Economics of Civil Conflict: Evidence from the Punjab Insurgency

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The article reviews the economic causes and consequences of the civil conflict in Punjab (1978-1993). Based on the rationalist strand of the literature, commitment problems and issue indivisibilities were proximate causes for the rise of the Punjab insurgency. During the insurgency, agricultural growth and incomes suffered and large numbers of cultivators became unemployed. While smaller cultivators may have been hindered by a decline in productivity, the richer farmers appear to have been affected more by the insurgency. They reduced their long-term investment but did not change their short-term investment decisions. There were larger negative developmental effects on labor spending and education. There was less spending on permanent labor and on longer-term contracts in agriculture. The insurgency not only affected agricultural growth and the economic lives of those engaged in agriculture but also had wide-ranging impacts on human capital accumulation. The conflict led to distortions within households on educational spending. Due to a prevailing gender bias, the conflict exacerbated the educational gap between girls and boys.

Introduction

The Punjab Insurgency in India (1978-1993) took the lives of over 20,000 people (P. Singh, 2012; Telford, 2001). Yet, there has been little research on the economic causes and consequences of the conflict in Punjab, which has been classified as a civil war and also an insurgency. In this article, I delve into some of the reasons why Punjab suffered such a prolonged and bloody insurgency. Finally, I consider the macroeconomic and microeconomic effects of the conflict in Punjab that affected every walk of life, and perhaps continues to do so today. Although there was a spike in violence related to civil wars in the 1990s after the collapse of the Soviet Union, incidence of civil wars as well as number of casualties in civil wars have been on the decline ever since (Gleditsch et al., 2002). There has been a corresponding "substitution" of violence into localized insurgencies in South Asia and drug-related trafficking violence in Latin America. This pattern can also be seen in the Indian context in Kashmir, Assam and Punjab where civil conflicts morphed into localized insurgencies with multiple non-state actors.

In this article, I outline (1) theoretical and empirical foundations of civil conflicts and insurgencies based on the broader economics and political science literature and then apply these to shed light on the case of the Punjab civil conflict (1978-1993), and (2) the macroeconomic and microeconomic consequences of the insurgency on Punjab's development.

Empirical literature on the causes of conflict

In order to understand the causes of civil wars, I state the definition of 'civil war' that I will use and then analyze the data according to this definition. There are several definitions of civil wars, but the most popular one is that used in the International Peace Research Institute (PRIO)/Uppsala dataset: "A contested incompatibility which concerns government and/or territory where there is use of armed forces and at least 25 battle deaths per year." In this data set, 25-999 deaths per year is the criterion for a minor conflict and more than 1000 deaths per year is categorized as a civil war. Variables in this dataset include "type of war", start date, end date, battle deaths, and results. There are obvious problems with this rather arbitrary definition, but as no better alternative is available, there seems to be an emerging consensus on using the above definition.

The Punjab civil conflict between the years 1985 and 1993 can be classified as a civil war according to this definition. A narrower classification may be an "insurgency." Fearon and Laitin (2003) define insurgency as "a technology of military conflict characterized by small, lightly armed bands practicing guerilla warfare from rural base areas."[1]

$$probability of war = \alpha.GDP per capita + \delta.population + \theta.terrain + \eta.tradeopenness + \varepsilon$$

The variables on the right hand side of the above equation, also called explanatory variables, attempt to explain the variation in the left hand side variable.[2] The coefficient of each explanatory variable is the change in probability of war for a one-unit increase in the corresponding explanatory variable, holding all other variables constant. The term ε is a classical error term included to model any other factors that affect the probability of war but have not been included on the right hand side of the regression or cannot be measured. The critical assumption is that ε should not capture excluded explanatory variables; otherwise the estimates of coefficients will be different from their true value (i.e. biased). This assumption is very often violated as there may be omitted variables (such as education) that could be correlated with GDP per capita and also affect probability of war (due to opportunity costs of fighting). Therefore, a common strategy is to control for as many variables as possible on the right hand side.[3] Another violation occurs due to reverse causality, where the left hand side variable (likelihood of war) affects any of the right hand side variables (income). For instance, people may stop investing in their businesses or there is selective migration in anticipation of conflict.

Despite these concerns, the earlier empirical literature in economics on civil conflicts points to the following correlations relying on cross-country regressions (regressions including values on all relevant variables from multiple countries):

(1) A lower per capita income and/or lower economic growth leads to a higher likelihood of conflict. This could be because of two reasons: a) The Collier and Hoeffler (1998) View: a reduced opportunity cost for

engaging in violence (due to a decline in wages) and b) The Fearon and Laitin (2003) View: a reduced state capacity (which is proxied by a lower per capita income) for targeting anti-state actors.

(2) Mountainous terrain contributes to a greater possibility of violence. This can be explained through a lack of economic development (which is difficult to achieve in mountainous terrain due to high costs of transportation) or because it acts as a refuge for rebel groups making the conflict persist (Fearon and Laitin, 2003).

(3) Lower levels of schooling are correlated with violence. This is also consistent with the Collier and Hoeffler view laid out in (1).

(4) Most economists stress the opportunity motive of a rebellion as laid out in (1)-(3) as opposed to the grievance motive. It is argued that because ethnic fragmentation, inequality, religious fractionalization and political participation are not significant in regressions, there is no grievance motive. This reasoning may be flawed for two reasons. First, we may not have adequate measures of inter-group inequality or the extent of religious polarization in society. Second, the regressions themselves suffer from serious econometric problems of reverse causation and omitted variables.

Conceptual framework

Economists like to model agents as acting in their own self-interest, even if these agents do not have identical utility functions. Modeling rebel groups as rational actors has gained currency in the theoretical economics literature. Several models predict the duration and the onset of civil war, how rebel groups would react to concessions and the effect of the state's uncertainty about the strength of the rebel group on the outcome of the war (Collier, Hoeffler, & Söderbom, 2004). The critical assumption is that both parties maximize their payoffs given their beliefs about the other party.

This rationalist approach, as exemplified in Jim Fearon's classic paper (1995), views conflict as an outcome when there is the impossibility of resolution through peaceful negotiations or concessionary bargains. He identifies three reasons why civil wars may take place:

(1) *Asymmetric information* – here, the relative strength of the two sides (typically, the government's army and a rebel group) is unknown to one another and there is no incentive to disclose one's power to the other side. This causes one of the sides to overestimate its chances of winning the conflict and thus they are unable to settle for a negotiated bargain that would have been efficient. This is unlikely to have been a problem in Punjab, as the police and rebel groups appear to have been well aware of their relative military power (and progressively more so as the insurgency became prolonged).

Asymmetric information can often be caused by geography. In sociological research by Joyce Pettigrew (1995), a political leader told her:

> *"If only we had had the mountains or the sea, we would have had our freedom by now…the people are our jungle."*

(2) *Commitment problem* – this issue is related to the dynamic nature of how conflict or peace affects one's strength in the future. If one of the sides (say, the rebel group) lays down arms in return for assurance from the government to give them amnesty or employment, there is an incentive for the government to renege on its promise after the rebel group has unarmed itself. On the other hand, there may also be preemptive strikes by the government against the rebel group (or vice versa) to not allow the balance of power to shift in the future. These theoretical reasons are not restricted to the explanation of civil wars. An example of the commitment problem is the American war on Iraq, which was based on the premise of the possibility of nuclear weapons altering future relative bargaining power between the US and Iraq.

(3) *Issue indivisibility* - it may also be impossible to bargain over conflictual issues that are indivisible (for example, the identity of the king, the state religion, or the state's capital). In this case, again, it is impossible to arrive at a peaceful negotiation.

Application of theory to the context of Punjab

In the rationalist strand of explanations for civil conflict, the theory of commitment problems seems to fit the scenario of Punjab. The insurgency began in 1978 as a religious movement. It advocated a separate country "Khalistan" with the insurgent group's disagreeing with the Center on economic issues. Despite a series of negotiations, there was no breakthrough between the Center (represented by the then Prime Minister, Indira Gandhi) and the separatists (led by Jarnail Singh Bhindranwale). Serious attempts were made to resolve the conflict, after the assassination of Indira Gandhi by her two Sikh bodyguards. In 1985, President's rule (a state of emergency) was lifted from Punjab with the Rajiv Gandhi-Longowal Peace Accord, which referred all contentious issues to several commissions. But Longowal was assassinated soon after, and the accord was never fully implemented by the central government. In May 1987, due to political instability, President's rule was imposed on the state again.

Two reasons may have contributed to this. First, there were commitment problems, i.e. no credible commitment mechanism for the separatists to believe in the Center's offers. This would mean that once the extremists handed over their weapons, there would be an incentive for the government to renege on its promises. This commitment problem could have been potentially solved through a credible third-party commitment agency. The other option was to wage war. Second, issue indivisibilities, namely, river water sharing and Chandigarh being made the capital of Punjab, were issues that did not seem to have a bargaining equilibrium as there may have not been enough alternatives for the groups to choose from and the initial allocation of water rights was at stake. In this case, a search for a negotiated solution is usually futile (Richards and Singh, 2002). This problem was accentuated by the divisions among the militant groups themselves, despite trying to forge alliances through committees.

The (bread) basket case of Punjab[4]

In many ways, the insurgency story of Punjab is anomalous to the stylized facts of civil war literature on all three counts and there are no obvious economic causes for the insurgency. Punjab was one of the richest states in India at the start of the insurgency, had not experienced any serious economic recessions, had no mountainous area, and had levels of schooling that were not lower than several other peaceful states.[5] Punjab ranked second in India in terms of the Human Development Index in 1981 (Indiastat).

Having a rural base in Punjab was essential to the insurgency as it provided cover from the state armed forces. Local knowledge allowed rebels to credibly threaten retribution for informing the police (Kalyvas, 1999). In Punjab, kidnapping was an efficient technology used by insurgents to extract rents and the insurgency was informationally extremely localized, especially in villages (P. Singh, 2012).

The death toll in the Punjab insurgency rose from 1,333 in 1987 to 5,265 in 1991 and tapered to 871 in 1993. By 1994, the police declared that normalcy had returned. Along with an increase in police personnel, changes in foreign support due to sealing of borders with Pakistan and the curtailing of ISI funding by Benazir Bhutto contributed to ushering in peace.

According to a village survey conducted by Puri et al. (1999), 65 per cent of the insurgents were from large families of landless laborers and marginal and small farmers while the majority of the remainder came from middle-class, rural families with over 5 acres in land holdings. Of the insurgents, 68 per cent were between the ages of 18 and 25 and 70 per cent were unmarried during the years of the insurgency (Singh and Shemyakina, 2016). Over the period of the conflict, 12.6 per cent of persons killed by insurgents were women. In rural areas especially, it was not uncommon for young insurgents to sexually exploit women in households where they forcibly made their stay (Puri et al., 1999). In the last part of the paper, we explore the gender-differential effects of the conflict in Punjab on education.

Macroeconomic consequences of conflict on development in Punjab

The 2004 Development Report states that Punjab's per capita income grew to more than twice that of the all-India average by 1979-1980. However, by 1998-1999, Punjab's per capita income was only 44.30 per cent higher than the all-India average (Government of Punjab, 2004). Punjab's growth in per capita income was actually lower in the 1990's than the 1980's (2.72 per cent in the 1990s vs. 3.42 per cent in the 1980s (L. Singh and S. Singh, 2002).

First, we assess the macroeconomic consequences of the conflict in Punjab. In order to understand the effect on Punjab's economic growth, we can compare the growth of Punjab to that of India in five-year intervals from 1960 until 2001-02.[6] The growth rates presented in Table 1 are split by sector into Primary (P), Secondary (S) and Tertiary (T), and then the overall weighted average growth is recorded in the column labeled "O." We observe two main patterns. First, the

growth rates of Punjab and India appear to show a secular and consistent increase with the arrival of the green revolution in the late 1960s. However, beginning in 1974, India's overall annual compound growth rate is 5 per cent and above, whereas Punjab records growth higher than 6 per cent before the onset of the insurgency but slowly drops to under 5 per cent per year in its aftermath. Second, there is growth in Punjab's manufacturing and services sectors (secondary and tertiary sectors) even in the 1990s and the substantial slowdown in overall growth is driven by the decline in the growth of the agricultural sector (which contributed 48 per cent to the state's GDP in 1981 and 1991). Punjab's growth starts slowing down post 1990, especially in the primary sector.[7]

Table 1: Average Annual Compound Growth Rate of Gross State/National Income (%)

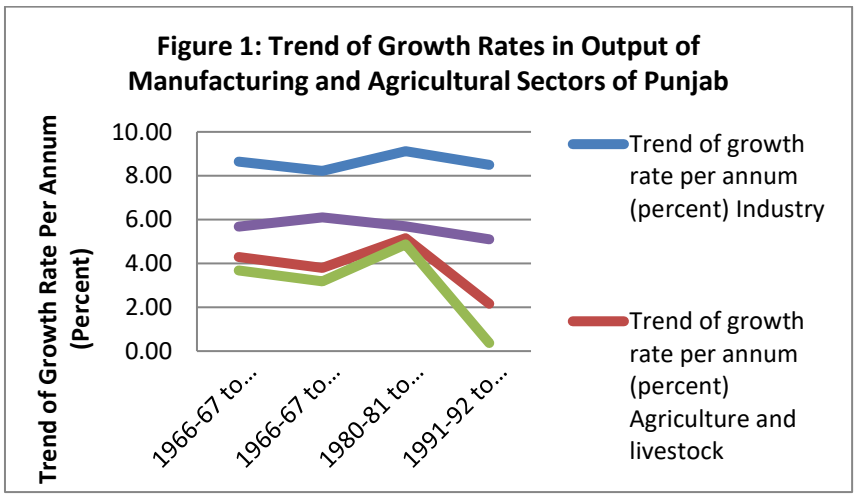
	Punjab				India			
	P	**S**	**T**	**O**	**P**	**S**	**T**	**O**
1960-61 to 1965-66	2.4	6.0	4.5	3.6	-0.9	6.9	5.6	2.7
1965-66 to 1968-69	9.9	6.7	6.8	8.4	4.5	2.9	3.9	4.0
1970-71 to 1975-76	2.86	5.87	5.95	4.21	0.5	3.9	4.5	2.5
1974-75 to 1978-79	5.74	8.70	7.93	6.87	3.62	6.39	6.49	5.14
1980-81 to 1984-85	5.37	5.04	5.14	5.23	5.63	6.05	5.42	5.66
1985-86 to 1989-90	5.24	8.65	5.22	5.98	3.58	6.49	7.41	5.79
1992-93 to 1996-97	3.08	7.10	5.78	4.81	3.85	8.28	7.87	6.76
1997-98 to 2001-02	1.84	6.20	5.38	4.08	2.21	4.52	7.77	5.34

Source: Statistical Abstracts of Punjab (Various Issues); Author's calculations.

Note: (i) P - Primary sector, S - Secondary sector, T - Tertiary sector and O - Overall growth-rate.

(ii) Up to 1968-69 growth rates are at 1960-61 prices; for period between 1970-71 to 1978-79; at 1970-71 prices; between 1980-81 and 1996-97, at 1980-81 prices, and for 1997-98 to 2001-02, at 1993-94 prices.

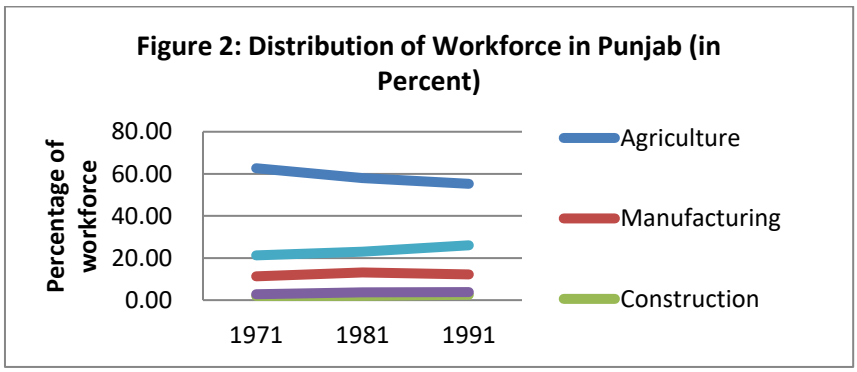
To dig deeper into the dismal performance of Punjab's primary sector, Figure 1 shows that the trend of growth rate per annum for the Industry sector (blue) is relatively constant over the time period 1966-1999 with Livestock (purple) decreasing slightly throughout. Agriculture (green) has an initial spike from 1980-81 to 1990-91 with a sharp decline in the 1991-92 to 1998-99 period, visually showing the agricultural sector's collapse to a near 0% growth rate.



Source: L. Singh and S. Singh (2002); author's calculations.

The slowdown in Punjab's agricultural growth led not only to a loss in incomes but also to reduced employment of agricultural laborers. Using data from the Census, Figure 2 shows that a majority of Punjab's workforce is engaged in agriculture. However, from 1971 to 1991, the percentage of workers employed in agriculture has decreased. The percentage of workers in the services sector ("Others") has increased the most while manufacturing, construction, and transport, storage and communication appear to be relatively stable.

Employment in agriculture includes self-employed cultivators and agricultural laborers (hired labor). According to the 2004 Punjab Human Development Report, the percentage of cultivators in the workforce fell drastically from 43 per cent to 31 per cent between 1971-1991, whereas the proportion of agricultural laborers grew from 20 per cent to 24 per cent. Manufacturing and services also grew modestly over the same period.



Source: Census of India 1971, 1981, 1991; author's calculations.

It is tempting to conclude that Punjab's slowdown in the 1990's was because of a secular decline in agricultural productivity. This could happen, for instance, if returns to HYV seeds, fertilizers and irrigation diminished following the golden years of the green revolution. Even though the production process had become highly mechanized, and bullock cultivation was replaced by tractor cultivation, poor cultivators were often unable to procure the needed capital. Aiyar (2012) argues that the notion that the insurgency caused Punjab's economic decline is a myth because the conflict ended two decades ago while Punjab's decline persists. Moreover, Indian states that face Maoist insurrections continue to record high growth. For example, Chhattisgarh has been greatly affected by conflict yet continues to be one of the fastest growing states in India (9.1 per cent average between 2002-03 and 2010-11) (Aiyar, 2012). On the other hand, a World Bank (2004) report conjectures that the agricultural decline can be attributed to decline in long-term investment amid uncertainty surrounding militancy.

Even though the macroeconomic data can provide us with clues regarding the causal impact of the conflict, there could be other underlying factors (failure of governance, low technological growth) that may lead to both conflict and poor growth in incomes. Thus, macroeconomics research fails to shed light on the hypotheses posed above. To explain whether and how agriculture was affected by the conflict, we need to analyze microeconomic data.

Transition to microeconomic research

It is econometrically much cleaner to use individual-level or firm-level data sets as regressions using such data would not lead to the reverse causality bias. Hence, there has been a shift in the research frontier towards more micro-oriented research and towards understanding the consequences of conflict which is less prone to such biases. This shift towards micro-level analysis will continue as data gets sharper and more accessible and resources are channeled into conducting household surveys. However, the big picture is often lost in the process, as social gains become tougher to estimate and moreover, general equilibrium effects are not taken into account.

Microeconomic papers often employ a methodology that relies on the assumption that conflict affected areas would have had the same trend (in growth or investment) as peaceful areas if there was no conflict (also known as the common trends assumption). The advantage of this approach is that by only having data along two points in time, one can estimate the difference in growth between the treated group (here, conflict-prone districts) and the control group (here, peaceful districts). There is an added bonus of restricting ourselves to the same institutional setup and not comparing apples (here, districts in Punjab) to oranges (districts in other parts of India). This approach is known as difference-in-differences.

By using individual-level data over time we can control for several omitted political and economic factors that are either fixed in a district over time or are changing over the entire state in a similar fashion every year.

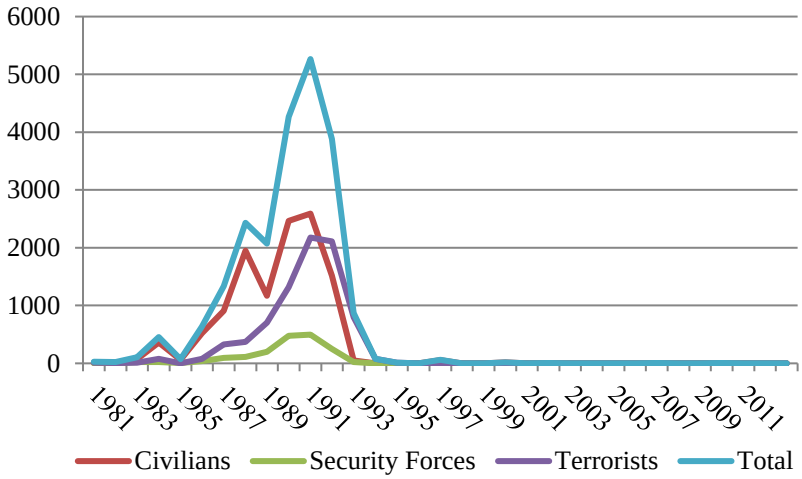
Punjab's conflict and agricultural labor spending

In earlier work, P. Singh (2012) analysed farmer-level expenditure data from the Punjab Agricultural Department to study the effect of violence on labor spending. The farmer-level data on labor spending was collected from annual surveys conducted by the Punjab Agricultural Surveys between 1978 and 1990. The main objective of the study on bullock-operated holdings was to assess expenditures of the cultivators in the state and to analyze important changes in farming. The study covers the entire state of Punjab in a repeated cross-sectional approach (where different farmers from the same sub-districts are sampled every year). One bullock-operated holding per sub-district has been surveyed. These holdings have been selected considering cooperation, willingness and the capability of the cultivator to maintain day-to-day records of his farm.[8]

There are two categories of manual labor spending: first, "Permanent manual labor spending" – which includes wages paid to labor hired for the entire year. If any family members were working on the farm, their forgone market wages were added to the permanent labor spending on the basis of wages paid to permanent hired labor in the village. The second category is "Casual manual labor spending" which includes wages paid to temporary labor hired during the year. Thus, effects on both permanent labor spending as well as casual labor spending can be estimated. On average, farmers spend close to 20 per cent of their total farm expenditure on permanent labor and 7 per cent of their farm expenditure on casual labor.

The data set on conflict has been obtained from the South Asia Terrorism Portal (SATP), which has publicly available district-wise record of all major conflict incidents in the state during the insurgency. The data on major killings begins in 1981. There are 1,045 killings recorded in the data set and 149 incidents with at least 3 killings constituting one "major violence" incident. See Figure 3 for a timeline of the annual fatalities recorded in the Punjab insurgency.[9]

Figure 3: Annual Fatalities in Insurgency-Related Violence 1981-2013



A negative estimated impact of the conflict on labor spending can be caused by difficulty in finding labor when people look to migrate or to find safer professions within the village (supply-side channel given that average wages did not decline during this period) or by the complementary nature of labor and capital in production (demand-side channel).

Through the analysis of micro-level farmer expenditure surveys during the period 1981-1993, P. Singh (2012) finds evidence for an 11.4 per cent decline in spending on permanent, but not casual, labor. This evidence suggests that insurgency-related violence adversely affected farmstead spending on permanent, but not temporary, hiring.

Decline in spending on 'permanent' labor can also be due to investment in technology such as tractors etc., which are more likely to be undertaken by richer farm households. If one assumes technology is not differentially distributed across districts and is not differentially changing across districts, the only differential factor would be violence and conflict.

Moreover, Singh hypothesizes that these effects may not be a reflection of labor demand factors but rather driven by labor supply shifting away from longer-duration contracts. Singh notes, however, that this effect appears to hold true only for the richer half of the surveyed farm households. This is consistent with the evidence on the decrease in employment in the agricultural sector and sheds light on the different mix of contracts that existed following the onset of the insurgency.

To analyze how the insurgency impacted Punjab's economy, it is critical to understand how violence affected investment decisions of farmers as they were the primary sources of state's GDP and engaged a large fraction of the

workforce. A likely mechanism through which conflict affects investment is through firms facing the threat of extortion of their employees (human capital losses) or loss of property (physical capital losses). Regression analysis in P. Singh (2012) shows that violence leads to a significant increase in the probability of kidnapping (a proxy for threat of extortion).

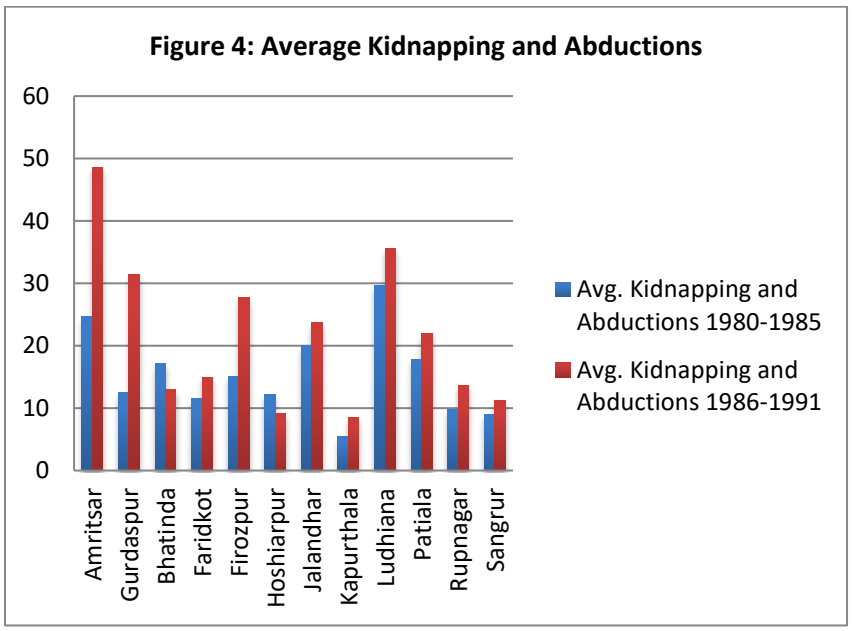


Figure 4 uses data from the New Delhi Crime Bureau's district reports and illustrates the increase in average kidnapping and abduction cases across all districts in Punjab. In particular, these measures doubled in in Amritsar and Gurdaspur districts of Western Punjab, where insurgency-related violence was the greatest. Puri et al. (1999) report several instances of kidnappings and extortions of rich farmers and businessmen that could have reduced long-term investments across sectors in Punjab. However, as Punjab is primarily an agricultural state, the greatest debilitating effects were seen in the agricultural sector.

Singh also finds that the district-level correlation between the presence of insurgent violence and kidnappings (and abductions) is close to five times higher in the following year as compared to the present year. These findings suggest that insurgent violence has the potential to signal an increase in future insecurity, which in turn can have a significant effect on labor-related choices.

Punjab's conflict and agricultural investment

Using data from annual surveys on representative farmers and district-wise

major violent incidents from 1978-1989, P. Singh's (2013) paper published in the *Journal of Conflict Resolution* finds significantly large negative effects of conflict on the level of investment in long-term agricultural technology, proxied by farmer expenditure on wells. The presence of a major conflict incident in a given district in a year is associated with a reduction in long-term fixed investment by around 17 per cent after controlling for district fixed-effects, time trends, district trends, and other farm-level controls.

In addition, these negative effects appear to be greater for richer farmers and those living in Pakistan-bordering districts. Singh calculates that this reduction in long-term agricultural technology investment on account of the insurgency results in a farmer losing close to 4 per cent of his annual income. Farmers' level of investment in short-term agricultural technology, proxied by farmer expenditure on fertilizer, is not found to be significantly affected by conflict.

Punjab's conflict and human capital development

Singh and Shemyakina (2016) use the 2005 India Human Development Survey (IHDS) to explore the long-term effects of the Punjab insurgency on educational attainment of adults who were between the ages of 6 and 16 at the time of the insurgency. They find a substantial and statistically significant negative effect of the conflict on female educational attainment. This loss amounts to a 0.83-0.91 years of school for a one standard deviation increase in conflict activity measures. To contextualize this decline in female educational attainment, the average education of women in Punjab is only 4.83 years.

Singh and Shemyakina also find evidence that suggests that in the presence of conflict and its associated constraints on resources, parents may prefer investing in the education of sons at the expense of their daughters' educational attainment. Therefore, a reduction in household expenditure on education appears to be one of the channels through which a shock imposed by the conflict hindered human capital accumulation by women. These findings highlight the consequence of increased gender inequality during conflict and post-conflict periods, which are likely to harm long-term and even inter-generational human development for women.

However, the effect of the conflict on female employment rates can reverse in some cases. For instance, Shemyakina (2011) finds that young women residing in conflict regions in Tajikistan are more likely to be employed in the last 14 days compared to women in non-conflict regions. Similarly, Menon and Rodgers (2015) find that as result of the Maoist-led insurgency in Nepal, women's employment probabilities were substantially higher in 2001 and 2006 relative to the period during the outbreak of war in 1996.

Implications for future research

The research frontier on Punjab's conflict has expanded by leaps and bounds in recent years. However, there are still important questions that have not been

answered convincingly. Not only would the answers be of academic value, but of use to policymakers as well. Future research on the impact of conflict in Punjab can analyze the following issues:

a) **Effects of Punjab's conflict on the manufacturing sector.** Even though it is likely that manufacturing firms suffered as a result of the insurgency due to poor governance, uncertainty, loss of capital and infrastructural damage, it is by no means obvious that the effect of conflict on firms is always negative, especially during a resource-based conflict. Indeed, the impact of civil conflict on individual firms has been studied with a unique methodology by Ferrara and Guidolin (2004). They look at diamond mining firms in Angola and find that a peace treaty between the rebel group and the group in power being perceived as "bad news" by the market. Using stock market data on these firms and also forming a set of control firms that did not have concessions in Angola, they notice abnormal returns falling by 4 per cent on the day the ceasefire agreement was signed.[10] They conclude that some firms may gain from the continuation of conflict because of the decreased transparency of licensing, barriers to new entrants and lower government bargaining power during conflict.

There can also be research on finding the duration of first-order effects. This will require detailed data over a longer window of time. For how long does investment in the primary, secondary and tertiary sectors suffer after the insurgency ends -- or are there immediate peace dividends? There has also been little research distinguishing outcomes during a conflict from post-conflict outcomes.

b) **Effects of Punjab's conflict on consumption.** An important determinant of GDP, apart from investment, is the consumption of individuals. Among what groups of individuals does the consumption pattern change post-conflict? Becker and Rubinstein (2004) show using micro level data from coffee shops in Israel that consumption substantially decreased after terror strikes, but this was not the case for consumers who were spending a large amount of their income on such consumption. They also show similar patterns for bus rides.

c) **Spillover effects of Punjab's conflict**. Contagion of conflict to other states such as Haryana and Delhi may have led to negative spillovers on growth in neighboring states. However, there may have also been migration of productive individuals (and reallocation of investment) from Punjab to neighboring states spurring economic growth. It can be hypothesized that industries where investments that were more mobile may not have suffered as much as industries where investments are sunk. Conflict could have also incentivized accumulation of human capital in Punjab among certain groups (as it is a mobile form of investment). Another source of spillovers is the wave of international migration that took place in the 1980s to UK, Canada and the US. For instance, Murdoch and Sandler (2004) find that civil wars have an impact on not just the home country, but neighboring countries.

d) **Finding new methodologies to control for learning.** Another possible area of study is identifying which sectors of the economy were more prone to attacks and why. For example, if extremists blow up an oil pipeline (as is the case in Colombia), the stocks of multinational oil companies that have markets in

Colombia could be compared with the stocks of the same company in a neighboring country. This strategy would help to control for other shocks to the oil industry in that region that happen at the same time as the attacks. However, when major incidents become commonplace, markets would take into account the possibility of such attacks in the future, and thus display no surprise when an attack actually occurs. Distinguishing the learning effect from other simultaneous effects is an area ripe for research. Chen and Siems (2004) interestingly unearth the apparent resilience and fast recovery of the US stock markets compared to other markets after September 11, 2001. They conjecture that this recovery is due to a stable financial sector that preserves liquidity and market stability. However, the exact reason was not recovered.

e) **Better data collection.** Individual-level surveys and firm-level data can help shed light on the microeconomic consequences of conflict. These microeconomic effects can be identified in a much more causal way than macroeconomic effects. A better survey design would measure group inequality as well as psychological attributes (self-control, grit, altruism) to control for previously unobservable variables. One important consequence for governments is to incentivize collection of data to understand the extent of inequality and polarization in society (Esteban and Ray, 1994). This will help settle the debate on how polarization affected conflict in the case of Punjab.

Conclusion

Punjab's insurgency can be considered an anomaly because it does not conform to the usual correlates of conflict – it is not a poor, mountainous or underdeveloped region and it did not suffer from a recession prior to the onset of violence. However, within the rationalist strand of literature, commitment problems and issue indivisibilities were proximate causes for the rise of the insurgency. More work needs to be done to understand how the technology of conflict (kidnappings and extortion) funded the armed groups and the industrial organization of the multiple groups (including the state) engaged in violence.

Microeconomic studies show adverse effects of conflict on physical[11] and human capital.[12] Moreover, these effects are disproportionately borne by the poor, children and women (Shemyakina, 2006). Overall, there is undeniable evidence that Punjab's insurgency affected investment and growth in the agricultural sector. Whereas the smaller cultivators may have been hindered by a decline in productivity, the richer farmers appear to be affected more by the insurgency. They tend to reduce their long-term investment – such as investment in tube wells – but do not change their short-term investment decisions – for example, spending on fertilizers. This may have led to longer term and persistent effects that are still being felt in Punjab today. These negative effects were concentrated in the Pakistan-bordering districts. There are also larger negative developmental effects on labor spending and education. There was less spending on permanent labor and longer-term contracts in agriculture. The insurgency not only affected agricultural growth and the economic lives of those engaged in agriculture but also had wide-ranging impacts on human capital development.

The conflict led to distortions within households' spending on education. Due to the prevailing gender bias, the conflict exacerbated the educational gap between girls and boys. This gender gap in education still persists today.

Notes

[1] Empirical economists do data-driven analyses ("run regressions") to understand a host of social, economic and political issues, and these techniques can also be applied to analyze the causes of war.

[2] There is no perfect multicollinearity here between population and GDP per capita. To the extent that population is also included in calculated GDP per capita, the coefficients will still remain unbiased, but this is likely to increase the standard error, which in turn would lead to insignificance of the estimates. However, empirically, the coefficients are still significant.

[3] This approach is also called the water-sink approach – it may not be the most appropriate strategy if conflict influences the control variables, resulting in the reverse causality problem.

[4] The term "Bread Basket" is mentioned in the 2004 Development Report of Punjab on page 17 with regard to Punjab's lead in India's Green Revolution of the 1960s.

[5] However, recent micro-level research on insurgencies supports the view that militancy is not correlated with poverty and lower education levels. This is consistent with the insurgency in Punjab, where those who took to arms on average were moderately educated and came from families owning small and medium sized farms.

[6] Haryana may not be a pure control group because of negative spillover effects of violence to this neighboring state and also substitution of industries to nearby locations with lower levels of violence.

[7] A more sophisticated macroeconomic approach would be to resort to the methodology of Abadie and Gardeazabal (2003) who create synthetic controls for the Basque country that take other regions of Spain in a particular combination to generate the same pre-conflict growth trend.

[8] First, biases arising due to selection of villages within sub-districts, farmers within these villages and bullock-holding farmers have been addressed in Singh (2012) where the bias (if any) would act in the direction of showing a lower effect than the true causal impact of conflict. Thus, our estimates for labour spending are also likely to be under estimated. Second, as the annual data on conflict and extortions is compiled from January to December and that from agricultural surveys is recorded from July to June, there is a natural lag of six months between the ending of conflict and labour spending.

[9] Note that the insurgents are labelled as "terrorists" in the data set.

[10] The agreement came into place after Jonas Savimbi, the UNITA leader, was killed on February 22, 2002.

[11] One of the earliest papers in this sub-field is Bruck (1996). Bruck finds that Mozambicans lost 80% of their cattle stock during their civil war.

[12] A good paper with sound empirics is Bundervoet et al. (2009). The authors create instrumental variables from the timing of armed clashes in the Burundi civil war to estimate impacts on child nutrition. Children who lived in a war-affected region have sharply lower height-for-age ratios.

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