

**PIDE Working Papers**  
**2011: 71**

**An Empirical Investigation of the  
Relationship between Food Insecurity,  
Landlessness, and Violent  
Conflict in Pakistan**

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## ABSTRACT

This study is an attempt to examine empirically the association between socio-economic measures of deprivation—such as food insecurity, landlessness, unemployment, and human under-development—and the incidence of violent conflict as measured by the number of violent attacks across districts in Pakistan. The study uses a linear probability model in which the dependent variable is defined on the basis of the presence or absence of violent attacks in a particular district. The results of the study indicate that in addition to the provincial-level fixed characteristics, landlessness and food insecurity are positively and robustly associated with the probability of violent attacks across districts in Pakistan. Quite contrary to the general impression held, the number of madrassahs (religious seminaries), employment rate, and literacy rate appear to be statistically irrelevant, on average, in terms of determining the probability of the presence of violent conflict across districts in Pakistan. While emphasising the need to collect better data on the intensity of violent conflict—to take into account both the incidence as well as the origin of violent attacks across districts in Pakistan—the study raises some important questions regarding the role of landlessness and food insecurity that need to be investigated further in future studies on socio-economic drivers of violent conflict in Pakistan.

*JEL classification:* O29, D63, D74, F52

*Keywords:* Violent Conflict, Militancy, Food Insecurity, Landlessness, Pakistan

## 1. INTRODUCTION AND OBJECTIVES OF THE STUDY

Violent conflicts have emerged as one of the most crucial and urgent humanitarian and development concerns of present day developing world. These conflicts impose huge costs that are not only restricted to generating human misery and insecurity in the short run but also extend in terms of having adverse consequences on the structure of economy, polity and society in the long run.

Like many other developing countries, Pakistan's history is also marked by the presence of various sorts of violent conflicts. These may be classified as sectarian, ethnic, religious or nationalistic insurgencies. During the past one decade or so however—particularly after Pakistan became a key ally of the United States of America in its 'War on Terror'—the incidence of violent conflict in Pakistan has reached serious proportions, not witnessed earlier in its entire history. The death toll from violent conflict that includes sectarian violence and terrorism has been on an upward trend for the past couple of years. According to Pakistan Institute of Peace Studies [PIPS (2009)], the total number of armed attacks in Pakistan increased from 254 in 2005 to 3816 in 2009 (a 15 fold increase between 2005 and 2009) with the death toll rising from 216 to 12,815 during the same reference period. As a result of the ongoing armed conflict in the North-Western and tribal regions of Pakistan, the country experienced one of the worst displacements of people in 2009. According to a recent study published in the Norwegian Refugee Council, around three million people were displaced internally in Pakistan and this has been one of the greatest displacements of people in the world.<sup>1</sup>

The economic costs that include direct as well as indirect costs are huge and according to an estimate by the Government of Pakistan, these costs represent around 5.1 percent of the GDP.<sup>2</sup> Many of these costs such as the distortion in the international image of the country and the anxiety and stress experienced by the common men and women due to rising physical insecurity are intangible and almost irreversible. The incidence of violent conflict and the associated costs also impinge on the achievement of MDG goals that are vital in terms of human development and poverty eradication.

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*Acknowledgements* The author is extremely grateful to Pakistan Institute of Peace Studies (PIPS), Islamabad for providing the relevant data and answering all queries patiently.

<sup>1</sup><http://www.reuters.com/article/idUSTRE64G4LP20100517> accessed on May, 24, 2010.

<sup>2</sup>PRSP II, Finance Division, Government of Pakistan. Direct costs include loss of human lives and injuries; value of property or infrastructure destroyed or damaged; costs of enhanced spending on security. Indirect costs include costs of greater uncertainty and risk perceptions; higher transaction costs; and psychological costs.

Despite such severe socio-economic repercussions of the ongoing violent conflict in Pakistan, there has been a dearth of systematic studies that explore the key drivers of violent conflict in Pakistan. Most of the evidence in this direction is anecdotal and mostly relates to the international relations and political science literature. Many of these studies [see e.g. Abbas (2004)] suggest that the formation of the violent militant groups in Pakistan can be traced back to the cold war era when this political force, known as ‘Afghan Mujahideen’ at that time, was mobilised by the U.S. and Pakistan to fight against the Russian invasion of Afghanistan. Similarly another popular and important explanation of the growth of radicalisation and the associated violence in Pakistan is that during 1977-87, commonly referred to as the ‘Zia era’, a systematic right-wing orientation of the society was achieved deliberately through a number of legal and administrative policy measures [see e.g. Aftab (2008)]. Many analysts argue however, that despite the gradual radicalisation of Pakistan’s society and body politic during Zia era and afterwards, the radical elements in the society did not indulge in violent activities of the sort witnessed today that includes suicide bombings at public as well as private places on a frequent basis. Moreover, the level of organisation that these violent groups have achieved today—as reflected by the establishment of parallel systems of government on vast array of state territory—is also unprecedented in the history of this country. Many analysts argue that the seeds of this violent radicalisation were sown right after the Government of Pakistan became a key ally of the United States in its ‘War against Terrorism.’ In this sense, the growing radicalisation of Pakistan’s society is seen by many as a reaction to western imperialism that continues to date in one form or the other. Observations such as these that trace the political and ideological roots of radicalisation are critical to understand the formation of violent militant groups in Pakistan. Yet they offer only a partial explanation of the recent growth of religious militancy and violent conflict in Pakistan. There are important socio-economic factors that must also be analysed in order to address the root causes of present violent conflict in Pakistan.

As a matter of fact, conflict is a complex phenomenon and the root causes may relate to multiple factors that may include grievances of the perpetrators of violence; ideological hegemony of a particular group of population; political exclusion; socio-economic inequality; lack of social justice; and poor governance including the weak capacity of institutions responsible for maintaining law and order. In Pakistan too, the sources of violent conflict may be traced to a confluence of factors that may transcend from socio-economic to geo-strategic and political factors. While recognising the role and significance of each of these factors, the present study examines this important subject from the lens of a development economist and investigates the role of socio-economic factors in promoting the incidence of violence. More specifically, the study

conducts a descriptive as well as an empirical investigation of the role of human deprivation, food insecurity and the absence of land ownership in mobilising support for violent conflict.

The study is organised as follows. The next Section 2 presents a brief review of the major hypotheses and arguments in the literature regarding the sources of violent conflict in the developing world. The review draws insights from both cross-country as well as within country studies. Studies in the context of Pakistan are also reviewed so as to provide the justification and theoretical basis of our study. In particular, we provide evidence and arguments on why we include variables such as food insecurity and landlessness in our study on violent conflict in Pakistan. Section 3 presents the empirical methods of analysis and sources of data. Section 4 presents insights from the descriptive analysis of our data. Section 5 presents the estimation results whereas Section 6 concludes.

## 2. LITERATURE REVIEW

There is no consensus in the literature regarding the key drivers of conflict across countries. There are various explanations that vary from country to country and the context in which conflict is defined and analysed. Most of these explanations fall under either the ‘Greed’ or the ‘Grievance’ hypothesis [see e.g. Collier and Hoeffler (2004)]. According to the ‘Greed’ hypothesis, it is the economic opportunity and the ability to finance armed rebellion that is the key driver of conflict. Financial viability of rebel groups, and not grievances or hatred according to Collier 2006, is the key factor that increases the risk of violent conflict. The possible sources of finance according to Paul and Collier, *et al.* (2001), are foreign governments, diasporas, and natural resources. Conflict driven by ‘greed’ mostly occurs in societies with an abundance of natural resources, dependence upon the export of primary commodities and the presence of large diasporas.

The ‘Grievance’ hypothesis on the other hand, attributes conflict to the grievances of certain groups of population that are marginalised on the basis of religion, ethnicity or caste etc. These grievances are generally political in nature and conflict on this basis mostly occur in societies where political means to seek redress are limited. An important thesis similar to the ‘Grievance’ hypothesis is advanced by Stewart (2002) who provides anecdotal as well as empirical evidence to show that it is the ‘horizontal inequalities’ and the ‘failure of social contract’ between the state and the citizens that lie at the heart of most violent conflicts across the developing world. Horizontal inequalities as defined by Stewart are inequalities—that may be measured across various dimensions such as economic, political and social—between culturally defined groups. These groups may be defined on the basis of geographical affiliation, gender, religion, class, caste or language etc. This is different from vertical inequality that measures inequality between individuals irrespective of their affiliation with a

particular group. According to this view, imbalanced development that involves sharp horizontal inequalities (group differences) is an important cause of conflict across the developing world. Stewart also links the root causes of conflict in some of the developing countries to the failure of social contract [Stewart (2002b)]. According to this view, the relationship between state and the citizens is based upon a social contract in which citizens accept state authority as long as it provides public services and reasonable economic conditions. A worsening of economic conditions and the breakdown of social services may result in conflict.

In this context, many studies argue that even if poverty, deprivation, inequality and the failure of social contract do not drive conflict directly, the presence of these conditions are very likely to fuel conflict by mobilising support. In other words, the risks of conflict may exacerbate due to the presence of these conditions thereby increasing the vulnerability of countries to conflict. In Nepal for instance, poverty, social exclusion and landlessness have been identified as the major drivers of mobilising support for violent groups. Ballentine and Sherman (2003) argue that Nepal does not have many natural resources which can be captured, thereby ruling out the 'Greed' hypothesis as the basis for violent conflict. What is more evident—the author argues—is the presence of social exclusion and economic exclusion on the basis of caste and ethnicity. The lower castes are mostly concentrated in the hills and Terai and these communities have strongly supported the Maoists insurgents in Nepal. According to the study, landlessness is found to be highly correlated with the intensity of the rebellion. Similarly, Do and Iyer (2009) examined detailed data set on conflict related deaths by districts in Nepal and find that these deaths are significantly higher in poorer district and in geographical locations that favour insurgents such as mountains and forests. More specifically, they find that a 10 percentage point increase in poverty is associated with 25–27 additional conflict-related deaths. Similarly, Douma (2006) presents the case of Sub Saharan Africa where poverty, relative deprivation, political exclusion and the failure of social contract between the ruling elite and their constituencies turn out to be the key drivers of conflict. Using household level data on Uganda, Deininger (2003) also finds evidence on the lack of economic development as one of the major factors contributing to the incidence of civil strife.

A related argument in this direction is that the risk of conflict is determined by the opportunity cost of joining an armed rebellion. Individuals weigh up their costs that include foregone income from other income earning activities and the benefits of joining up the armed rebellion. If the opportunity costs are very low, the likelihood of individuals joining a violent conflict movement is very high.

As a matter of fact, the drivers of conflict vary from region to region. Studies conducted in the context of Israeli-Palestinian conflict in the Middle East, for instance, do not find any evidence on poverty or lack of education



driving conflict. Kruger and Maleckova (2003) for instance find no relationship between education or economic background and participation in terrorism in the Middle East. Utilising data from a public opinion poll conducted in the West Bank and Gaza strip, the study finds no evidence of more highly educated individuals supporting less violence against Israeli targets.

Similarly, Krueger and Laitin (2007) use US State Department's data on international terrorism and analyse the socioeconomic and political profile of the country of origin of the terrorist and the target country of the terrorist event. In particular, the study focuses on two variables: GDP per capita and civil liberties in countries from where terrorists originate. The authors do not find any support for the theory that poverty leads to violence and arrive at the conclusion that GDP per capita is not a good predictor of the origins of terrorists. Instead, it is the individuals that come from politically repressed countries that lie behind international terrorism.

World Bank (2004) conducted a study on the pattern and incidence of local conflict in Indonesia. Using data on Indonesia's 69,000 villages, the study finds that poverty by itself has very little correlation with conflict in Indonesia. However, unemployment, natural disasters, changes in sources of income and clustering of ethnic groups within villages are found to be positively correlated with the incidence of conflict. A number of other studies, mostly conducted in a cross-country perspective do not lend support to the hypothesis that poverty and lack of education increase the propensity to participate in violence [see e.g. Russel and Miller (1983); and Berrebi (2003)].

Another approach to analyse the sources of conflict emphasises the political and economic interests of the key actors of conflict. These actors/agents may derive benefits by using conflict to their own ends and these interests may very well be served by sustaining or perpetuating conflict. In Kyrgyzstan for instance, Post Soviet political elite that has used state apparatus for its own gains, has been identified as the major source of internal conflict [see e.g. DFID (2002)]. Ethnic and religious fractionalisation as well as 'polarisation' has also been found to contribute to violent conflict [see e.g. Easterly and Levine (1997)]. Amongst other variables, certain geographic characteristics have been found to be relevant in explaining armed conflict. Mountains and forests, for instance, serve as good training and hideout sites for armed groups [see Paul and Collier, *et al.* (2001)].

Summing up, conflict is a complex phenomenon for which there is no single explanatory framework. Various factors interact with each other to drive and sustain conflict. Given the multiplicity and divergence of existing evidence on key drivers of conflict, it is important to reconcile the evidence on the basis of the nature and context of conflict across different countries and regions of the world. It is also important to differentiate between within country and cross country evidence on the drivers of conflict, civil war and terrorism.

### **Evidence in the Context of Pakistan**

In the context of Pakistan, there are only a few noteworthy studies that explore the nexus between socio-economic variables such as illiteracy and poverty on the one hand and religious militancy and current violent conflict on the other hand: Fair (2008) conducted a survey of 141 households of slain militants who died fighting in Afghanistan and Kashmir. The data was collected in 2004 and focussed more on Punjab and Khyber Pakhtunkhwa. The study came up with two interesting findings: first, contrary to the general view held, the respondents were considerably more educated than the average population and second, an insignificant proportion (4 percent) attended madrassah schools suggesting that madrassahs were irrelevant to militant recruitments. The study however found unemployment to be extremely high among militants despite basic education. Aftab (2008) conducted a descriptive analysis of the spatial distribution of poverty in Pakistan and concluded that there was little evidence to suggest that poverty, per se fuelled extremism. In order to support her contention, she argued that poverty had declined significantly between 2001 and 2006. However, this had also been the period of rising militancy and violent conflict in Pakistan.

Interestingly, in recent years, a few studies point to the possible connection between measures of deprivation such as food insecurity and landlessness to violent conflict in Pakistan. The mediating factor that seems to link food insecurity and violent conflict is argued to be the poor governance or what Stewart (2002b) terms as the 'failure of social contract' between the citizens and state. A recently released Report by Woodrow Wilson International Centre for Scholars on food insecurity in Pakistan [Kugelman and Hathaway (2010)] provides convincing arguments and evidence on the critical nexus between food insecurity, governance and conflict both across countries and within the context of Pakistan. The Report argues that most countries in the world that are classified as food insecure in the world (both chronic and transitory) also suffer from poor governance and perform poorly in World Bank's worldwide governance indicators. The Report further argues that 30 of the 36 FAO's designated food-insecure countries are included in the Failed States Index.

In fact, food insecurity—particularly in the context of developing countries that are self-sufficient in the production of food such as Pakistan—is often rightly perceived as the problem of distribution and access rather than the non-availability of food. Corruption that includes hoarding of food supply and poor governance can very safely be taken as one of the root causes of food insecurity in Pakistan. Poor governance, grievances and marginalisation also leads to conflict [see Stewart (2002b)]. In the context of Pakistan, Kugelman and Hathaway (2010) utilise the conflict map of Khyber Pakhtunkhwa and FATA published by BBC Urdu service that identifies districts with respect to the

degree of the presence of militants and provide evidence on the link between food insecurity and violent conflict. The Report argues that all districts and tribal agencies classified as having “Taliban Stronghold” have the worst level of food insecurity and are designated to be “extremely food insecure” by the FAO classification. These include North Waziristan, Shangla, South Waziristan, Orakzai, Bajaur, Swat, Buner, and Lower Dir. BBC has classified these conflict districts to be the ones not only with “Taliban stronghold” but also as areas where the Pakistani government has completely lost its writ. Overall, out of 22 conflict districts (that are either classified as having “Taliban stronghold” or “Taliban presence”), 15 are extremely food insecure. Out of the nine “government controlled” districts, only two are found to be extremely food-insecure. Furthermore, the report highlights the fact that the second most food insecure districts in Pakistan: Dera Bugti (in Balochistan), also happens to be the most conflict ridden districts in Pakistan. This, according to the Report, reveals a clear relationship between governance stress, food insecurity and conflict. While highlighting the social dimensions of food insecurity in Pakistan, the Report argues that conditions such as food insecurity and landlessness that lead to the marginalisation of the general population has certainly fuelled violent conflict.

Lack of ownership of land also depicts an important form of economic marginalisation. The pattern of land ownership is highly skewed in Pakistan with the top 2.5 percent owning 40 percent of the land and nearly half of the rural households owning no land at all [Gazder (2003)]. In fact militant groups such as Taliban often exploit these insecurities of ordinary people to gain support. In the district of Swat in Khyber Pakhtunkhwa for instance, there have been reports of Taliban forcefully redistributing land [see Parlez and Shah (2009) and Kugelman, *et al.* (2010)]. People who are outraged by chronic hunger, lack of justice and poor governance are more likely to support violent conflict. Although studies such as the one by Woodrow Wilson Centre, reviewed above provide theoretical arguments and some statistics on the association between food insecurity, landlessness and violent conflict, there is no systematic study that tests the empirical validity of these arguments. The present study is an attempt to explore econometrically the association between these and other socio-economic factors and violent conflict in the context of Pakistan.

### 3. DATA AND EMPIRICAL METHODS

In order to investigate the association between socio-economic variables and violent conflict in Pakistan, we use a linear probability model in which we define a binary dependent variable based on the presence or absence of violent conflict across districts in Pakistan. More specifically let  $y_{ij}$  represent our outcome of interest in district  $j$ , then

$Y_{ij} = 0$  if there are no violent attacks in district  $j$

$Y_{ij} = 1$  if there is one or more violent attacks in district  $j$

We also present the econometric results in which our dependent variable takes the following form

$$Y_{ij} = 0 \text{ if the number of people killed per 100,000 population} = 0$$

$$Y_{ij} = 1 \text{ if the number of people killed per 100,000 population is } > 0$$

A Logit model of the following form is used:

$$Y_{ij} = a + \beta X_i + e_i$$

Where  $Y_{ij}$  is a discrete random variable that measures the presence or absence of violent conflict in district  $j$ ;  $a$  is the intercept parameter;  $X_j$  is a vector of socio-economic and geographic characteristics at the district level. These variables include employment rate, literacy, human development, the number of madrassahs, land-ownership, food security as well as provincial dummies. The justification of using these variables and their sources are described in detail below. We have used pre-conflict socio-economic characteristics of the districts to avoid any possibility of reverse causation.

### 3.1. Measure of the Incidence of Conflict

To measure the incidence of conflict, we have used data on the number of violent attacks in each district in 2009, as collected by Pakistan Institute of Policy Studies [PIPS (2009)]. The attacks include incidents of a terrorist, insurgent, and sectarian nature. We also use the number of people killed in these attacks by district. We recognise that this is an imperfect measure of conflict intensity as it relates more to the *incidence* of violent attacks and may not relate directly to the *origin* of these attacks or their perpetrators. There is definitely a dire need to map districts by the intensity of conflict—that takes into account not only the number of attacks but also the presence of violent militant and sectarian groups—so as to conduct a full-fledged analysis of the sources of violent conflict in Pakistan. However, within the limitation of data at this point, the present study is just one step towards examining the sources of the *incidence* of violent conflict across districts in Pakistan. Certainly, more comprehensive data on conflict is needed to answer some of the critical questions raised by our preliminary analysis.

### 3.2. Independent Variables

#### *Socioeconomic Variables*

Our major socio-economic variables such as literacy rate, employment rate and landlessness rate at the district level are obtained from Pakistan Living Standards Measurement Survey [PSLM (2006-07)]. The literacy rate and employment rate are used in order to test the much disputed hypothesis in the conflict literature that it is the uneducated, unemployed and thereby frustrated youth that serves as the recruiting ground of militant organisations. The

landlessness rate (percentage of households that do not own land) is not only a measure of material deprivation but it also reflects inequality in land ownership. In some specifications we also include another comprehensive measure of socio-economic wellbeing, the Human Development Index (HDI) that is a weighted average of three indices comprising of GDP per capita, education and health. This index is computed at the district level by UNDP (2003). Data on district level population is based on projections from population census conducted by the Government of Pakistan.

#### *Number of Madrassahs and their Enrolment*

This variable is used to test whether or not religious seminaries commonly referred to as *madrassahs* are relevant to militant recruitments. Data for the number of *madrassahs* and their enrolment at the district level is obtained from the census of education conducted in 2004-05 by the Academy of Educational Planning and Management.

#### *Food Security*

The World Food Programme [WFP (2003)] has classified districts according to the food security zones in which they fall. The following five zones have been classified according to the situation in terms of food insecurity: 'extremely insecure'; 'Very insecure'; 'Less insecure'; 'moderately secure'; 'reasonably secure'.

#### *Provincial Dummies*

In order to control for provincial level fixed characteristics, we also include provincial dummies.

The correlation matrix of these variables is presented in Table 1.

Table 1  
*Correlation Matrix*

|  | Attack Dummy | Killed Dummy | Khyber Pakhtunkhwa | Balochistan | Punjab  | Sindh   | Landless | Food Insecurity |
|--|--------------|--------------|--------------------|-------------|---------|---------|----------|-----------------|
| Attack Dummy                               | 1            |              |                    |             |         |         |          |                 |
| Killed Dummy                               | 0.8795       | 1            |                    |             |         |         |          |                 |
| Khyber Pakhtunkhwa                         | 0.3029       | 0.3108       | 1                  |             |         |         |          |                 |
| Balochistan                                | 0.2343       | 0.2301       | -0.3263            | 1           |         |         |          |                 |
| Punjab                                     | -0.2824      | -0.1888      | -0.4252            | -0.3641     | 1       |         |          |                 |
| Sindh                                      | -0.2587      | -0.3762      | -0.293             | -0.2509     | -0.327  | 1       |          |                 |
| Landless                                   | -0.0105      | -0.0788      | -0.5261            | 0.1295      | 0.1198  | 0.3244  | 1        |                 |
| Food Insecurity                            | 0.3461       | 0.3862       | 0.3235             | 0.2412      | -0.5263 | 0.0042  | -0.248   | 1               |
| No. of Madrassahs (per 100,000 Population) | 0.1931       | 0.2092       | 0.5582             | -0.2381     | -0.0897 | -0.2819 | -0.3773  | 0.1311          |
| Employment Rate                            | -0.1748      | -0.1679      | -0.5257            | 0.2316      | 0.0574  | 0.2902  | 0.2716   | -0.147          |
| Adult Literacy                             | -0.1036      | -0.1068      | -0.0612            | -0.404      | 0.4947  | -0.0951 | 0.1454   | -0.4894         |
| HDI  | -0.2138      | -0.2505      | -0.1893            | -0.2427     | 0.4487  | -0.0638 | 0.2522   | -0.5919         |

|   | No. of Madrassahs (per<br>100,000 population) | Employment | Adult Literacy | HDI |
|---|---|------------|----------------|-----|
| No. of Madrassahs (per<br>100,000 Population) | 1   |            |                |     |
| Employment Rate                               | -0.2172                                       | 1          |                |     |
| Adult Literacy                                | 0.0693  | -0.3749    | 1              |     |
| HDI   | -0.1116                                       | -0.1004    | 0.7179         | 1   |

### 3.3. Some Data Caveats

Before proceeding to report the estimation results, it is pertinent to highlight some data caveats. First, data on conflict intensity, either defined by the number of violent attacks or the presence of certain conditions and factors that promote such attacks is extremely limited. We have made an attempt in this study to make the best use of whatever data was available. We cannot rule out the possibility of measurement errors with respect to data collected. Improved data on these and other related variables is extremely crucial to conduct policy oriented research studies in this area. The present study takes this opportunity to highlight the significance of compiling such data.

Second, district level data on some important socio-economic variables such as poverty and human development is limited. We have used Pakistan Living Standards Measurement Survey (PSLM, 2006-07) to obtain data on most of the socio-economic variables at the district level. For FATA and FANA, such data is not available due to which we had to exclude these geographical areas that are nevertheless important in the context of ongoing conflict in Pakistan. The exclusion of these areas is likely to create a downward bias in the coefficient estimates of socio-economic variables. This is because these are the areas that have the highest intensity of conflict and at the same time have one of the poorest human development indicators. FATA continues to be one of the least developed regions in Pakistan with more than 60 percent of the population living below the poverty line [ICG (2009)]. Its maternal mortality rate at 600 per 100,000 live births is nearly twice the national average. A history of economic and political neglect of the region by the state as well as the lack of provision of public services and economic opportunity has been widely cited as one of the major factors contributing to the rise of militancy and violent conflict in FATA [see e.g ICG (2009)]. The majority of the population rely on subsistence farming or cross-border trade with Afghanistan. With meagre employment opportunities available, the opportunity cost of those who offer their services for militancy is low. According to one estimate the militants' recruits receive a monthly salary of around Rs 15,000 on average that is much higher than the prevailing salary in many other occupations in FATA [ICG (2000)]. Due to these observations, one may suggest that the inclusion of FATA and FANA districts in our analysis may strengthen the contention that poverty and lack of human development may have resulted in fuelling the violent conflict.

Third, some of the socio-economic variables such as poverty and food insecurity may be endogenous to conflict in the sense that conflict may not only stem from, but may also exacerbate poverty and food insecurity. We have tried to circumvent this problem by using pre-conflict socio-economic variables where available.

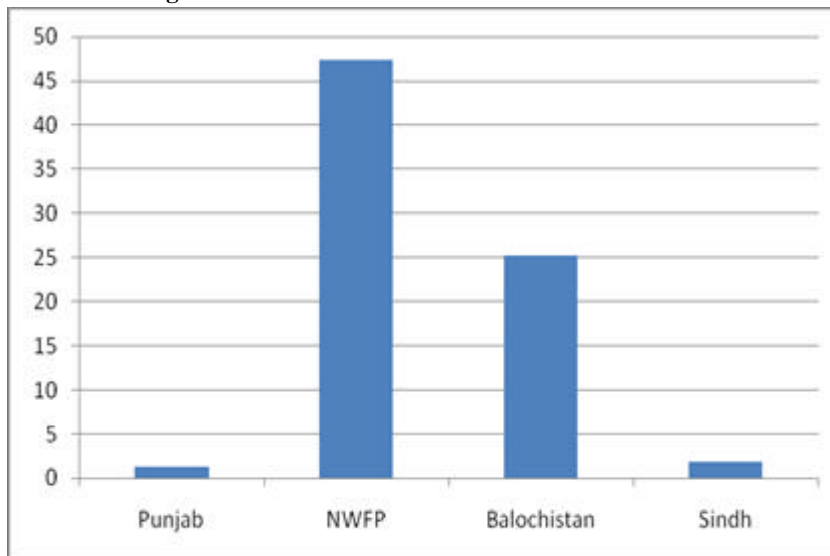
Last but not least, the relationship between socio-economic variables and violent conflict may not be causal if there are other factors that drive both socio-economic deprivation and violent conflict. Needless to mention, the analysis of political and geostrategic drivers of conflict are also outside the purview of the present study. This does not imply by any means that we discount the role of these important factors.

#### 4. INSIGHTS FROM DESCRIPTIVE ANALYSIS

##### 4.1. Summary Statistics

Originally we had around 101 districts on which data on conflict incidence was available. However, after the inclusion of all controls, we were left with 88 districts for which we report our results. Out of these, around 30 districts have not experienced any attack during our reference period of 2009 whereas 58 districts have experienced one or more attacks during the same period. The highest number of violent attacks took place in Khyber Pakhtunkhwa followed by Balochistan (see Figure 1).

**Fig. 1. Absolute Number of Violent Attacks in 2009**



Source: PIPS (2009).

In terms of casualties, around 32 districts have a death toll of zero per 100,000 population whereas the remaining 56 districts have a death toll of more than zero per 100,000 population. Table 2 shows that in conflict affected districts, adult literacy rate; net enrolment at primary level; as well as employment rate is lower, on average, than conflict free districts (with no violent attack in 2009). The average number of madrassahs and their enrolment is higher in conflict prone districts. Similarly landlessness rate is higher, on average, in conflict prone districts.

Table 2

|  | Adult<br>Literacy<br>Rate | Youth<br>Literacy<br>Rate | Net<br>Primary<br>Enrolment<br>Ratio | HDI  | Employment<br>Rate | Average<br>No. of<br>Madrassahs |
|--|---------------------------|---------------------------|--------------------------------------|------|--------------------|---------------------------------|
| Districts with no Attack                                   | 49.5                      | 61.6                      | 56.3                                 | 0.51 | 40.1               | 104                             |
| Districts with 1 or more<br>Attacks                        | 46.4                      | 58                        | 49.9                                 | 0.47 | 36.9               | 111                             |
| Districts with Death<br>Rate=0 (per 100,000<br>Population) | 45.2                      | 56.1                      | 54.9                                 | 0.51 | 40.2               | 94                              |
| Districts with Death<br>Rate>0 (per 100,000<br>Population) | 48.5                      | 60.8                      | 50.1                                 | 0.46 | 36.8               | 117                             |

While difference in terms of these socio-economic variables, between conflict-prone and conflict-free districts is not really discernible in these summary statistics, interestingly, the difference in terms of food insecurity is strikingly high: the average number of attacks is 14 in food secure districts compared to 23 in food insecure districts whereas the average number of people killed (per 100,000 population) in food secure districts is one half of that in food insecure districts (Table 3).

Table 3

|  | Food Insecure<br>Districts | Food Secure<br>Districts |
|--|----------------------------|--------------------------|
| Average No. of Attacks                                 | 23                         | 14                       |
| Average No of Attacks per 100,000 Population           | 4.6                        | 1.2                      |
| Average No. of People Killed per 100,000<br>Population | 3.2                        | 1.6                      |
| Number of Observations (N)                             | 64                         | 37                       |



## 5. LOGIT MODEL REGRESSION RESULTS

Table 4 presents the regression results of our Logit model when our discrete dependent variable is defined on the basis of whether or not a particular district has experienced one or more attack in 2009. The sign of the coefficient of an explanatory variable depicts the direction in which the probability of violent attack increases/decreases as a result of an increase in the explanatory variable. The statistical significance of a variable in explaining the probability of violent attack is shown by the *t*-values in parenthesis and is represented by asterisks in the table. In column 1, we start out with the provincial level fixed characteristics as represented by provincial dummies; the landlessness rate; and food insecurity. The dummy for Khyber Pakhtunkhwa and Balochistan stand out in terms of their statistical significance as well as their robustness. The positive signs on the coefficients of these provincial dummies indicate that the probability of violent attacks in a particular district increases, on average, if the district happens to be located in Khyber Pakhtunkhwa or Balochistan. This remains to be the case even when we include socio-economic variables in columns 2, 3, 4 and 5. This result highlights the significance of provincial level fixed characteristics in explaining violent conflict in Pakistan.

Table 4

### *Logit Regression Results*

| <b>Dependent Variable: Districts having 1 or more Attack (Yes=1; No=0)</b> |                     |                     |                    |                     |                    |
|--|---------------------|---------------------|--------------------|---------------------|--------------------|
|  | [1]                 | [2]                 | [3]                | [4]                 | [5]                |
| Constant   | -6.121**<br>(-3.19) | -6.138**<br>(-3.20) | -5.256*<br>(-2.04) | -6.703<br>(-1.90)   | -3.324<br>(-0.82)  |
| Khyber Pakhtunkhwa   | 4.521***<br>(3.4)   | 4.118**<br>(2.86)   | 3.896*<br>(2.54)   | 3.972**<br>(2.61)   | 3.875*<br>(2.52)   |
| Balochistan  | 3.015**<br>(3.17)   | 2.973**<br>(3.13)   | 2.976**<br>(3.1)   | 3.074**<br>(3.13)   | 3.053**<br>(2.89)  |
| Punjab   | 1.473<br>(1.85)     | 1.336<br>(1.63)     | 1.251<br>(1.48)    | 1.213<br>(1.37)     | 1.327<br>(1.58)    |
| Landlessness   | 0.0693**<br>(3)     | 0.0680**<br>(2.98)  | 0.0683**<br>(2.99) | 0.0667**<br>(2.88)  | 0.0706**<br>(3.05) |
| Food Insecure Districts (1=yes; 0=No)                                      | 1.475*<br>(2.19)    | 1.462*<br>(2.13)    | 1.488*<br>(2.21)   | 1.652*<br>(2.27)    | 1.251<br>(1.82)    |
| Number of Madrassahs per 100,000 Population                                |                     | 0.0376<br>(0.6)     | 0.0398<br>(0.64)   | 0.0327<br>(0.56)    | 0.0421<br>(0.65)   |
| Employment Rate  |                     |                     | -0.0216<br>(-0.68) | -0.00621<br>(-0.15) | -0.0299<br>(-0.81) |
| Literacy Rate  |                     |                     |                    | 0.0179<br>(0.52)    |                    |
| Human Development Index  |                     |                     |                    |                     | -3.362<br>(-0.63)  |
| No. of Observations  | 87                  | 87                  | 87                 | 87                  | 87                 |

*t*-statistics in parentheses.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\*  $p < 0.001$ .

Interestingly, the coefficient on both landlessness and food insecurity is statistically significant (at 1 percent and 5 percent respectively) even after controlling for provincial level fixed characteristics. The signs are positive indicating that both landlessness and food insecurity increases the probability of violent attacks. Both these variables are fairly robust even when we include other socio-economic variables in columns 2, 3, 4 and 5.

The number of madrassahs per 100,000 population do not exert a statistically significant impact on the probability of violent attacks. This finding again supports the Fair (2008) study according to which madrassahs are largely irrelevant to militant recruitments. Most of the militants in her study originated from the public schooling system. The employment rate, literacy rate, as well as the Human Development Index (HDI), added in column 3, 4 and 5 also do not seem to be associated with the probability of violent attacks in a statistically significant manner. This is quite contrary to the general impression held that it is illiteracy and lack of education that drives violent conflict. Again, this confirms the findings of Fair (2008) study, according to which the households of the slain militants, in a survey conducted in Pakistan, were found to be considerably more educated than the average population. However, the results of our study must be interpreted with caution as the dependent variable corresponds more to the incidence of violent conflict and may not relate precisely to the origin of the perpetrators of violence. For that purpose, we need a separate study exploring the socio-economic background of militants and terrorists.

Table 5 presents the regression results when our dependent variable is defined on the basis of the number of people killed in violent attacks. Broadly, the results support the findings of our earlier analysis presented in Table 3. The provincial dummies of Khyber Pakhtunkhwa and Balochistan are statistically significant. Among the socio-economic variables, landlessness rate and food insecurity stand out again in terms of the statistical significance and the robustness of their impact. This is the first ever econometric verification of the possible association between landlessness, food insecurity and violent conflict in Pakistan. The possibility of an association between landlessness and violent conflict was alluded to earlier in a few journalistic articles [see e.g. Perlez and Shah (2009) in *New York Times*] but never tested empirically. This finding also strengthens the 'Horizontal Inequality' [see Stewart (2002a, 2002b)] view regarding the drivers of violent conflict according to which intergroup inequality is one of the most important root causes of violent conflict within the developing countries. The possible association between food insecurity and violent conflict as pointed out recently by Kugelman and Hathaway (2010) also finds empirical support in our study. Certainly, the present study makes a convincing case of the need to explore further the role of both landlessness and food insecurity in violent conflict in Pakistan.

Table 5

*Logit Regression*

| Dependent Variable: Districts having Death toll per 100,000 >0 (Yes=1; No=0) |                     |                     |                    |                     |                    |
|--|---------------------|---------------------|--------------------|---------------------|--------------------|
|  | [1]                 | [2]                 | [3]                | [4]                 | [5]                |
| Constant   | -6.532**<br>(-2.79) | -6.604**<br>(-2.84) | -6.642*<br>(-2.49) | -9.820**<br>(-2.75) | -4.482<br>(-1.17)  |
| Khyber Pakhtunkhwa   | 4.465***<br>(3.81)  | 4.148**<br>(3.28)   | 4.158**<br>(3.21)  | 4.497***<br>(3.4)   | 4.103**<br>(3.21)  |
| Balochistan  | 3.348**<br>(3.05)   | 3.323**<br>(3.02)   | 3.323**<br>(3.04)  | 3.676**<br>(3.19)   | 3.312**<br>(2.97)  |
| Punjab   | 2.589**<br>(2.78)   | 2.495**<br>(2.59)   | 2.500*<br>(2.5)    | 2.576*<br>(2.45)    | 2.507**<br>(2.63)  |
| Landlessness   | 0.0561*<br>(2.01)   | 0.0557*<br>(2.05)   | 0.0557*<br>(2.05)  | 0.0542<br>(1.93)    | 0.0577*<br>(2.14)  |
| Food Insecure Districts (1=Yes; 0=No)  | 2.038**<br>(2.74)   | 2.037**<br>(2.7)    | 2.038**<br>(2.68)  | 2.497**<br>(2.91)   | 1.715*<br>(2.24)   |
| Number of Madrassahs per 100,000 Population                                  |                     | 0.0312<br>(0.56)    | 0.0311<br>(0.56)   | 0.0178<br>(0.36)    | 0.0336<br>(0.57)   |
| Employment Rate  |                     |                     | 0.000864<br>(0.03) | 0.0309<br>(0.81)    | -0.00718<br>(0.20) |
| Literacy Rate  |                     |                     |                    | 0.0363<br>(1.25)    |                    |
| Human Development Index  |                     |                     |                    |                     | -3.625<br>(-0.84)  |
| No. of Observations  | 88                  | 88                  | 88                 | 88                  | 88                 |

t-statistics in parentheses.

\*p&lt;0.05, \*\*p&lt;0.01, \*\*\* p&lt;0.001.

**6. CONCLUSION**

Empirical evidence on violent conflict across developing countries indicates that quite often it is the socio-economic deprivation and intergroup inequality that drive violent conflict. This study tests this important hypothesis in the context of ongoing violent conflict in Pakistan. The intensity of violent conflict is measured by the number of violent attacks and the number of people killed in these attacks by districts in 2009. While recognising the imperfection of this measure to depict fully the origin of violent attacks, the study provides important insights on certain socio-economic factors that need to be explored further in the context of ongoing violent conflict in Pakistan. The study uses a linear probability model in which the dependent variable is defined on the basis of the presence or absence of violent attacks in a particular district. The results indicate that in addition to the provincial level fixed characteristics, two socio-economic variables: landlessness and food insecurity seem to be positively associated with the probability of violent attacks across districts in Pakistan. The statistical significance of both these variables remains robust to the inclusion of other variables such as the number of madrassahs operating in a district; employment rate; literacy ratio and the Human Development Index. The overall irrelevance of the madrassah factor in driving violent conflict in Pakistan is quite

contrary to the general impression held but supports earlier empirical studies conducted on this subject such as that of Fair (2008). The role of food insecurity and landlessness as alluded to in some recent studies on conflict in Pakistan certainly finds empirical support in the present study. Future studies on socio-economic drivers of violent conflict in Pakistan need to explore these aspects further. Last but not least, reliable data in the form of mapping of districts by the intensity of violent conflict—that measures both the incidence as well as the origin of violent conflict—is extremely crucial to corroborate our findings on the socio-economic drivers of violent conflict in Pakistan.

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