1] collected before (ENV-2002 round) and after the conflict (ENV-2008 round) with data from the *Armed Conflict Location and Event Database (ACLED)* (Raleigh et al., 2010), we examine the causal effect of the conflict on dietary energy supply (DES). We contend that less dietary energy supply during conflict escalated health-related problems in Cote d'Ivoire.

We build our hypothesis based on insights from the existing literature. Conflict and food security are linked in various ways. On one hand, the incidences of civil war exacerbate the conditions leading to malnutrition such as inadequate household food security and poor diet (FAO, 1998). On the other, the need to secure food and nutrition

requirements of the population suffering from the conflict become a necessary condition for recovery (Flores, 2004). In 2003, a report by the *Food and Agriculture Organization (FAO)* documented that more than half of the countries where undernourishment was most prevalent experienced violent conflict and civil war in the 1990s (FAO-SOFI, 2003). Theoretical models by Taeb (2004) and Messer and Cohen (2004) argue that conflict has similar effects on food security. This has been supported by empirical studies. Using a sample of 38 countries that experienced conflict between 1961 and 2000, Teodosijevic (2003) finds that the incidence of conflict reduces daily energy supply (DES) calories on average by 7 percent. Jeanty and Hitzhusen (2007) find similar evidence on a larger panel of 80 less developed countries. These findings indicate a negative correlation between conflict and food security. However, Messer and Cohen (2004) point out the need for food insecurity has rarely been investigated by the studies of the economic correlates of war directly, although they often provide evidence that conflict is strongly related to factors associated with food insecurity.

Descriptive evidence from Cote d'Ivoire strengthens our argument. In 2006, an in-depth *Emergency Food Security Assessment* carried out by the *World Food Program (WFP)* jointly with the *Food and Agriculture Organization (FAO)* in 10 of the 19 regions of Cote d'Ivoire, find that 9 percent of the population is food insecure and an additional 20% are at risk. The same report also documents that households who are the most food insecure are located in the Western and the Northern departments of Cote d'Ivoire, the hardest hit areas of violent conflict. Almost 40 percent of the population in these regions is at risk of food insecurity (WFP, 2006). The report states that food insecurity is linked to the problem of access to food associated with poverty, lack of access to productive activities, displacement and insecurity of life. Also, the higher child mortality rate and stunting is prevalent in the presence of improper food utilization and inadequate feeding practices, creating a food shortage (WFP, 2006). These findings suggest that the nutritional status of vulnerable populations in Côte d'Ivoire has worsened since the crisis began.

To empirically test the research hypothesis, we combine two nationally representative household surveys, one collected in 2002 and the other collected in 2008,

1 Households Living Standards Survey (HLSS) data, also known as *Enquete sur le Niveau de Vie de Menage* (ENV); these surveys were undertaken by the National Institute of Statistics in Cote D'Ivoire.

bracketing the peak conflict period in Cote d'Ivoire from 2002 to 2006. We construct *Food Consumption Scores (FCS)*[2] as a proxy measure of food security, originally developed by the World Food Programmme (WFP, 2007). This measures calorie availability from food consumption taking into consideration both food diversity and the frequency of food intake[3]. Our first empirical strategy identifies the impact of war using pre-war (ENV-2002) data to control for the baseline food consumption score and the spatial variation in conflict counts between the North and the South. A comparison of kernel density plots show increasing vulnerability with food insecurity in the post-war period. The baseline difference-in-difference OLS outcomes indicate similar outcomes. This implies food security for households in the Northern and the Northwestern regions drops at a higher rate compared to households in the South between the pre-war and the post-war periods.

Our second empirical strategy identifies the impact of war using the spatial variation in conflict counts across departments (source ACLED database). We find a negative coefficient of the war intensity measure. This indicates that households in departments with at least one conflict event have on average less food security. From the onset of the conflict until 2008, various targeted food interventions were designed to support the war victims with the recovery process (WFP, 2009). In 2007-2008, World Food Programme (WFP) supported the recovery process to reestablish basic services, protect and re-integrate displaced people, and reinforce food security and promotion of livelihoods. In the context of our study, these could be potential sources of bias in the estimated causal effect if a share of reported items of food consumption came from food aid. We control for the departments that received food aid programs, and statistical results confirm that food aid programs are less likely to have any impact on the causal relationship between conflict and food security in the present context.

Household food security during armed conflict can be affected by a combination of factors including: decline of agricultural production because of physical insecurity; lack of agricultural inputs and extension services; destruction of food processing units

[2] The FCS is a frequency-weighted diet diversity score, also referred to as a "food frequency indicator" (WFP, 2007).

3 This is based on the earlier work by Ruel (2002) and Hoddinott and Yohannes (2002).

and food distribution system; destruction of infrastructure including roads and markets; and last but not the least loss of income coupled with rising prices (FAO, 1998). Our conflict intensity variable cannot identify these channels. As the third identification strategy, we use a set of victimization indicators to measure the potential effect of conflict. To minimize the selection bias and confounding in the causal effect, we create a counterfactual comparison group based on observable household characteristics. The average treatment effect derived from the matched propensity scores indicates a robust negative impact of conflict on food security. A narrower identification of war intensity through the channels of victimization provides robust empirical support to our hypothesis.

This study provides evidence of food insecurity as a mechanism through which conflict can affect health outcomes. Our findings complement some recent studies that show food insecurity is the most common manifestation of the conflict (Pingali et al., 2005). About 925 million people were estimated to be undernourished in 2010[4] (FAO-SOFI, 2010) and nearly 20 percent of them lived in 22 countries[5] characterized by recurring crisis mainly due to armed conflicts and natural disasters (FAO-SOFI, 2010). Food insecurity could escalate into a higher prevalence of stunted (shorter height for age due to inadequate nutrition) and wasted (low weight for height) children (UNICEF, 2009; Black et al., 2009). Such children are highly unlikely to reach their full educational and productive potential therefore procrastinate the long-term prospects for recovery and development (Victora et al., 2008; UNICEF, 2009).

The paper is structured as follows. Section II provides a brief account of the consequences of Ivoirian conflict. In section III, we provide an outline of the concept and measurement of food security in the light of the Ivoirian civil war. We discuss empirical models, identification strategies and the empirical findings in section IV. This is followed by the outcomes of sensitivity tests in section V. We provide our concluding remarks at the end.

4 The State of Food Security in the World (SOFI), "Addressing food security in protracted crisis", Food and Agriculture Organization (FAO) of the United Nations (2010).

5 Cote d'Ivoire is in the list of 22 countries characterized by protracted crisis in the FAO-SOFI (2010) report.

2. A brief account of the consequences of the Ivoirian civil war

After two decades of successful economic development following independence in 1960, anchored by political stability and reasonable macro-economic management, Côte d'Ivoire descended into crisis that has lasted for twenty years. A combination of economic shocks and lack of competitiveness accounted for the observed secular decline in GDP and worsening terms of trade since the late 1980s. The economic downturn, brought about by structural problems, was compounded in recent years by a series of political and social crises. The first sign of trouble began with the failure to manage the political transition after the death of President Houphouet Boigny who had been in office since independence. In the 1990s, the concept of *Ivoirite* became the major political discourse and in 1994 the new Electoral Code restricted the right to vote and presidential candidacy nominations to only Ivorian nationals with complete Ivoirian parenthood.

This led to an attempted coup in 1999. In September 2002 another attempt to overthrow President Gbagbo failed, but did split the country in two, each controlled by rivals. The Muslim dominated North, consisting of the majority of immigrants and descendants of immigrants from neighboring countries (Burkina Faso, Niger and Mali) was in the hands of "Forces Nouvelles" (a coalition of four former rebel groups). Meanwhile the government controlled the Christian dominated regions in the South. A buffer zone, manned by 8,000 UN troops (UNOCI) and 4,000 troops from the French Licorne Forces, was established along the frontline. The consequences for the population's welfare have been tragic especially with the political instability posing a persistent threat of civil war and rising food prices in recent years. The GDP growth was negative in 2005 and 2006 and the GDP per capita stood at US$ 866 in 2007, with almost half of the population living below the poverty line of US$2 per person per day[6].

The humanitarian situation has continued to deteriorate over the years (FAO, 2007). The human development index for Côte d'Ivoire has been in steady decline since 1980. It was ranked 164th out of 177 countries in the Human Development Index scale in 2006 (UNDP, 2006). The nutritional status of vulnerable populations, especially children under five worsened since the the civil war began. The percentage of children under five

6 World Bank, 2010

suffered from stunting increased from 30.8% in 2004 to 32.9% in 2006 whereas 13.6% of children suffered from wasting in the North (UNICEF-MICS, 2006). Moreover, the under-5 mortality rate increased from 117 per 100,000 live births in 2004 to 125 per 100,000 live births in 2005 (FAO, 2007). Only one third of births were attended by skilled personnel, pushing maternal mortality to 690 deaths for 100,000 live births (FAO, 2007). The in-depth emergency food security assessment conducted in October 2006 by WFP concluded that about 9 percent of the population of the affected regions was food insecure, whereas an additional 20 percent was at risk (WFP, 2006). In the western regions of Moyen Cavally Denguele and Bafing about 43 percent of households were food insecure. In addition, a large proportion of households were at risk of food insecurity in the western and northern departments of Man (40 percent) and Bouake (28 percent), respectively (UNICEF-MICS, 2006).

After more than four years of civil conflict, massive population displacement and a division of the country, signs of improvement emerged at the start of 2007. In the March 2007 Ouagadougou Agreement, a new peace process was launched advocating a power sharing deal between the government and rebel forces. Steps were taken to achieve and sustain both economic and social recovery, including the rapid implementation of the Disarmament, Demobilization and Reintegration (DDR) and voter identification and registration processes, the return of the administration to the North and finally the organization of elections at the nearest feasible date (FAO, 2007). In 2007-2008, World Food Programme (WFP) supported the recovery process to meet the following objectives: (1) reestablishment of basic services, (2) protection and re-integration of displaced populations, and (3) reinforcement of food security and promotion of livelihoods. Recovery-type interventions comprised the bulk of activities including Food-for-Education, Food-for-Work, Food-for-Training and targeted nutrition programs. The Food-for-Education program provided cooked school meals to 580,000 students. In addition, take-home rations were also provided to 60,000 girls and their family members to enhance both food security and enrollment rates[7]. To support the return of displaced populations, the Food-for-Work and Food-for-Training was provided to some 90,000 beneficiaries. Finally, targeted nutrition programs were implemented for 47,000

[7] These objective were in line with the Millennium development goals; MDG 2, to achieve universal primary education and MDG 3, to promote gender equality and empower women.

vulnerable mothers and children under-5 in food insecure areas to prevent malnutrition and other worsening health conditions.

[Figure 2.1]

For the purpose of this study, the data on local incidences of conflict is taken from the Armed Conflict Location and Event Database (ACLED). The Armed Conflict Location and Event Database[8] (ACLED) (Raleigh, Hegre, and Carlson, 2009) compiles exact locations, dates, and additional characteristics of individual battle events in states affected by civil war. The conflict data for Cote d'Ivoire is available for the period from 1997 to 2010. The ACLED database on Cote d'Ivoire reports a total number of 965 conflict events between 1998 and 2008. It tracks rebel activity and distinguishes between territorial transfers of military control from governments to rebel groups and vice versa. The conflict events are disaggregated into six categories: (i) Battle - government regains territory, (ii) Battle - no change of territory, (iii) Battle - rebels overtake territory, (iv) Non-violent activity by a conflict actor, (v) riots/protests, and (vi) Violence against civilians. In Figure 3.1, we show the total number of reported conflicts per year for the period starting from 2001 to 2006. The conflict intensity reached its peak between 2002 and 2004 with a total of 459 conflict events.

For empirical purposes, we disaggregate the conflict events into 50 departments, which are nested into 19 regions in Cote d'Ivoire. To decipher the causes and consequences of conflict at the local level, many studies have used smaller geographical regions or artificial geographic grid-cells (that do not relate to any meaningful sub-national border) as the unit of analysis. Some researchers prefer to follow the grid-cell approach because the unit of analysis does not change spatially (Buhaug and Rod, 2006). In comparison, when the unit of analysis is the sub-national regions, they are likely to vary in terms of area. In this study we map the exact locations of the conflict event provided by the ACLED database into 50 departments using spatial coordinates taken from the DIVA-GIS[9] website.

8For more information go to the ACLED website at http://www.prio.no/CSCW/Datasets/Armed-Conflict/Armed-Conflict-Location-and-Event-Data/

9DIVA-GIS website for Cote d'Ivoire http://www.diva-gis.org/datadown.

[Figure 2.2]

Figure 2.2 plots the total number of conflict events at the department level for the period 2002 to 2004. On the left hand panel of Figure 2.2, we show the conflict prevalence map taken from the ACLED website[10]. On the right hand panel, we plot the intensity of conflict across departments. The geographical areas marked with darker shades indicate departments that experienced more intense conflict. The incidences of civil conflict have been more frequent in the western and southern departments of Core d'Ivoire and in the neighborhood of Abidjan. Between 2001 and 2006, the average number of conflict events per department recorded at 8.6. In 2003, only in Abidjan did the number of armed conflict events escalate to more than 150. Furthermore the conflict events occurred at a large number near the Line of Control administered by UN and French troops. About three-quarters (37 out of 50) of the departments experienced at least one conflict event during the period from 2002 to 2006.

[Figure 2.3]

Cote d'Ivoire has a rich history of detailed household surveys. The Cote d'Ivoire Institut National de la Statistique (INS) has a nationally representative household survey (Enquête Niveau de Vie des Ménages - ENV) that has been implemented periodically since the mid-1980s. For this study, we use the 2002 and the 2008 round of Households Living Standards Survey (HLSS) data, also known as *Enquete sur le Niveau de Vie de Menage* (ENV). These surveys were undertaken by the National Institute of Statistics in Cote D'Ivoire. The ENV-2008, jointly administered by the National Institute of Statistics - Cote d'Ivoire and UNICEF, was specifically designed to document the consequences of the civil war. A new section on the 'impact of the war' was added, which included a range of questions that are commonly used to evaluate the welfare impact of war on individuals and households. For example, household respondents were asked: "How did your income change over the years of crisis?" / "Has the current crisis affected your life?" In addition, the survey included a set of questions on the physical impact and casualty of

10The following website http://www.acleddata.com/index.php/dynamic-maps provides conflict maps for a number of countries.

the war, such as “Have you registered a death or illness linked to the crisis? / “Have you been displaced during the war?” / “Have you suffered any violence linked to the crisis?”

In Figure 2.3 we provide a pictorial view of the war victimization based on household responses. We plot the average responses at the department level; darker shades imply a higher average rate of victimization experience for the inhabitants in a department. It is evident that the civil war deeply devastated the livelihoods of the entire population in Cote d’Ivoire; however, this impact was more prevalent in the Middle and the Northwest of the country. Overall, between 30 to 50 percent of the respondents experienced declines in their income. The incidence of war victimization was more prominent in the departments located near the UN-peace keeping line and to the West where the civil war was more intense. Nearly 30 percent of the respondents had to hide during the war in the Northwestern departments. The conflict in the mid-West of the country is also marked by high levels of internal displacement. The adverse effect of the war on jobs and land is prevalent throughout the country. However, the people in the mid-West reported loss of livestock and non-land assets.

3. Concept and measurement of food security in Cote d’Ivoire

The concept of food security first originated in the mid-1970s, when the World Food Conference (1974) defined food security as *“Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”*. Since then, in the past forty years this definition has changed, reflecting changes in official policy thinking (Clay, 2002; Heidhues et al., 2004; FAO, 2006). For example, in 1983, FAO defined food security based on the balance between the demand and supply side of food security equation. In 1986, the World Bank Report on Poverty and Hunger (World Bank, 1986) introduced the distinction between chronic food insecurity and transitory food insecurity, where the former is associated with problems of continuing poverty and low incomes and the later reflects food crisis caused by natural disasters, economic collapse or conflict (Clay, 2002)[11]. Later, at the World Food Summit (1996) a new definition of food security

[11] This was complemented by Sen’s theory of famine (1981) which highlighted the effect of personal entitlements on food access, i.e. production, labor, trade and transfer-based resources.

emerged emphasizing the importance of food access, availability, food use and stability. Since then, this multidimensional approach to food policy responses became fundamental to international organizations' (FAO, WFP, etc.) development programs.

As Devereux (2000) points out, over time the analysis of food insecurity has emerged as a social and political construct rather than an analysis of the link between food security, starvation and crop failure. However, the quantitative measurement of food security still suffers from methodological challenges (Migotto et al., 2005; Scaramozzino, 2006; Weismann et al., 2009). Multidimensional in nature, the most commonly used definition of food security reads as "*all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (FAO, 1996). In this regard, Barrett (2002) defines four essential aspects of food security: diet quantity, diet quality, psychological dimensions and social and cultural dimensions. The standard practice is to gather information on food consumption or expenditure data over a recall period. Common indicators, such as calorie availability at the household level typically use 7 days to obtain information on household level consumption of food (Deaton, 1997); another indicator of food security dietary energy indicator is computed, based on the amounts of all foods an individual consumed in the previous 24 hours (Gibson, 2004).

In this paper we use a proxy measure of food security, the food consumption scores (FCS)[12], developed by the World Food Programme (WFP, 2007). The FCS

measures calorie availability from food consumption taking into consideration both food diversity and the frequency of food intake[13]. The FCS is calculated using the frequency of consumption of eight food groups consumed by a household in the past seven days from

the survey. The weights for each food groups are calculated based on nutrient density[14] of each food group, as described in the Vulnerability Analysis and Mapping (VAM) of the World Food Programme (2007). The highest weight was attached to foods with

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12 The FCS is a frequency-weighted diet diversity score, also referred to as a "food frequency indicator" (WFP, 2007).

13 This is based on the earlier work by Ruel (2002) and Hoddinott and Yohannes (2002).

14 "Nutrient density" is a term used to subjectively describe a food group's quality in terms of caloric density, macro- and micronutrient content and actual quantities typically eaten. Typically, greater weights are given to meat and fish, usually considered to have greater "nutrient density" and lesser importance to foods such as sugar.

relatively high energy, good quality protein, and a wide range of micronutrients that can be easily absorbed (Wiesmann, et al., 2009). The food security status of a household is determined by the following rule: a household is classified as poor if the score is below 21.5, borderline if it is between 21.5 and 35, and acceptable if the score is above 35. While the weighting procedure is subjective in nature, a recent study by Wiesmann et al. (2009), analyzing household data from three countries – Burundi, Haiti and Sri Lanka - provides encouraging evidence on the usefulness of FCS[15]. It shows a positive and statistically significant association between FCS and alternative indicators of dietary diversity and food frequency.

In this study, we use the ENV-2002 and the ENV-2008 surveys to compute food consumption score at the household level before and after the war, respectively. The sample size varied from 10,800 households in 2002 to 12,600 households in 2008. As documented by researchers, any change (to composition of the list of food items or questions) in the food module jeopardizes comparability of the ENV-2002 with the ENV-2008[16]. Variations in household consumption surveys resulting from modifications of survey designs and questionnaires are likely to produce inconsistent and biased estimates of welfare over time (Dabalen and Paul, 2011). Revisions were made to the degree of commodity detail in ENV-2008, as the number of food items increased from 99 in ENV-2002 to 115 in ENV-2008. However, the recall periods for food consumption remained unchanged at 7 days and 30 days, for some products.

It is important to note that an expansion of the list does not automatically mean higher reported expenditure. In the unlikely event that households understand the question clearly and report expenditure categorically, there may be a difference between providing a detailed list and not doing so. It is generally suspected that an expansion of the list is likely to lead to higher reported consumption because the list prompts households to remember the expenditures more accurately than when the products are

15 A number of recent studies (for example, D'Souza and Jolliffe, 2010) have used FCS to evaluate household coping strategies when a crisis has to be faced.

16 For detailed discussions, see Gibson, 2006; Deaton and Grosh, 2000; Tarozzi, 2007; and Beegle, De Weerdt, Friedman and Gibson, 2010.

lumped together under one heading. Thus, a shorter list may potentially lead to a lower reported consumption level and an over-estimation of poverty rates. However, experimental research on the impact of length of lists on food consumption provides mixed results. For instance, an experimental study in Tanzania on the impact of questionnaire design on reported food or expenditures shows that food and households' total consumption expenditures did not deviate much from the benchmark food and total consumption (Beegle, De Weerdt, Friedman and Gibson, 2010). They define the benchmark level as the carefully supervised diary (or what the authors call the "gold standard") including a standard list of key commodities for daily consumption. They used a longer list and a shorter list but with the same recall period. The outcome in both cases is similar to the benchmark standard.

[Table 3.1]

In Table 3.1 we compare the average expenditure share and degree of commodity details of selected food items between two ENV survey rounds, 2002 and 2008. We show a list of food items such as rice, plantain, fish, leaves and vegetables, etc. for which the number of entries have increased in 2008. We do not find any consistent relationship between the share of food expenditures and number of items. For example, number of entries for leaves and vegetables increased from 19 to 24 with an average increase in the food expenditure share by almost 1 percentage point. At the same time number of entries for milk and its by-products increased from 4 to 6 with a drop in the average expenditure share by .1 percentage point. We find similar outcomes for food items that did not experience any change in the degree of commodity detail. Based on these findings, it is difficult to detect any systematic bias between 2002 and 2008 data, and by consequence when comparing FCS between 2002 and 2008.

[Figure 3.1]

Figure 3.1 compares the Kernel density estimates of log real per capita food expenditure[17] for households before war and households after war. The distribution of log per capita food expenditure for households who were interviewed after the war in 2008 shifts leftward. This indicates an overall fall in the food expenditure across all income

17 The real figures are obtained after adjusted for regional deflators and Consumer Price Index (CPI).

levels. In the right hand panel we compare the distribution of FCS between 2002 and 2008. The Kernel density function of FCS in 2002 shows a bimodal distribution, with its first peak around the score of 30 and the second around the score of 60. In 2008, we find a rightward skewed distribution of FCS, with a peak below 30. This indicates a significant shift of the population share with FCS below 20 between 2002 and 2008. Moreover, there is also a significant increase in the population share between 20 and 35.5, indicating increasing vulnerability based on dietary diversity and access to food.

[Table 3.2]

Table 3.2 reports similar evidence where the percentage of households with an acceptable food consumption score drops by 22 percentage points between 2002 and 2008. A more direct way of estimating the changing risk of poverty for households is to plot the probability of FCS as a function of income. Figure 3.2 compares non-parametric kernel-weighted local polynomial regressions outcome of aggregate FCS as a function of log per capita consumption expenditures between 2002 and 2008. We also show regression outcomes for un-weighted individual food consumption score considering each of the eight food categories separately. Except for vegetables, FCS for of the remainder of the food categories and basket demonstrate a positive association between food consumption score and log per capita consumption.

4. Empirical Findings

4.1. Difference-in-difference outcomes

The civil war that broke out in Côte d'Ivoire in September 2002 caused more than 3,000 deaths and divided the country into two: the rebel-held North and the government-controlled South (World Bank, 2010). According to many studies the deterioration of human capital was more severe in the North than in the South (the Ministry of Education in Côte d'Ivoire, 2004; Sany, 2010; Furst et al., 2009). Following this, we construct the North dummy which takes the value of one if a household resides in the worst hit regions of the North and the Northwest, zero otherwise (we label it as the South). This dummy variable explains the variation in dietary diversity that is specific to the Northern regions but cannot be captured by the Time dummy, which takes the value one for households in

the post-war survey (ENV-2008) and zero for households in the pre-war survey (ENV-2002). Table 4.1.1 reports the outcomes of our first identification strategy in a two-by-two difference-in-difference table. Both dummy variables identify the causal effect of war on food diversity (as shown in Table 4.1.1). The average difference-in-difference coefficient of FCS yields a negative value of -1.39. This implies food security for households in the Northern and Northwestern regions declines at a higher rate compared to households in the South between the pre-war and post-war periods.

[Table 4.1.1]

We generalize this identification strategy with a regression framework (Duflo, 2001; Shemyakina, 2011). This estimates the average food consumption scores as a function of household and demographic controls. If exposure to conflict (i.e. residing in the worst affected regions) is detrimental to dietary diversity, then the estimated coefficient of average food consumption scores will show a negative outcome. Table 4.1.2 reports the generalized difference-in-difference findings. The estimated coefficients indicate a similar outcome for the results depicted in Table 4.1.1. The outcomes are robust when we control for department fixed effects and household and demographic characteristics, and the estimated coefficients are statistically significant at 1 percent.

[Table 4.1.2]

4.2. OLS outcomes using war intensity measures from ACLED

Our second empirical strategy identifies the impact of war using the spatial variation in conflict counts across departments (source ACLED database). We construct a dummy variable which takes the value of one if a department experienced at least one conflict event (war), zero otherwise (No war). The war prevalence of a department reflects the total number of conflict events between 2002 and 2006. Since the conflict count is based on the period from 2002 to 2006, we use only the post-war survey for this part of the analysis. The first column of Table 4.2 reports the OLS regression outcomes of food consumption scores as a function of war intensity and household and demographic controls. A negative coefficient of the war intensity measure indicates that households in departments with at least one conflict event have on average lower food security

measured as food consumption scores. However, this outcome is not statistically significant.

[Table 4.2]

4.3. OLS outcomes after controlling for food aids

From the onset of the conflict until 2008, various targeted interventions consisting of *Food-for-Education, Food-for-Work, Food-for-Training* and *Targeted Nutrition Programs* were designed to support the war victims with the recovery process (WFP, 2009). The Food-for-Education program provided cooked school meals to 580,000 students, take-home rations were also provided to 60,000 girls and their family members[18]. To support the return of displaced populations, the Food-for-Work and Food-for-Training schemes were provided to some 90,000 beneficiaries. In 2007-2008, World Food Programme (WFP) supported the recovery process to meet the following objectives: (1) reestablishment of basic services, (2) protection and re-integration of displaced populations, and (3) reinforcement of food security and promotion of livelihoods. These could be potential sources of bias in the estimated causal effect if a share of reported items of food consumption is derived from the food assistance programs. However, in the presence of food aid we are likely to obtain the lowest boundary of the conflict's impact on food security.

To control for the departments that received either types of food aid we map the food assistance locations (see Appendix 2) to political boundaries of departments. In total we find 14 programs that were initiated by the World Food Programme (WFP) mapped into 11 departments. The average food consumption score in food-aid departments (37.47) is insignificantly higher than the same in non-food-aid departments (37.34). Additionally, almost 20 percent of the conflict-affected departments were covered by these food assistance programs whereas the same for the no-conflict department stands at around 13 percent. The last two columns of Table 4.2 report estimated OLS coefficients of food consumption score on war intensity dummy in food-aid and non-food aid departments, respectively. On average, households from food-aid departments exhibit

significantly less food security if they are affected by conflict directly. We find similar outcomes for households in no food-aid departments, but the coefficient is statistically insignificant. Overall, these findings confirm that food aid programs are less likely to have any impact on the causal relationship between conflict and food security in the present context.

4.4. OLS outcomes using victimization indicators

Our third empirical strategy includes 9 victimization indicators as potential identifiers of war victims. The ENV-2008 was specifically designed to document the consequences of the civil war and for this reason a new section on the 'impact of the war' was added, which included a range of questions that are commonly used to evaluate the welfare impact of war on individuals and households. We construct the victimization indicators as dummy variables, which take the value of one for a household or individual being a victim, zero otherwise. It is possible that the self-reported victimization indicators may produce subjective bias concerning a particular ethnic group or other identities. To check this possibility we run regressions on each
victimization indicator as a function of the observable characteristics. The estimated outcome does not conform to any subjective bias generated by any particular variable (for reasons of space we do not show the outcome in this paper; it is available from the authors if requested).

[Table 4.4]

We estimate the standard OLS regression of food security measured as food consumption scores as a function of the victimization dummy controlling for household and individual specific characteristics. The sample is restricted to households surveyed only in ENV-2008 round. In Table 4.4 we report the estimated coefficients for the nine victimization categories (columns 1 through 9). The coefficients of all the victimization dummy variables are negative. Consequently, for households who are self-reported victims of conflict they have on average less food security. The outcomes are statistically significant for five victimization indicators out of nine. Overall, these findings are in line

18 These objectives were in line with the Millennium development goals; MDG 2, to achieve universal primary education and MDG 3, to promote gender equality and empower women.

with the previous results. Three identification strategies we used so far indicate that households in the worst-hit areas or the direct victims of conflict on average have lower food security. Thus conflict is negatively related to food security in almost all circumstances.

5. Robustness checks

The identification strategies until this point assume that the war victims (as identified above) and control groups are exchangeable, such that they have identical distributions of variables. This can be confirmed by data using a randomized controlled trial; however, drawing causal inference using survey data requires a more careful analysis because selection biases and confounding invalidates the exchangeability assumption. In such cases the estimated causal effects are likely to be biased. In this section, we consider a few measures to check the robustness of our findings.

5.1. Propensity score matching (PSM) outcomes

Based on our research design, since it is unrealistic to assume that the incidence of war is randomly assigned, a direct comparison of two groups of individuals may not overcome the problems of identification. As a robustness check, we employ propensity score matching methods (Rosenbaum and Rubin, 1983), which estimate the impact of the causal factors using paired individuals. These are identical based on all observable characteristics (including department of birth, other households' characteristics and relevant socio-economic factors) except variables that measure war victimization. We discuss it more formally below (equation 1). Let us denote the binary victimization indicator W_i equals to one if individual *i* is a war victim and zero otherwise. We are particularly interested in estimating the average treatment effect on the treated (ATT). This can be written as equation (2) below:

$$\textbf{(1)}\quad \tau_{ATT} = FCS(\tau|W=1) = E\,[FCS(1)|W=1)] - E\,[FCS(0)|W=1)]$$

where $FCS_i(W_i)$ denotes the potential food consumption score outcome for each individual *i*. As the food consumption score of the counterfactual comparison group -

$E\ [FCS(0)|W = 1)$ - is not observed, we choose a proper substitute from the matched pairs based on propensity scores. Propensity scores are generated by simple probit regression. Individuals are paired or chosen from the war victims (treatment group) and the rest (control group) based on the closeness of their propensity scores and then we calculate the average difference in food consumption score across them. Since the performance of different matching estimators depends largely on the data structure (Zhao, 2000), for our purpose, we use the straightforward nearest neighbor matching as a baseline strategy. This method first categorizes both the treatment and control group records according to the estimated propensity score. Then it searches backward and forward for the closest control units for a particular treatment value.

In Appendix 3, we provide a visual description of the comparison of propensity score distributions between the direct conflict victims (treated) and the matched comparison groups (untreated). As Caliendo and Kopeinig (2005) have argued, the visual analysis of the density distribution of propensity scores is the most straight forward way to check the overlap and region of common support between the treatment and comparison groups. To determine the average treatment effect on the treated (ATT), it is sufficient to ensure the existence of potential matches in the control group (Bryson, Dorsett and Purdon, 2002). In our case, except for lost ownership, lost farm, lost livestock, the rest of the models show a satisfactory match simply by visual observations. A majority of the models do not encounter any common support problem.

[Table 5.1]

Table 5.1 reports the estimated effect of war on educational outcomes for nine victimization indicators. The propensity score matching method yields a negative impact of conflict on food security measured as food consumption score when individuals are direct victims of conflict by having a lower income, losing ownership, losing job, losing farm, losing livestock, losing assets and the overall effect. However, the coefficients for conflict victimization measured as registration of death and displacement do not yield an expected negative outcome. Thus, in a majority of war victimization cases, the average treatment effect on the treated (ATT) indicates that war victims have lower food security compared to the matched control group. The treatment effect is statistically significant

when victimization is indicated by a drop in income, lost ownership, lost farm and lost assets.

5.2. Double robust outcomes

The propensity score matching model is correctly specified when all relevant confounders are included in the model (Emsley et al., 2008). In this paper, we employ another robustness check on the basis of common support generated by propensity scores. We use double-robust estimators (Robins, 2000; Bang and Robins, 2005), which requires a model for estimating the propensity scores and the outcome model (OLS in our case) in the same estimator. This method selects only those observations that are on common support and discards the remainder of the data. Furthermore this retains the weights from matching, thus indicating how many times each control case will be used in the regression. The double-robust estimators provide unbiased estimates of the treatment effect when either or both of these models are correctly specified. It therefore provides more protection against the misspecification (Uysal, 2011).

Table 5.2 reports the estimates of double-robust model for nine victimization categories. If these models are correctly specified then ideally the double-robust estimates would produce a similar effect to the OLS and the treatment effect generated by propensity scores. Based on a comparison of outcomes between these three models (as shown in Table 5.2), the result is mixed but encouraging. The model is correctly specified when war victimization resulted in a drop in income, loss of ownership, loss of job, loss of farm and loss of assets. The outcomes from the rest of the models do not conform to the double-robust estimates closely. Overall the double robust support is mixed and the trade-off between the OLS and propensity scores matching methods is evident.

[Table 5.2]

5.3. OLS outcome on households restricted to children and female members

While conflict affects everyone, women and children are often the worst victims of conflict and food insecurity (USAID, 2007). Studies show negative health outcomes especially for households with children and adult women (Minoiu and Shemyakina, 2011; FAO-SOFI 2010). If food insecurity is one of the potential channel though which conflict

affects health outcomes, then households with children and adult women could be systematically different than the rest in terms of the incidence of food security. If this is true, then it might put an upward bias in the estimated OLS coefficient and the estimated negative impact could be through an upward limit considering the full sample. As a robustness check, we run the same OLS specification on household samples restricted by children of various age groups and at least two adult women. Table 5.3 reports the results. The outcomes are similar to what we find in the full sample model. Only for households with teenagers and adult female members does the level of food security decline at a higher rate. This probably explains why such households show worse negative health outcomes due to conflict.

[Table 5.3]

6. Conclusion

Understanding the causal mechanism by which conflict affects the health outcomes is critical for designing adequate polices in the post-conflict reconstruction phase. In the context of Cote d'Ivoire, this paper examines food security as one of the possible channels by which conflict escalates health concerns. Our findings indicate that households in the worst-hit conflict areas and individuals who are the direct victims of the conflict have lower dietary energy supply.

After more than ten years of protracted conflict, massive population displacement and a division of the country, there were signs of improvement in Cote d'Ivoire in 2011. Despite the recent improvement in the political situation, the effects of the long-term crisis are likely to manifest in the persistence of poor human capital outcomes. The recent evidence on Cote d'Ivoire suggests a detrimental impact of conflict on health indicators. In this paper, we combine data from two *Households Living Standards Surveys (HLSS)* collected before (ENV-2002 round) and after the conflict (ENV-2008 round) with *Armed Conflict Location and Event Database (ACLED)* (Raleigh et al., 2010), to examine the causal effect of the conflict on the dietary energy supply (DES).

Conflict and food security are linked in various ways. In most cases, conflicts affect food security by creating food shortages. In conflict affected food-producing

regions, food stocks along with livestock and other assets are seized and destroyed, which disrupts both upstream and downstream output markets. At the household level food security can be viewed as the extent to which daily food supply or consumption departs from daily minimum dietary energy requirements. In the present context, we use a proxy measure of food security, the food consumption scores (FCS), developed by the World Food Programme. The FCS measures calorie availability from food consumption taking into consideration both food diversity and frequency of food intake.

To determine causal effects of conflict on dietary diversity, we use a number of identification strategies. First, we use pre-war and post-war household data bracketing the conflict period and the spatial variation in the prevalence of conflict between regions in the country's North and South. Our second identification strategy uses the specific counts of conflict events across departments. Finally, we employ self-reported victimization indicators at the individual level. As a robustness check, the propensity score matching estimates do not alter the main findings. Other robustness checks including subsamples of households with children and alternative estimation of conflict intensity provide mixed but encouraging support to the destructive impact of conflict on food security.

Finally, we link our findings to the three dimensions of food security - availability of food, access to food and stability of food (WFP, 2007). The availability of food supply primarily depends on domestic food production and food aid whereas access to food relies on income, employment, access to assets and several other observable factors. We control for food aid and households who are farmers and these factors do not alter our main findings. The victimization indicators at the individual level and also spatial variation of conflict counts across departments provide information on the extent to which determinants of access to food were damaged. Moreover, the propensity scores based on observable characteristics confirm our findings, and by and large show a negative impact of conflict on food consumption scores. However, our data do not allow us to directly capture the stability of food which is largely a function of price fluctuation, weather and political stability. We leave these issues for future studies to examine.

Overall, the results provide evidence of the detrimental effect of conflict on food security as a mechanism that escalates health-related concerns during the on-going conflict and post-conflict recovery periods.

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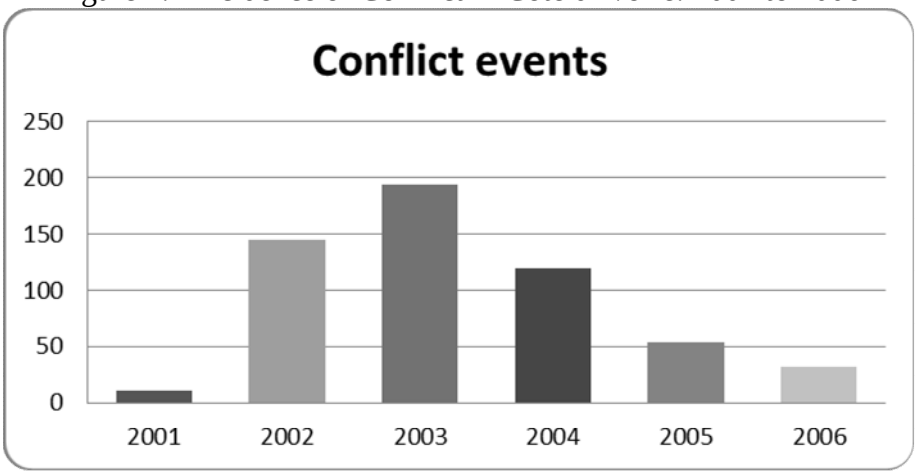
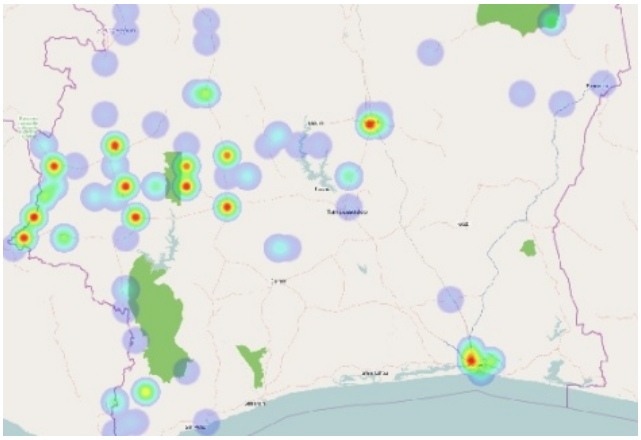
Figure 2.1 Incidence of Conflict in Cote d'Ivoire: 2001 to 2006



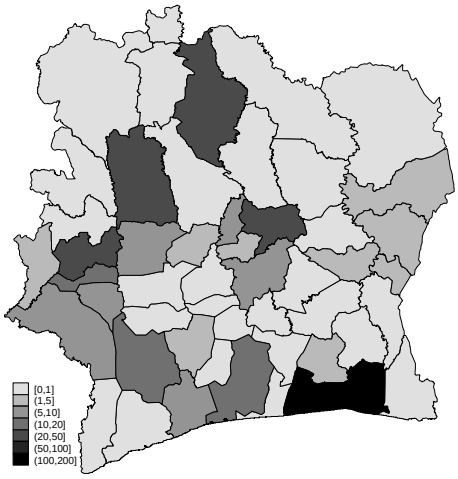
Source: Authors' calculation based on the ACLED database

Figure 2.2 Conflict events map at the department level: 2001 to 2006

Conflict events map from ACLED

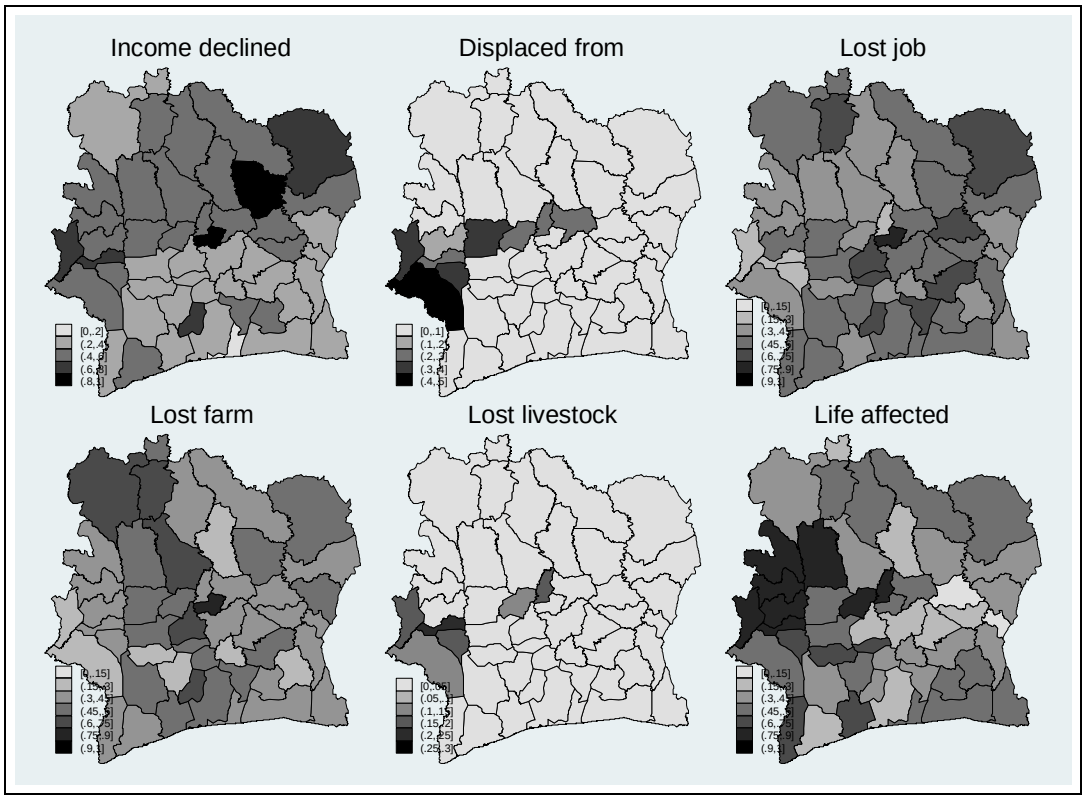


Conflict Events:



Source: ACLED and authors' own calculations

Figure 2.3 A pictorial description of war victimization



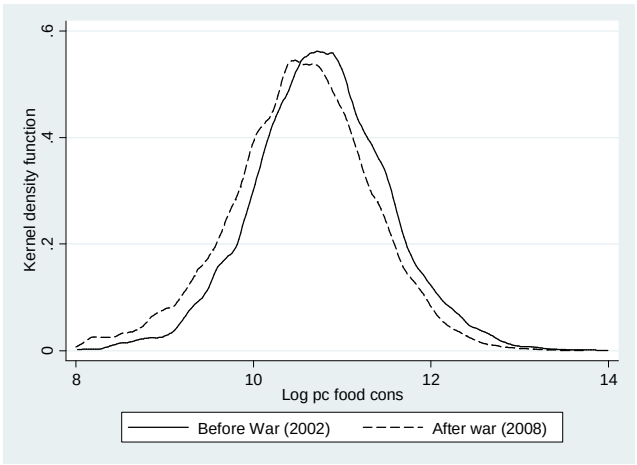
Source: ACLED and authors' own calculations

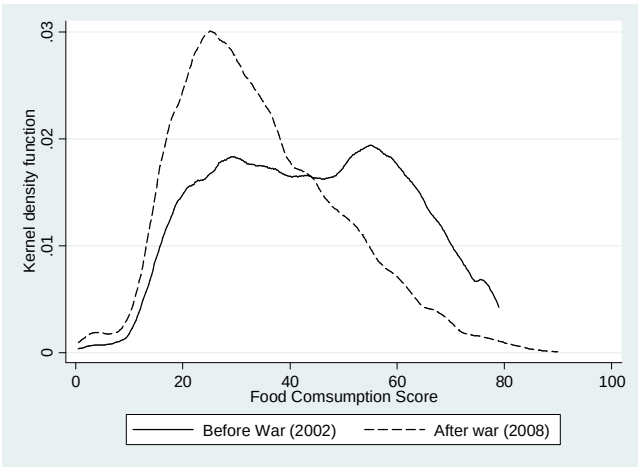
Table 3.1: Expansion of food items

	Food subcategories	Number of items in the questionnaire		
			2002	2008
Revisions made to the degree of commodity detail	Rice	# of items	3	4
		Mean share in food	17.1%	18.4%
	Yam	# of items	1	2
		Mean share in food	6.9%	6.6%
	Plantain	# of items	1	2
		Mean share in food	3.7%	2.9%
	Leaves and vegetables	# of items	19	24
		Mean share in food	9.5%	10.6%
	Fruits	# of items	9	10
		Mean share in food	3.0%	2.4%
	Milk and by-products	# of items	4	6
		Mean share in food	1.6%	1.5%
	Fish	# of items	5	6
		Mean share in food	11.3%	11.7%
No revision made to the degree of commodity detail	Maize	# of items	3	3
		Mean share in food	4.7%	4.3%
	Millet/Sorghum/Fonio	# of items	5	5
		Mean share in food	0.8%	0.5%
	Cassava	# of items	4	4
		Mean share in food	6.1%	4.8%
	Taro/sweet potatoes	# of items	3	3
		Mean share in food	0.9%	1.0%
	Meat	# of items	5	5
		Mean share in food	6.7%	5.9%
	Non-alcoholic beverages	# of items	4	4
		Mean share in food	1.3%	1.5%

Source: Authors' calculations

Figure 3.1 Kernel density plots of Per capita Food Consumption and Dietary Diversity (Food consumption scores)





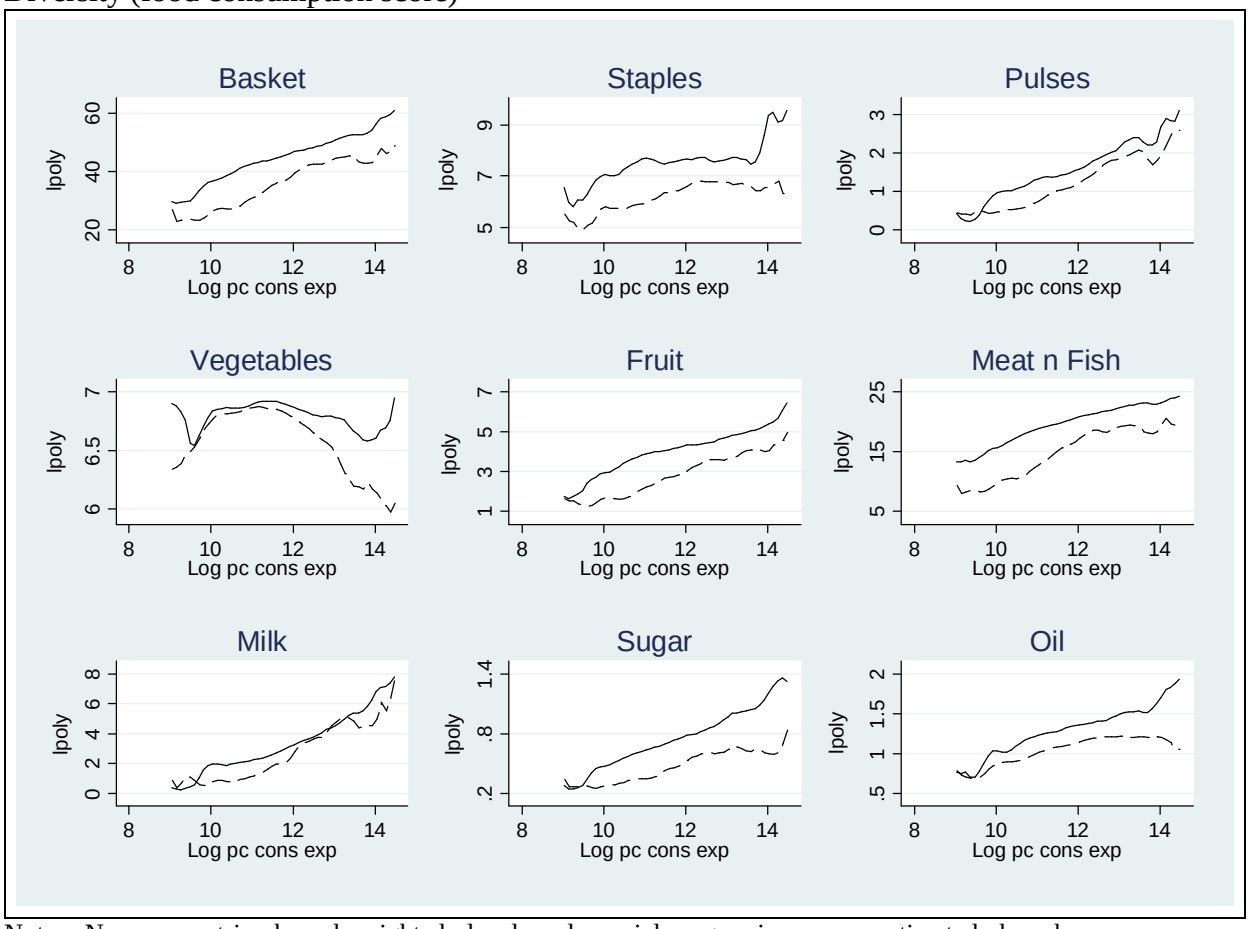
Source: Authors' calculations

Table 3.2 Classification of households based on Food Consumption Scores

Food consumption Score	ENV-2002	ENV-2008
0-21 (Poor)	11 %	19 %
22.5 – 35 (Borderline)	24 %	38 %
>35 (Acceptable)	65 %	43 %

Source: Authors' own calculation from ENV-2002 and ENV-2008 survey data. The thresholds for creating food consumption groups are adopted from World Food Program (2007).

Figure 3.2 Non-parametric kernel-weighted local polynomial regressions of Dietary Diversity (food consumption score)



Note: Non-parametric kernel-weighted local polynomial regressions are estimated based on Epanechnikov kernel.
Basket refers to aggregate food consumption score (eight categories together).

Table 4.1.1 Means of Dietary Diversity (Food Consumption Score)

	Food Consumption Score		
	South	North	Difference
Pre-war	42.70	41.82	0.87
(2002)	0.21	0.33	0.40
Post-war	33.42	31.14	2.02
(2008)	0.17	0.28	0.15
Difference	9.28	10.68	-1.39
	0.26	0.44	0.52

Note: All mean differences are statistically significant at 5 % or lower level.

Table 4.1.2 Effect of War on Dietary Diversity (Household level)

Dependent variable: Food consumption score				
	(1)	(2)	(3)	(4)
Year*North	-1.399***	-2.515***	-3.867***	-4.663***
Year (2008==1)	-9.287***	-8.720***	-7.492***	-7.213***
North (=1)	-0.880**	0.624	3.826***	5.812***
Department fixed effects	No	No	Yes	Yes
Household controls	No	Yes	No	Yes
Constant	42.707***	-28.3***	36.19***	-26.31***
Number of observations	22,519	21,828	22,519	21,828
R-squared	0.076	0.170	0.198	0.265

Notes: The household level controls include log per capita consumption expenditure, gender, gender of household head, average years of education in the household, ethnic groups and religious groups.
Robust standard errors, *** implies significant at 1%, ** implies significant at 5% and * implies significant at 10%.
Household sample consists of ENV-2002 and ENV-2008 rounds.

Table 4.2 Effect of War intensity on Dietary Diversity (Household level)

Dependent variable: Food consumption score			
	Full sample (ENV-2008)	Restricted sample to departments **received food aid**	Restricted sample to departments **did not receive food aid**
War intensity (=1 if department experienced at least one conflict event)	-0.174	-2.369***	-0.181
Department fixed effects	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Constant	-39.624***	-45.808***	-36.500***
Number of observations	11,644	2,468	9,176
R-square	0.246	0.295	0.232

Notes: The household level controls include log per capita consumption expenditure, gender, gender of household head, average years of education in the household, ethnic groups and religious groups.
Clustered standard errors at the department level, *** implies significant at 1%, ** implies significant at 5% and * implies significant at 10%.
Household sample consists only of the ENV-2008 round.

Table 4.4 OLS estimates of civil conflict on food consumption score (Individual level)

	Registered deaths	Displaced	Income dropped	Lost ownership	Lost job	Lost farm	Lost livestock	Lost assets	Affected by the war
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Registered deaths	-0.793***								
Displaced		-0.290							
Income dropped			-1.17***						
Lost ownership				-1.352***					
Lost job					-1.16***				
Lost farm						-1.83***			
Lost livestock							-0.347		
Lost assets								-0.482	
Affected by the war									-0.004
Households controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-28.2***	-27.5***	-28.3***	-28.22***	-27.9***	-27.9***	-27.8***	-27.9***	-27.8***
Number of observations	47,135	46,945	47,505	47,505	47,505	47,505	47,505	47,505	47,505
R-square	0.258	0.255	0.258	0.257	0.257	0.257	0.257	0.257	0.257

Notes: The household level controls include log per capita consumption expenditure, gender, gender of household head, average years of education in the household, ethnic groups and religious groups;
*** implies significant at 1%, ** implies significant at 5% and * implies significant at 10%.
Note: *** p<0.01, ** p<0.05, * p<0.1

Table 5.1 Estimated effects of war on years of food consumption score using propensity score matching

(Matching method: nearest neighbor)

	Observations	Treatment	Controls	ATT
Registered deaths	48101	36.16	34.91	1.25**
Displaced	47150	35.99	35.01	0.96
Income dropped	48485	33.71	34.61	-0.89***
Lost ownership	48330	35.51	36.76	-1.24**
Lost job	48485	36.71	37.79	-1.07
Lost farm	44340	32.96	34.49	-1.53*
Lost livestock	43228	34.37	34.44	-0.07
Lost assets	48274	35.95	36.99	-1.04*
Affected by the war	48485	34.89	35.34	-0.45

*** implies significant at 1%, ** implies significant at 5% and * implies significant at 10%.

Note: ATT is the average treatment effect on the treated.

Table 5.2 Double robust model outcomes

	OLS	ATT	Double robust
Registered deaths	-0.79***	1.25**	1.78***
Displaced	-0.29	0.96	1.43***
Income dropped	-1.17***	-0.89***	-0.52***
Lost ownership	-1.35***	-1.24**	-0.78**
Lost job	-1.16***	-1.07	-1.16**
Lost farm	-1.83***	-1.53*	-1.67***
Lost livestock	-0.34	-0.07	0.01
Lost assets	-0.48	-1.04*	-0.67
Affected by the war	-0.004	-0.45	0.35***

*** implies significant at 1%, ** implies significant at 5% and * implies significant at 10%.

Table 5.3 Effect of War on Dietary Diversity (Household level)

	Households with children less than 5 years	Households with children between 6 to 9 years	Households with children between 10 to 14 years	Households with more than two adult female members
Year*North	-3.612***	-3.689***	-5.505***	-5.174***
Year (2008==1)	-7.198***	-6.845***	-6.756***	-6.090***
North (=1)	9.424***	8.542***	4.979**	9.193***
Department fixed effects	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Constant	-47.775***	-39.608***	-36.365***	-40.366***
Number of observations	6,436	5,744	5,203	8,417
R-squared	0.321	0.308	0.315	0.315

Appendix 1

Calculation of Food Consumption Score

We followed the procedure as outlined in the WFP (2007) report. It involves the following steps:

1. Using standard food frequency data, group all the food items into seven food groups
2. Sum the consumption frequencies of food items within the same group, yielding a food group score for each food group
3. Any food group score greater than seven is recoded as seven
4. Multiply the value obtained for each food group by its weight thus creating weighted food group scores
5. Sum the weighed food group scores, thus creating the FCS
6. Based on the appropriate thresholds, recode the variable FCS from a continuous variable to a categorical variable for the Food Consumption Groups (as shown in Table 3.2)

Aggregate Food Groups and Weights to Calculate the FCS

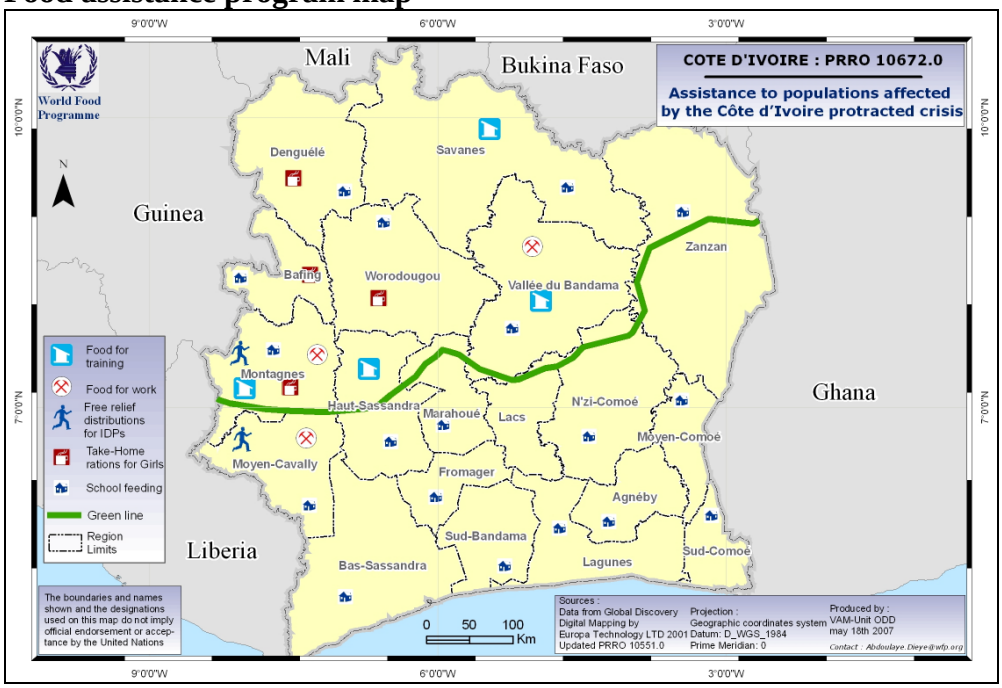
Food groups	**Weights**	**Comments**
Main staples	2	Energy dense, protein content lower and poorer quality than legumes, micronutrients (bound by phytates)
Pulses	3	Energy dense, high amounts of protein but of lower quality than meats, micronutrients (inhibited by phytates), low fat
Vegetables	1	Low energy, low protein, no fat, micronutrients
Fruit	1	Low energy, low protein, no fat, micronutrients
Meat and fish	4	Highest quality protein, easily absorbable micronutrients (no phytates), energy dense, fat. Even when consumed in small quantities, improvements to the quality of diet are large
Milk	4	Highest quality protein, micronutrients, vitamin A, energy. However, milk could be consumed only in very small amounts and

		should then be treated as condiment, and therefore reclassification in such cases is needed
Sugar	.5	Empty calories. Usually consumed in small quantities
Oil	.5	Energy dense but usually no other micronutrients. Usually consumed in small quantities

Source: Adapted from World Food Programme (2007, 17ff.).

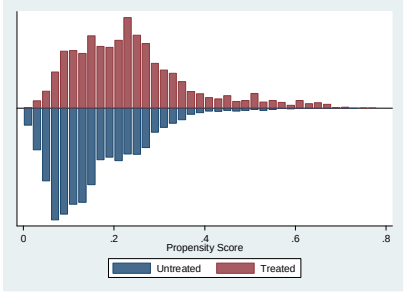
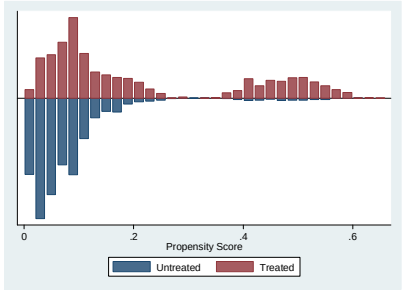
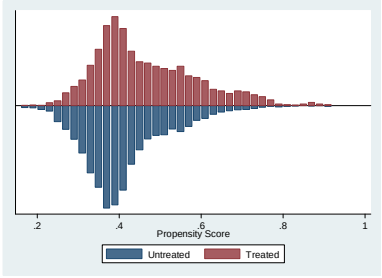
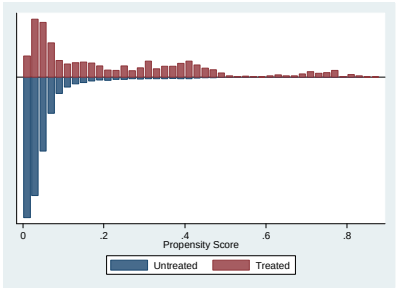
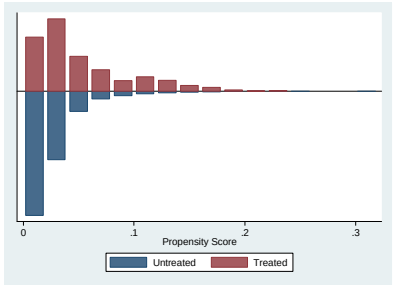
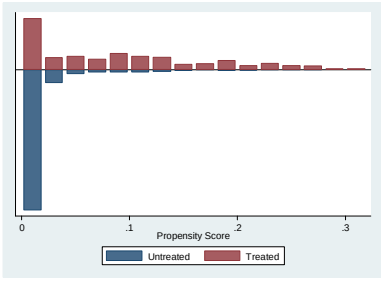
Appendix 2

Food assistance program map



Source: World Food Programme (2007)

Appendix 3 The common support between the war victims and the comparison groups

Registered deaths	Displaced	Income dropped
		
Lost ownership	**Lost job**	**Lost farm**
		
Lost livestock	**Lost assets**	**Affected by the war**