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Violent Conflicts and Economic Performance of the Manufacturing Sector in India

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Abstract

We investigate the effects of violent conflicts on the economic performance of manufacturing sector of Indian regional states. The number of violent conflicts, the number of deaths and the number of participants in violent conflicts all have negative impacts on gross value added and capital labor ratio of manufacturing sector. Among violent conflicts, ethnic and religious conflicts, as well as those nested in a large conflict have significantly negative impacts.

JEL Classification No.: D74, K42, O43, R3, L2
Key Words: violent conflict, gross value added, capital labor ratio, ethnic conflict, religious conflict, nested conflict

1. Introduction

Conflict is defined as disagreement or confrontation between groups (or individuals) over some interests. Conflicts are ubiquitous in human life and can be peaceful or violent. Violent conflicts typically damage human and physical economic resources, and alter the expected returns to economic activities, leading to changes in economic action and thus economic performance.

Although the frequency of interstate wars has been on the decline since the end of World War II, the number of internal violent conflicts has been increasing (Fearon and Latin 2003). Internal conflicts include civil wars, riots, terrorist attacks, protests, demonstrations, feuds, lynching, pogroms and genocide, which are not mutually exclusive. These violent conflicts can be classified in terms of various dimensions, such as objective, strategy, participants, targets, organization, location and duration. Different violent conflicts could have distinct effects on various economic actions. However, previous studies that examined economic consequences of violent conflicts have been rather broad-brush, typically relating the number of incidence or casualties to macroeconomic measures such as the growth rate of GDP or per capita GDP (e.g., Blomberg, Hess and Orphanides 2004).

In this study, we examine the effects of different types of internal violent conflict on the economic performance of the manufacturing sector. While there is a vast literature on the cause of violent conflicts, such as civil war (e.g., Collier and Hoeffler 1998, 2004; Collier, Hoeffler and Rohner 2008; Fearon and Laitin 2003; Dube and Vargas 2013; Miguel, Satyanath and Sergenti 2004; Do and Iyer 2010), riots (e.g., Varshney 2001; Wilkinson 2004; Brass 1997, 2003) and terrorist attacks (e.g., Blomberg, Hess and Weerapana 2004), the literature on the consequences, especially economic consequences, of internal violent conflicts is scarce. Within this thin literature, the economic consequences of civil wars have recently become better studied (see, e.g., Collier 1999; Deininger 2003). In contrast, the economic consequences of violent conflicts on a scale smaller than civil wars, such as riots, are yet to be understood. [1]

[1] It is interesting to note that, compared with the very large body of literature in political science on the causes of riots, studies on the consequences of riots, especially those on the impact of riots on macroeconomic variables, are much scarcer. (Partially because rioting has primarily been considered to be e a research theme of political science, but not economics.) However, more attention has been paid to the effects of violence in economics recently, probably because more people have begun to recognize that violence is one of the critical constraints on the economic development of developing countries. The World Bank (2011) states that, although interstate warfare and large-scale civil wars have been on the decline since peaking in the early 1990s, different forms of violence of a smaller scale have now become major threats to the development of

In this study we take as our dependent variables not just gross value added per worker, but also its component factors in the manufacturing sector (capital labor ratio and total factor productivity), because violent conflicts may have a different effect on each factor. We also classify internal violent conflicts by background social cleavage (i.e., ethnic, religious, caste, political and economic), and by the nesting relationship among violent conflicts (i.e., discrete or nested in a larger conflict). Moreover, we try three different measures of violent conflicts in this study, because the number of incidents, which has been widely used in previous studies, may not precisely capture the vehemence or brutality of violent conflicts. To improve on this, we take the number of deaths in violent conflicts and the number of participants in violent conflicts as our additional explanatory variables.

We conduct instrumental variable two-stage least squares estimation on a dataset for twenty-eight Indian subnational states for the period from 1973 to 2004. Our estimations results find evidence that violent conflicts negatively affect gross value added per worker and capital labor ratio significantly, though they do not affect total factor productivity of the manufacturing sector. Moreover, we find the most adverse effects of violent conflicts for those nested in a larger conflict, and religious or ethnic violent conflicts, while we do not find such effects for other types of violent conflict.

The rest of the paper is organized as follows. Section 2 surveys related previous studies and sets out our hypotheses for this study. Section 3 gives a snapshot of violent conflicts in India. Section 4 explains our estimation strategy and data construction. Section 4 presents our estimation results for numbers of incidents, deaths and participants of violent conflicts. Section 5 shows the effects of violent conflicts disaggregated by social cleavages and Section 6 presents the effect of the nesting relationship. We discuss our estimation results in Section 7. Section 8 concludes our paper.

2. Previous studies

2-1. Survey

Since the end of World War II the number of interstate wars has declined, while the number of internal conflicts remains large. According to Fearon and Laitin (2003), 3.33 million people have died due to 25 interstate wars that incurred casualties of at least 1000 in total and at least 100 on each side between 1945 and 1999; during the

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developing countries.

same period, 16.2 million people lost lives in 127 civil wars that caused at least 1000 deaths in total and 100 deaths on each side. The number of casualties in civil wars is roughly five times as large as that in interstate wars in this period, indicating the threat of internal conflicts may be more serious in this period.[2] According to Stewart, Huang and Wang (2001), the number of civil wars that caused more than 1000 deaths a year was 16 in the 1950s, 22 in the 1960s, 24 in the 1970s, 36 in the 1980s and 27 in 1990–1995. Since most civil wars are fought within a country and different social groups fight against each other, leading to a serious social cleavage and a deterioration in governance, the costs inflicted by civil wars could be higher than those arising as the result of interstate wars.

Civil war is defined, for operational purposes, to be internal conflict in which aggressors challenge the authority of government, and which incurs more than 1000 deaths in a year (e.g., Wallensteen and Sollenberg 1996). Civil wars doubtless cause economic costs. Collier (1999), in the cross-national framework, estimates that economic growth rates during civil war are 2.2 percentage points lower than during peace.[3] Cerra and Saxena (2008) show that civil wars reduce GDP by 6 percent during their initial period. Stewart, Huang and Wang (2001) state that the growth rate of GDP per capita was reduced in 15 out of 16 countries in their sample.[4] In an extreme case of a civil war, the GDP per capita of Afghanistan dropped by 20% from 1980 to 1990 (Marsden and Samman 2001). Nicaragua suffered economic damage equivalent to one year's GDP during the period with the highest intensity of conflict from 1987 to 1989 (Fitzgerald and Grigsby 2001).

Some countries that do not face civil wars suffer from a sequence of smaller-scale violent conflicts, such as riots or terrorism. There is a variety of internal violent conflicts: civil wars, riots, terrorist attacks, demonstrations, protests, pogroms, genocide, lynching, feuds, gang assaults, and so on. They can be differentiated along several dimensions, such as motivation (anger-venting, demand for better policy treatment, economic rent or resources, seeking for political power, overthrowing of governments, etc.), organization (well-organized vs. unorganized, etc.), strategy (peaceful vs. violent, disruptive, well-planned vs. unplanned, terrorism, etc.), participants (homogeneous vs. heterogeneous, ordinary citizens vs. professionals,

[2] It is also known that more people die after the end of a war due to war-related causes (see, e.g., Skaperdas 2008, Ghobarah et al. 2003)

[3] Blattman and Miguel (2010) provide a comprehensive survey of both theoretical and empirical literature related to civil war.

[4] Guatemala was the exception among their sample countries, where the conflict occurred only in one part of the country.

ethnic/religious/linguistic groups, social classes, occupational groups, etc.), targets (government, police, army, specific social group, minority vs. majority, indiscriminate, etc.), location (urban vs. rural, dispersed vs. concentrated, etc.), duration (long vs. short, recurrent vs. one-time (one-off), discrete vs. nested in a larger conflict, etc.). There is no comprehensive and consistent system of classification of internal violent conflicts.[5] Among various forms of internal violent conflicts, civil wars have attracted a disproportionately large part of the attention of academics, since the scale of civil wars is larger than other kinds of internal violent conflict. Skaperdas (2008), however, mentioned that "…civil wars are not completely distinct from all other types of internal (or external) conflict. Rather, there is a continuum of conflict intensities that might include, say, the Democratic Republic of Congo and Rwanda on one end of the spectrum, and the myriad of internal conflicts that involve minimal violence or the threat of violence (such as strikes or road blockades) on the other. The middle and lower ends of the spectrum have been understudied, and severely so when compared to the study of civil wars." Our study tries to fill this gap, at least partially.

Although they are smaller in size or number of fatalities, if internal violent conflicts occur more frequently or recurrently over a protracted period, their cumulative effects on the economy could be large, in particular, in areas with a concentration of such violence. Evia, Laserna and Skaperdas (2008), using data on conflict in Bolivia between 1970 and 2005, found that the costs of various incidents such as strikes, road blockades and protests could add up to as much as a tenth of GDP for some of their sample years. Abadie and Gardeazabal (2003) investigated the effects of Euskadi ta Askatasuma (ETA) on the economy of the Basque region of Spain and found that the GDP per capita of the region was 10 percent lower in the 1980s and 1990s than in a "synthetic" Basque country without terrorism by ETA.[6] Blomberg, Hess and Orphanides (2004) also found that terrorism exerts statistically significant but small negative effects on GDP growth rates, although the effects are smaller than those of internal conflicts or external wars.

In this study we use the dataset called India Sub-National Problem Set, constructed by the Center for Systemic Peace, and examine the aggregate effects of

[5] In civil wars dissidents are typically based in rural areas, so that countries that have rough terrain such as large mountain areas (Fearon and Laitin 2003). Communal riots in India are primarily urban and it seems that geographical features are irrelevant. Terrorist attacks can be executed by a relatively small number of terrorists, while civil wars need at least hundreds of young male members.

[6] For the construction of a synthetic Basque country, refer to Abadie and Gradeazabal (2003).

various forms of violent conflict. The Center for Systemic Peace counts, in the dataset, any incident that entails at least one death or significant property damage and that has a political aim. Accordingly, the dataset covers civil wars, riots, terrorist attacks, demonstrations, protests and so on during the period from 1960 to 2004 in India, as long as they meet the conditions. In this period civil wars which meet the conditions mentioned above occurred only twice, namely, those in Punjab (1981–1997) and Jammu & Kashmir (1990 and on). As Horowitz (2001) states, though he made the claim in the context of riots, no violent conflict occurs "in a pure, natural state, uncontaminated by other forms" of violent conflict. For instance, terrorist attack is used as a means in other forms of violent conflict, such as civil wars, and gang assault may occur during a riot, which is precipitated in the process of a pogrom.

Collier (1999) lists five effects of civil war on the economy (GDP in his study) and we believe that the effects can be applied to other kinds of violent conflict, though the extent of influence may be smaller. The first is called the destruction effect: civil war destroys some economic resources, damaging the economy. Secondly, there is the disruption effect: civil war disrupts social order and suppresses civil liberties, imposing extra costs on economic activity. Thirdly, there is the diversion effect: public expenditure is diverted from output-enhancing activities to military activities.[7] Fourthly, there is the dissaving effect: savings available for investment shrink and capital costs rise. Lastly, the portfolio substitution effect induces people to shift their assets to foreign countries, reducing domestic capital.[8]

The most important impact of violent conflicts on the economy intuitively seems to be through portfolio substitution effects, namely, shrinkage of investment or capital flight, because firms would refrain from investing in violence-prone areas or relocate assets to peaceful regions (Skaperdas 2008). Nevertheless, empirical studies on the effect of internal conflicts do not necessarily obtain statistically or economically significant effects on investment rates (e.g., Blomberg, Hess and Orphanides 2004). However, various micro-level analyses report that violent internal conflicts, though they are smaller scale, have adverse effects.[9] For instance, Collins

[7] Collier et al. (2003) report that the ratio of military expenditure to GDP of average developing countries increased during civil wars from 2.8% to 5%.

[8] According to Collier (2003), the share of private wealth held abroad increases from 9% before civil wars to 20% by the end of wars. Collier (1999) shows that the portfolio substitution effect proceeds gradually; thus, even after a peace settlement is achieved, the economy may decline if the civil war was so short that the economy has not reached a new equilibrium under the more adverse economic environment.

[9] Deininger (2003), using data drawn from household surveys conducted in Uganda in 1992 and 1999/2000, showed that civil strife reduced asset accumulation at both household and community levels, as well as startups of non-farm enterprises at household level.

and Margo (2004a) show that the riots that occurred between 1964 and 1971 across American cities had negative effects on the incomes and employment of black people. Similarly, Collins and Margo (2004b) find evidence that those riots reduced the median value of black owned property between 1960 and 1970.[10] Numerous journalistic reports document uncountable tragic stories of sacrifice in violent conflicts. One of the reasons why we do not observe any significant economic impact of violent conflicts at the national level seems to be that, since lower level internal violent conflicts do not necessarily spread over the whole country, economic activity simply moves to other peaceful regions inside the country, leading to no significant change in economic indices at national level. The impact may be more salient inside a country because firms can more freely shift their physical assets to other places within a country than across national borders. This mandates that we investigate the effect of smaller scale violent conflicts on the economy at a level that is less aggregated than national level. Thus, in this study, we investigate the economic impact of violent conflict at the regional state level in India.

2-2. Hypotheses

Drawing on previous studies related to the impact of violent conflicts, in this subsection we postulate our hypotheses for this study.

In this study we investigate the extent of the impact of internal violent conflicts on the economic performance of the manufacturing sector at regional state level in India. Throughout our analysis we highlight four issues of violent conflicts: first, different measurements of violent conflict; second, different dependent variables as measures of the economic performance of the manufacturing sector; third, the effects of different violent conflicts classified by social cleavage; fourth, the distinction between discrete conflicts and conflicts nested in a larger conflict.

In relation to the first issue, we capture the intensity of violent conflicts by three kinds of measure: the number of violent incidents, the number of fatalities and the number of participants. Many previous studies analyzing the causes or consequences of riots as a representative type of violent conflict take the number of violent incidents as the main dependent or explanatory variable (e.g., Collier and Hoeffler 1998; Urdal 2008; Bohlken and Sergenti 2010). However, the number of violent conflicts is constructed by putting equal weight on violent conflicts in which

[10] Blomberg, Hess and Orphanides (2004) and Enders, Sandler and Parise (1992) show the negative effects of terrorism.

thousands of people participate and many fatalities occur and those in which only dozens of people take part and few people get injured. The impact on the economy should plausibly be expected to be very different for these two types of conflict. Accordingly, in this study we take the numbers of deaths and participants as additional explanatory variables to capture the intensity of violent conflicts. Since economic agents are concerned with damage to themselves, it seems plausible to suppose that they are concerned with the brutality of violence in a conflict incident. In that sense, among the three variables, the number of deaths in a violent conflict most strongly affects economic behavior, because the number of violent incidents or the number of participants in violent conflicts is not necessarily related to the degree of violence, while the number of deaths directly reflects the extent of brutality in the conflicts.

Hypothesis One:
Among measures of violent conflict, the number of deaths affects the economic performance of the manufacturing sector, while the number of participants and the number of violent incidents may not.

Regarding the second issue, we examine which economic performance variables are affected most by violent conflicts. On one hand, physical assets are vulnerable to destruction during violent conflicts, and are less mobile than people. Thus, people tend to refrain from making investment in (sunk) physical assets facing a higher risk of violent conflict. On the other hand, the loss of life is lower in most internal violent conflicts than it is in large civil wars.

Next, with respect to total factor productivity (TFP), violent conflicts do not destroy business ideas conceived by business persons, and thus the part of total factor productivity that is based on business ideas is not seriously affected, at least in the short run. Total factor productivity is, as is well known, a catch-all index, capturing all the residual factors that are not explained by factors considered in the estimation. Thus, for instance, through the disruption effect, the part of total factor productivity that depends on social capital may be reduced by a violent conflict. Hence the size of the effect of violent conflicts on TFP is an empirical question. Lastly, since the gross value added per worker is a weighted sum of capital labor ratio and total factor productivity, the impact of violent conflict on this variable is another empirical question.

Hypothesis Two:
Violent conflicts reduce the capital-labor ratio, while they may or may not affect total factor productivity as well as gross value added per worker.

In regard to the third issue, among the five effects of Collier (1999) those of destruction, disruption and diversion are direct results of violent conflict. It is reasonable to suppose that the impact of these effects would be smaller in violent conflicts at a smaller scale. The last two effects of violent conflicts, namely, dissaving and portfolio substitution, are consequences of the change in the behavior of economic agents after violent conflicts. These effects work through changes in predictions by economic agents. Observing violent conflicts in a region, economic agents change their predictions about the future occurrence of violent conflicts there and the probable damage to their interests. The impact of a violent conflict on the economy is the aggregate of these direct and indirect effects. Although the direct impact of a violent conflict may be small, the indirect impact of violent conflict, especially recurrent and protracted violent conflict, could be large.[11]

If a significant number of people perceive the risk of violence targeted at them to be high, they would change their economic action to a large extent and the consequences could be severe. For most people the very fact that a violent conflict has occurred is sufficient for them to perceive that their society is prone to violence.

Among various types of violent conflict classified by background social cleavage, a target group is more clearly defined and more easily identified in ethnic or religious conflicts.[12] Thus, members of a potential target group may be seriously concerned that they might be attacked and would change their behavior. For instance, entrepreneurs in such a group may refrain from making a large investment in physical assets that are vulnerable to destruction or looting in violent conflicts. In contrast to ethnic or religious identity, people may from time to time change their support to a political party, or go up and down the ladder of economic classes. Thus,

[11] Additional reasons are the tendency of many people to be risk averse, and that people tend to perceive the probability of a catastrophic event in an exaggerated way. Kahneman and Tversky (1979) advocated prospect theory, according to which people have the tendency to overestimate very low probabilities. As long as the prospect theory holds valid, people tend to react more sensitively to catastrophic events, such as an airplane crash, that occur with very low probability, rather than daily car accidents, even though they face a much higher risk of being a victim of a car accident than an airplane crash. Similarly, if a violent conflict with a large number of casualties occurs, people tend to believe that such incidents will occur again and damage them with subjective probability that is higher than reality.

[12] Chandra (2004) elucidates that patronage democracy, such as one in India, induces social cleavage along ethnicity rather than other group identity, under severe information constraints faced by both voters and politicians.

members of a political group or an economic class are not so stable. Therefore, it may be relatively more difficult to organize people in a political or economic group than in an ethnic or religious group.[13]

Furthermore, Wilkinson (2008) shows that religious conflicts (especially, Hindu–Muslim conflicts) are likely to be more brutal, in terms of death toll, than other types of conflict. In this sense, the occurrence of ethnic or religious violent conflict makes people feel more threatened.

Hypothesis Three:
The negative impact of ethnic and religious violent conflicts is more serious than that of political or economic violent conflicts.

Fourthly, another factor that makes people perceive a higher risk of being targeted in violent conflicts is whether a violent conflict is a discrete incident or an episode of a protracted large conflict. For instance, communal conflict between Muslim and Hindu people has been persistent, recurrent and large scale since even before the partition of India and Pakistan in 1947, in which hundreds of thousands people were killed on both sides of the border. Once a violent conflict occurs in the context of communal violence, people may expect the recurrence of such violent conflicts. Therefore, the impact of a violent conflict that occurred in the context of communal conflict may have a larger impact on the economic behavior of people involved than a discrete violent conflict that occurred independently of such large conflicts.

Hypothesis Four:
The negative impact of violent conflicts nested in a larger conflict is greater than those that occur independently.

[13] With respect to caste-based violent conflict in India, aggressors are typically members of high castes and low caste people have been targeted. Low caste people are typically weak and are not active business persons. As a result, the economic consequences of violent conflicts against those low caste people are expected to be low.

3. The trend in violent conflicts in India

Figure 1

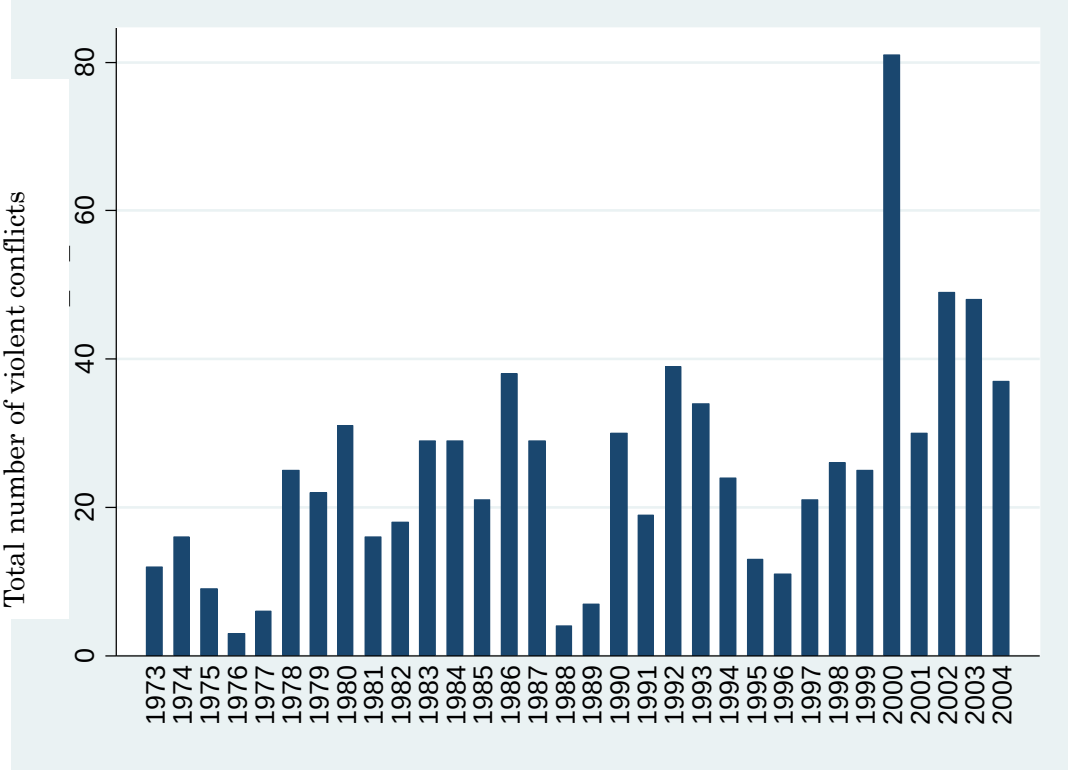

Figure 1 shows the total number of violent conflicts included in our data set. No specific trend is seen, but there are many violent conflicts in the early part of the 2000s. The salient increase in 2000 reflects the hike of violent conflicts in Jammu & Kashmir.

Figure 2

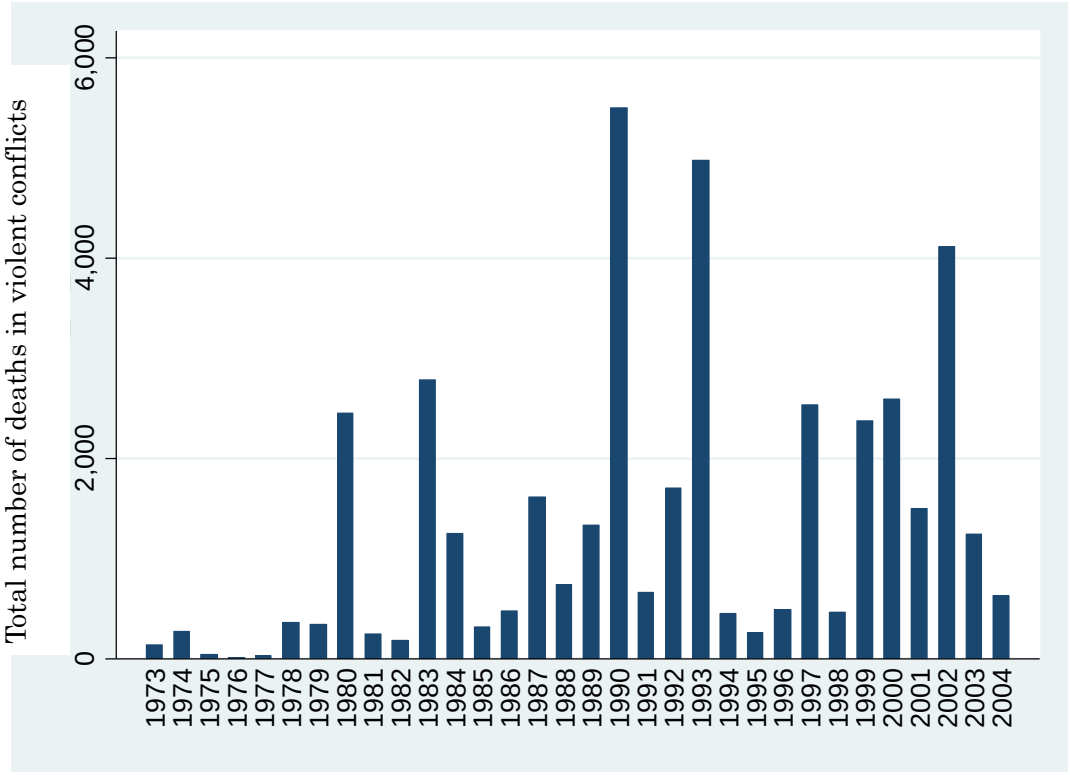

Figure 2 reports the total number of deaths in violent conflicts in each year in our data set. 1990 recorded the highest number of deaths, mainly due to the Rath Yatra organized by the BJP. A high number of deaths was recorded in 2002, when the Godhra riot occurred in Gujarat. 1983 also saw a large number of fatalities, a part of which is due to the large-scale massacre in Assam. Note that the reason why there are not so many deaths in 1984, when a large-scale anti-Sikh riot occurred, is that Delhi is not included in our data set. The hike in 1980 primarily corresponds to violent conflict in Tripura.

Figure 3

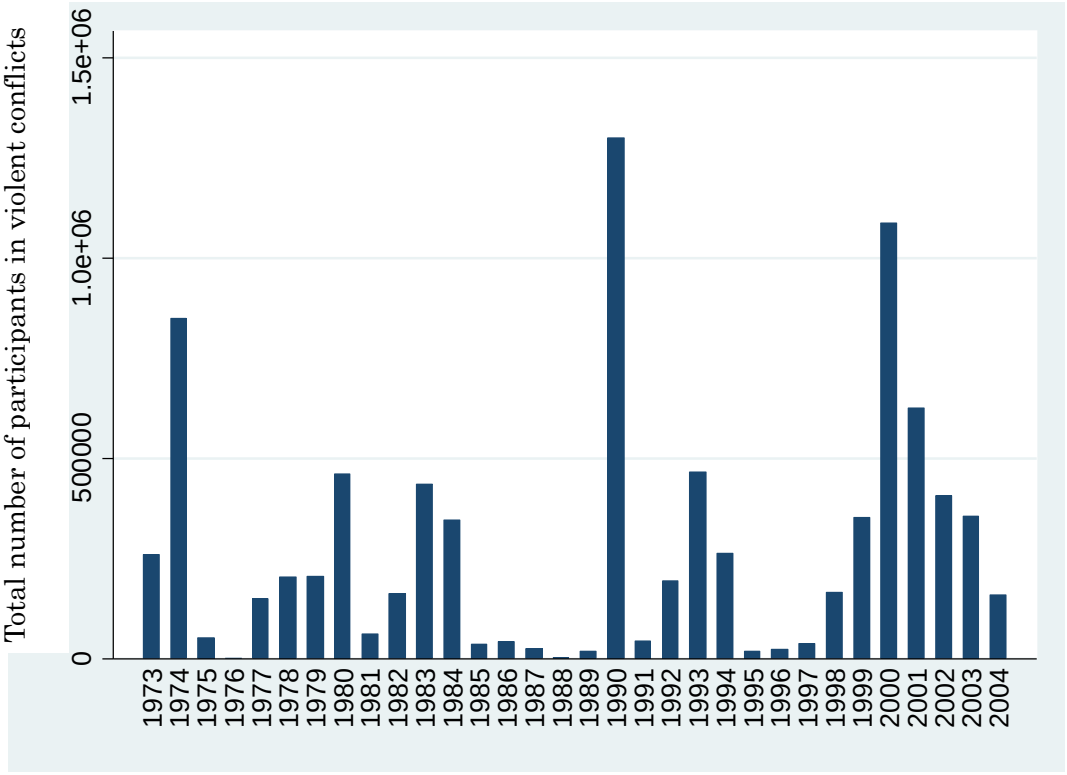

Figure 3 presents the estimated number of participants in violent conflicts in each year. Again, in 1990, the highest number is recorded, and the second largest number of participants in violent conflicts was in 2000.

However, these aggregate numbers hide the uneven distribution of the incidence of violent conflicts across states in India, which we wish to take advantage of.

4. Econometric Strategy

4-1 Estimation Model

In this study, we primarily focus on the effect of violent conflicts on gross value added per worker of manufacturing industry at state level (in log terms). If we find that violent conflicts influence gross value added per worker, we would also like to examine the transmission channels from violent conflict to gross value added per worker. It has been shown that a Cobb-Douglass value added production function with constant returns to scale,

$$Y = AK^{\alpha}L^{1-\alpha},$$

can be transformed into

$$\ln \frac{Y}{L} = \ln A + \alpha \ln \frac{K}{L},$$

where Y is gross value added, K is capital, L is labor and A is total factor productivity. Thus, we also examine the disaggregated effects of violent conflicts on log total factor productivity and log capital-labor ratio, by which we were able to tell whether the change in gross value added per worker due to violent conflict occurs mainly through the change in the capital-labor ratio or in total factor productivity or both.

Our estimation model is

$$Z_{it} = \alpha + \theta_t + \theta_i + X_{it}\beta + Y_{it}'\gamma + \varepsilon_{it}.$$

Here, Z_{it} is the natural log of the economic performance variable of the manufacturing sector of state i in year t, X_{it} is the variable that captures the intensity of violent conflicts in year t and state i, and Y_{it} is the vector of control variables that may influence the economic performance of the manufacturing sector. All of the independent variables in X_{it} and Y_{it} are expressed in natural log terms. The state dummy θ_i and year dummy θ_t are included in the estimation.

We consider three kinds of violent conflict variables. The first variable is the number of violent conflicts per population in state i in year t. The second variable is the number of deaths in violent conflicts per population in state i in year t. The third variable is the number of participants in violent conflicts per population in state i in year t.

As our explanatory variables for the estimation, we take the sum of each variable for the last two years (the current year and the previous year). In this way, we can capture the cumulative effects of violent conflicts in the recent past on the perception of economic agents. Namely, if the number of incidents, deaths and participants of violent conflicts in the last two years are large, managers may perceive the probability of recurrence of violent conflict in the state to be high, even if the incidence of violent conflicts up to that point in the current year is low. Such a perception is expected to affect the behavior of firm managers.

Endogeneity in the relationship between economic performance and the incidence

of violent conflicts is a reasonable concern. One possible relationship between these two variables is that when the income levels of the public are very low, the opportunity costs of participating in violent conflicts are low, so the number of participants in violent conflicts is higher when the economy stagnates. This is called the opportunity hypothesis. Alternatively, when income levels are low, people are more frustrated and desperate, and they would be more willing to join violent conflicts to vent their anger, or would engage in violence and looting. This is called the grievance hypothesis. If these arguments are valid, violent conflicts would tend to be more prevalent in poorer states. Blomberg and Hess (2002), analyzing the Markov probability model for external and internal conflicts as well as the state of the economy (recession/expansion), obtained findings consistent with the argument that a recession raises the probability of internal conflicts. They also find that a combination of external conflict and recession increases the probability of internal conflicts.

As mentioned earlier, compared with the literature on the consequences of violent conflicts on economic performance, the volume of the literature on their causes is large.[14] To address the endogeneity problem, we conduct an instrumental variable (denoted IV hereafter) two-stage estimation. Relying on the large literature on the causes of riots, we have tried a variety of political and social variables, and their combinations, as candidate instrumental variables. Many of those variables have significant coefficients in the first stage of two-stage least squares estimation. However, they typically do not pass weak instrument tests, because, we guess, violent conflict would occur when more than one factor overlaps in a specific area and timing. Among candidate variables we constructed, only the combination of log policemen per population and Muslim/Hindu population ratio produces acceptable values of the statistics for a weak identification test. Hence, we use the ratio of the Muslim to Hindu populations of state i in year t (called the Muslim–Hindu ratio hereafter) and the total number of policemen per thousand people (in natural log) (called policemen per population hereafter) as our instruments. Ethnic violence in India is primarily due to conflicts between Muslim and Hindu people (e.g., Engineer 1984; Brass 1997, 2003; and Varshney 1999), and it is said that when the dominance

[14] Varshney (2002) sorts out the long tradition of academic analyses of the causes of riots into essentialism, instrumentalism, constructivism and postmodernism, in Chapter 2 of his book. Varshney (1999) advanced an alternative theory that civic management is a critical factor, while Wilkinson asserts that political competition is an important determinant of riots. Recently, Jha (2013) claims that the complementarity of economic activities between Muslim and Hindu peoples is critical in explaining the occurrence of communal riots.

of Hindu people is threatened by the rise of Muslim people, communal violence is likely to occur (e.g., Mitra and Ray 2014).[15] Therefore, as the Muslim–Hindu ratio rises, it would be more likely that communal violence will occur. Conversely, with respect to the concern for reverse causality, populations change only gradually, so the occurrence of violent conflicts does not change the Hindu–Muslim ratio contemporaneously. The number of policemen per population may be correlated with the incidence of violent conflicts, because in violence-prone states the government tends to reinforce the police force. Conversely, the variable may not have an impact on the economic performance of the manufacturing sector, except through its impact on law and order.

In addition to the explanatory variables related to violent conflicts, we control for the physical infrastructure and human capital conditions of each state in each year, which can reasonably be expected to influence a state's economic performance. Since the variables in each category tend to be correlated, we choose two variables from each category: namely, we choose the electricity generated per population (electricity per population hereafter) and the total length of surfaced road per population (surfaced road per population) to represent a state's physical infrastructure, and the incidence of labor disputes per worker (disputes per worker) and the literacy rate to represent the state's human capital. Note that disputes per worker also control for the intensity of management-labor conflicts, which may also affect the economic performance of the manufacturing sector, even if it does not cause violence.

4-2 Data and Variable Construction

A reliable database on violent conflicts has not been constructed by the Government of India. Varshney (1999), based on his interviews with IAS (Indian Administrative Service) and IPS (Indian Police Service) officers, states that in India there exists no standard definition of a communal incident applied by police officers, and no system of checking the records of communal incidents reported from police station, where each police officer subjectively judges each incident. Varshney and Wilkinson, as an alternative, read through all the issues of the *Times of India* (Mumbai edition) from 1950 to 1995, and constructed a data set on *Hindu–Muslim communal riots*. Their data set (hereafter called the V-W data set) is far superior to the others that existed

[15] Suzan Olzak (1992), who studied ethnic conflicts in the period 1877-1914 in the United States, also concludes that ethnic conflicts increase when ethnic inequalities increase and a racially ordered system begins to break down.

before theirs.[16]

However, the V-W data set concentrates on Hindu–Muslim communal riots and does not contain information on other kinds of violent conflict. For instance, since the late 1970s a sequence of riots provoked by Sikh extremists occurred primarily in Punjab, and it is estimated that around 10,000-20,000 deaths occurred, including the assassination of Prime Minister Indira Gandhi, in the violent conflicts by the mid-1990s. However, since the riot is not a Hindu–Muslim communal riot, it is not listed in the V-W dataset. Similarly, a huge massacre of immigrants from Bangladesh by Assamese occurred in 1983 in Assam. Kimura (2013) documented that nearly 2000 Muslim peasants of East Bengal origin were killed in a single day. But, since these incidents are not considered to be Hindu–Muslim communal riots, they are not included in the V-W data set.

To investigate the impact of violent conflicts on the economic performance of the manufacturing sector, we have to use a data set that includes all kinds of violent conflicts. For that purpose, in this study, we use the data set called the India Sub-National Problem Set, which was constructed by Marshall, Sardesi and Marshall (2005) of the Center for Systemic Peace. They compiled the dataset from the Keesings Record of World Events (Keesings Online) and the period from 1960 to 2004 is covered at the present time (2014). It is not a perfect data set of violent conflicts in India, but due to the lack of a suitable alternative, we rely on it in this study.[17] The details of the construction of the dataset for this study are explained in Appendix A.

Notice also that it is almost impossible to construct a perfect dataset on violent conflicts, because the boundary between conflicts are amorphous. It is not evident as to whether we should count violent incidents that occurred in two distant cities in the same state on the same day as one conflict or two. Similarly, what about two incidents in the same city? It is not clear, either, as to whether we should count a violent incident that occurs a week later in the same city as being part of the same conflict as one a week earlier. Furthermore, what criterion should be applied in defining an ethnic conflict or economic conflict (see, e.g., Horovitz 2001, ch.2)? With such limitations in mind, in this study, we simply rely on the dataset of the Center of Systemic Peace.

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[16] Their data set is now being extended to more recent times by Bhalotra, Clots-Figueras and Iyer (2012).

[17] We hope that we can avail ourselves of a more complete data set, comparable to the V-W data set, on all types of violent conflict in India in the future. However, we must compromise at the present moment.

Because many state-years have zero incidences of violent conflicts, as well as deaths and participants in violent conflicts, those zeroes are replaced by 0.01 before we take the natural logarithm of these sample data, following a technique used in previous studies (Debraj and Ray 2014; Bohlken and Sergenti 2010).

We examine the effects of violent conflicts on three measures of economic performance of the manufacturing sector as follows. First, the value added per worker is obtained by dividing the deflated gross value added by the number of workers. Second, the capital labor ratio is calculated by dividing the real capital stock by the number of workers. Third, to obtain the total factor productivity (TFP, hereafter), we estimate the production function with the log deflated value of output as the dependent variable and log real capital stock, log number of workers and log deflated value of inputs as independent variables, using the Levisohn-Petrin method (Levinsohn and Petrin 2003), with the deflated value of fuels as a proxy variable. We then insert the estimated coefficients back into the production function and subtract the coefficients multiplied by the independent variables from the log deflated value of output so as to obtain the log TFP. Detailed information on the data sources and the construction of the variables used in the estimation is provided in Appendix B.

Tables 1a and 1b present summary statistics of the variables used in our estimation before being transformed by taking the natural logarithm.

Table 1a. Descriptive statistics of variables for the period 1973–2004.

Variable	No. of Observations	Mean	S.D.	Min	Max
gross value added per worker	687	1.244	0.988	−0.141	7.162
capital labor ratio	646	6.269	5.209	0.112	35.587
log total factor productivity	646	0.158	0.158	−0.273	1.112
energy generated per population	808	0.182	0.185	0	0.966
surfaced road length per population	808	1.714	1.149	0.106	9.025
disputes per worker	665	0.000498	0.0011182	4.81E−07	0.0120664
literacy rate	896	52.219	15.454	14.142	91.775
policemen per population	807	2.660	2.594	0.381	16.412
Muslim Hindu population ratio	812	0.212	0.403	0.013	2.260

Source: Authors' calculations.
gross value added per worker: gross value added per one thousand workers of manufacturing sector.
capital labor ratio: ratio of capital stock to number of workers in thousand of manufacturing sector.
log total factor productivity: log total factor productivity of manufacturing sector, obtained by Petrin−Levinsohn method.
energy generated per population: energy generated per 100 thousand population.
surfaced road length per population: surfaced road length per 100 thousand population.
disputes per 100 thousand workers: number of industrial disputes per worker.
literacy rate: literacy rate expressed in terms of the number per 100 population.
policemen per population: number of population per one thousand population.
Muslim Hindu population ratio: the ratio of Muslim population to Hindu Population.

Table 1b. Descriptive Statistics of Various Variables Related to Violent Conflicts

Variable	Obs	Mean	Std. Dev.	Min	Max
Number of violent conflicts per pop	808	0.174	0.720	0	9.242
Number of ethnic violent conflicts per pop	808	0.153	0.708	0	9.242
Number of religious violent conflicts per pop	808	0.017	0.096	0	1.502
Number of political violent conflicts per pop	808	0.015	0.163	0	4.348
Number of economic violent conflicts per pop	808	0.005	0.101	0	2.857
Number of caste violent conflicts per pop	808	0.001	0.005	0	0.081
Number of discrete violent conflicts per pop	808	0.021	0.178	0	4.348
Number of nested violent conflicts per pop	808	0.153	0.699	0	9.242
Number of violent conflicts nested in mega conflict per pop	808	0.133	0.686	0	9.242
Number of violent conflicts nested in meta conflict per pop	808	0.020	0.152	0	2.988
Number of deaths in violent conflicts per pop	808	5.776	43.619	0	983.527
Number of deaths in ethnic violent conflicts per pop	808	4.780	42.169	0	983.527
Number of deaths in religious violent conflicts per pop	808	0.864	8.106	0	192.844
Number of deaths in political violent conflicts per pop	808	0.135	1.660	0	44.444
Number of deaths in economic violent conflicts per pop	808	0.070	0.876	0	22.857
Number of deaths in caste violent conflicts per pop	808	0.020	0.163	0	2.704
Number of deaths in discrete violent conflicts per pop	808	0.191	1.367	0	27.056
Number of deaths in nested violent conflicts per pop	808	5.585	43.591	0	983.527
Number of deaths in violent conflicts nested in mega conflict per pop	808	3.864	26.477	0	504.857
Number of deaths in violent conflicts nested in meta conflict per pop	808	1.721	34.820	0	983.527
Number of participants in violent conflicts per pop	808	1160.848	6956.602	0	93447.320
Number of participants in ethnic violent conflicts per pop	808	975.360	6589.606	0	93447.320
Number of participants in religious violent conflicts per pop	808	80.244	488.003	0	6030.996
Number of participants in political violent conflicts per pop	808	96.802	747.876	0	10227.270
Number of participants in economic violent conflicts per pop	808	6.332	81.570	0	1711.914
Number of participants in caste violent conflicts per pop	808	7.829	146.631	0	4022.755
Number of participants in discrete violent conflicts per pop	808	168.388	1607.961	0	39099.530
Number of participants in nested violent conflicts per pop	808	992.459	6789.509	0	93447.320
Number of participants in violent conflicts nested in mega conflict per pop	808	898.886	6719.778	0	93447.320
Number of participants in violent conflicts nested in meta conflict per pop	808	93.573	1053.570	0	24467.050

Source: Authors' calculations.

Note: abbreviation used in the table is as follows. vc: number of conflicts; dth: number of deaths; part: number of particiapnts; eth: ethnic; rel: religious; pol: political; eco: economic; cas: caste; dsc: discrete; nst: nested in a large conflict; mgnst: nested in a mega conflict; mtnst: nested in a meta conflict; pop: per one million population.

For instance, dthmtnst_pop means number of deaths in violent conflicts nested in meta conflicts per one million population. Similarly, parteth_pop indicates the number of participants in ethnic violent conflicts per one million population.

Table 2 shows simple correlation coefficients between log-transformed variables. We do not observe a high correlation between any pair of explanatory variables, so that there is little concern with respect to the multicollinearity problem. Note that the three variables related to violent conflicts are, not surprisingly, highly correlated.

Table 2. Unconditional correlations among variables

	ln gross value added per worker	ln capital labor ratio	ln total factor productivty	ln energy generated per population	ln surfaced road length per population	ln industrial disputes per worker	ln literacy rate	ln sum of the number of violent conflicts per population for the last two years	ln sum of the number of deaths in violent conflicts per population for the last two years	ln sum of the number of participants in violent conflictsper population for the last two years	ln number of policemen per population	Muslim Hindu ratio
ln gross value added per worker	1.000											
ln capital labor ratio	0.784	1.000										
ln total factor productivty	−0.201	−0.292	1.000									
ln energy generated per population	0.494	0.357	−0.434	1.000								
ln surfaced road length per population	0.278	0.221	0.069	0.432	1.000							
ln industrial disputes per worker	−0.395	−0.363	0.102	−0.337	−0.142	1.000						
ln literacy rate	0.474	0.292	−0.034	0.236	0.439	−0.205	1.000					
ln sum of the number of violent conflicts per population for the last two years	−0.210	−0.135	0.224	−0.275	−0.047	−0.006	−0.017	1.000				
ln sum of the number of deaths in violent conflicts per population for the last two years	−0.118	−0.077	0.053	−0.195	−0.117	−0.018	−0.028	0.931	1.000			
ln sum of the number of participants in violent conflicts per population for the last two years	−0.129	−0.122	−0.017	−0.150	−0.141	0.022	−0.052	0.907	0.922	1.000		
ln number of policemen per population	−0.286	−0.110	0.569	−0.330	0.261	−0.075	0.078	0.408	0.257	0.119	1.000	
Muslim Hindu ratio	−0.201	−0.117	0.040	−0.125	−0.143	−0.362	−0.113	0.302	0.240	0.212	0.373	1.000

See the notes for Table 1 for the explanation of variables.

Source: Authors' calculations.

Table 3 shows simple correlations among state gross domestic product per capita, output per worker in the manufacturing sector, gross value added per worker in the manufacturing sector, state expenditure per population and the number of policemen per population. Since the manufacturing sector accounted for a relatively small part of the state domestic products during most of our sample period, gross value added per worker is not highly correlated with state government expenditure, which in turn is highly correlated with policemen per population. Therefore, gross value added per worker is not correlated with policemen per population, and Table 3 actually shows a negative correlation coefficient. Therefore, we need not be concerned that higher gross value added per worker in the manufacturing sector might raise state government revenues, which in turn would enable the state government to employ more police officers.

Table 3. Correlations between policemen per population and other variables

	State Net Domestic Products per capita	Output per worker	Gross value added per worker	State expenditure per population	Policemen per population
State Net Domestic Products per capita	1				
Output per worker	0.6817	1			
Gross value added per worker	0.6481	0.9391	1		
State expenditure per population	0.4462	0.386	0.3748	1	
Policemen per population	0.1209	−0.2094	−0.2153	0.5779	1

Note: The correlations are obtained for the period 1973−2004.

Source: Authors' calculations.

5. Estimation Results

Our estimation results on the impact of the total number of violent conflicts per population on economic performance are presented in Table 4.

Panel A of Table 4 shows the first-stage estimation results with the sum of the number of violent conflicts per population for the last two years (hereafter called *number of violent conflicts per pop*) as our explanatory variable.[18] F-tests reject the null hypothesis that all the coefficients are zero, and the value of R-squared is reasonable. An underidentification test is conducted with the test statistics, which are distributed as chi-squared with one degree of freedom under the null hypothesis that the sum of the number of violent conflicts per population for the last two years is underidentified by our instrumental variables. The test statistic is high with p-values close to zero, indicating a rejection of the null hypothesis. The test statistic for the weak identification test (Wald F-statistic based on Kleibergen and Paap 2006) has values that are not very high, and it is between 15% and 20% of the critical values proposed by Stock and Yogo (2001). The results indicate that our instrumental variables are not very strong, but are not very weak instruments for the endogenous

[18] Note that due to the differing availability of data on each dependent variable, the number of observations varies among the dependent variables, and first-stage estimation results differ.

variable, either. We suppose that the range of critical values to which the values belong are acceptable and proceed to the second stage of the estimation.

Note also that the coefficients of the instrumental variables are statistically significant. The results show that the Muslim/Hindu population ratio is positively correlated with the log of the number of violent conflicts per population, and log policemen per population is positively correlated with the log of the number of violent conflicts per population.

Table 4. Relation of the number of violent conflicts to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of violent conflicts per person for the last two years		ln the sum of the number of violent conflicts per person for the last two years		ln the sum of the number of violent conflicts per person for the last two years	
Muslim/Hindu population ratio	9.067	(2.803) ***	9.016	(2.875) ***	9.016	(2.875) ***
ln policemen per population	1.261	(0.575) **	1.363	(0.653) **	1.363	(0.653) **
ln energy generated per population	0.043	(0.173)	0.066	(0.189)	0.066	(0.189)
ln surfaced road length per population	0.809	(0.430) *	0.837	(0.456) *	0.837	(0.456) *
ln disputes per worker	0.014	(0.084)	0.015	(0.089)	0.015	(0.089)
ln literacy rate	1.406	(1.311)	1.355	(1.334)	1.355	(1.334)
R^2	0.181		0.1701		0.1701	
F Statistics (p-value)	4.63	(0.0000)	3.79	(0.0000)	3.79	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	8.85	(0.0002)	8.9	(0.0002)	8.9	(0.0002)
Underidentification test						
rk LM statistic (p-value)	15.351	(0.0005)	15.62	(0.0004)	15.62	(0.0004)
Weak identification test						
rk Wald F statistic	8.85		8.901		8.9	
Stock-Yogo weak ID test critical vlalue	11.59	15%	11.59	15%	11.59	15%
	8.75	20%	8.75	20%	8.75	20%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of violent conflicts per person for the last three years	-0.086	(0.037) **	-0.261	(0.059) ***	0.010	(0.007)
ln energy generated per population	0.093	(0.046) **	-0.104	(0.042) **	0.036	(0.015) **
ln surfaced road length per population	0.056	(0.071)	0.259	(0.136) *	-0.069	(0.020) ***
ln disputes per worker	0.001	(0.016)	0.041	(0.025)	-0.012	(0.007) *
ln literacy rate	0.449	(0.188) **	0.036	(0.360)	0.003	(0.050)
R^2	0.682		0.1125		0.281	
F Statistics (p-value)	0.6816	(0.000)	15.82	(0.000)	8.12	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	0.452	(0.5014)	0.874	(0.3499)	0.552	(0.4575)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.619	(0.0178)	49.927	(0.0000)	0.674	(0.4115)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Panel B of Table 4 presents the results of the second stage estimation. The test statistic for the endogeneity test is distributed as chi-squared with one degree of

freedom. It is high with p-values close to zero in columns (1) and (2), but not in column (3) (which implies that the number of violent conflicts and total factor productivity are not endogenous, and IV estimation is not necessary). The test statistic for the overidentification test is chi-squared distributed under the null hypothesis that our instrumental variables are correctly excluded from the estimated equation. The null is not rejected in all columns; thus, an overidentification problem is not likely to exist in our estimation.

Our estimation results in column (1) show that the coefficient of number of violent conflicts per population has a negative coefficient at the five percent significance level. Since we take a log-log formulation, a one percent increase in the number of violent conflicts per pop decreases gross value added per worker by 0.086%. This is actually not a small effect, despite the impression it gives at first sight. For instance, if a state-year with the average number of violent conflicts per population (0.174) experienced an increase of the number of violent conflicts per population of one standard deviation (0.72), then the gross value added per worker in the manufacturing sector would shrink by about 36% (= 0.086*414%). This is so because in many state-years no violent conflicts occur, but where it occurs, it could cause a chain of violent conflicts, seriously damaging the manufacturing sector.

In column (2) of Panel B the number of violent conflicts per population has a negative coefficient at the one percent significance level, and one percent increase in it will cause the capital labor ratio to decrease by 0.261 percent. This result indicates that firms invest less in physical assets, move physical assets to other states, or substitute labor for physical capital when facing violent conflicts. This would indicate that if a state with the average number of violent conflicts per population experienced a one standard deviation increase in the number of riots, the capital labor ratio would decline by 108%, which is a ridiculous number that resulted from applying the marginal estimation results to a large part of the domain. Still, it indicates that the increase in the number of riots would marginally have a significant impact on the capital labor ratio.

Column (3) shows that the number of violent conflicts per population does not have a significant coefficient for total factor productivity. Since the endogeneity test is not passed, we are not sure whether the number of violent conflicts does not affect total factor productivity or our empirical formulation was not appropriate. In all of the following estimations for TFP, endogeneity tests are not passed and the coefficient of violent conflict variables are not significant. Thus, the same caveat applies. Therefore, we do not pay attention to the estimation results for TFP

hereafter.

Table 5. Relation of the number of deaths in violent conflicts to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of deaths in violent conflicts per person for the last two years		ln the sum of the number of deaths in violent conflicts per person for the last two years		ln the sum of the number of deaths in violent conflicts per person for the last two years	
Muslim/Hindu population ratio	18.177	(5.061) ***	17.933	(5.149) ***	17.933	(5.149) ***
ln policemen per population	1.563	(0.892) *	1.718	(0.988) *	1.718	(0.988) *
ln energy generated per population	0.076	(0.258)	0.052	(0.278)	0.052	(0.278)
ln surfaced road length per population	0.847	(0.661)	0.881	(0.680)	0.881	(0.680)
ln disputes per worker	0.000	(0.137)	0.012	(0.141)	0.012	(0.141)
ln literacy rate	3.020	(1.920)	3.087	(1.956)	3.087	(1.956)
R^2	0.203		0.194		0.194	
F Statistics (p-value)	4.95	0	4.13	(0.0000)	4.13	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	8.83	(0.0002)	8.92	(0.0002)	8.92	(0.0002)
Underidentification test						
rk LM statistic (p-value)	17.8	(0.0001)	18.09	(0.0001)	18.09	(0.0001)
Weak identification test						
rk Wald F statistic	8.83		8.92		8.92	
Stock-Yogo weak ID test critical vlalue	11.59	15%	11.59	15%	11.59	15%
	8.75	20%	8.75	20%	8.75	20%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of deaths in violent conflicts per person for the last two years	−0.050	(0.020) **	−0.141	(0.031) ***	0.006	(0.004)
ln energy generated per population	0.091	(0.045) **	−0.118	(0.036) ***	0.037	(0.015) **
ln surfaced road length per population	0.029	(0.066)	0.177	(0.112)	−0.066	(0.020) ***
ln disputes per worker	0.000	(0.016)	0.038	(0.023) *	−0.012	(0.007) *
ln literacy rate	0.483	(0.185) ***	0.143	(0.314)	−0.004	(0.052)
R^2	0.686		0.291		0.276	
F Statistics (p-value)	45.03	(0.000)	20.4	(0.000)	8.02	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	0.059	(0.8080)	3.367	(0.0665)	0.328	(0.5666)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	6.109	(0.0135)	40.917	(0.0000)	0.956	(0.3282)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Our estimation results on the impact of the number of deaths per population on economic performance are presented in Table 5. The validity tests of our estimation are reasonably well passed, except for the overidentification test in column (2) and the endogeneity test in column (3). Thus, we must interpret the results with care. Two instrumental variables are statistically significant with the expected signs.

Column (1) of Panel B shows that number of deaths per population has a negative coefficient at the five percent significance level. The estimated coefficient indicates that a one percent increase in number of deaths per pop pushes down gross value

added per worker by 0.050%. For instance, if a state with the average number of deaths in violent conflicts per population (5.78) experienced a one standard deviation increase of that number (43.62), then the gross value added per worker would decline by about 37% (= 0.05*755).

In Column (2) of Panel B we obtain a negative coefficient at the one percent significance level for the number of deaths per population: a one percent increase in the number of deaths per population decreases the capital labor ratio by 0.141 percent. These results indicate that, if a state with the average number of deaths in violent conflicts per population (5.78) experienced a one standard deviation increase of that number (43.62), then the capital labor ratio would decrease by about 106% (= 0.141*755)! Again, the number is unrealistic, but we can be assured that the impact would not be small.

Table 6. Relation of the number of participants in violent conflict to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of particiapnts in violent conflicts per person for the last two years		ln the sum of the number ofparticiapnts in violent conflicts per person for the last two years		ln the sum of the number of particiapnts in violent conflicts per person for the last two years	
Muslim/Hindu population ratio	18.724	(7.081) ***	18.457	(7.235) **	18.457	(7.235) **
ln policemen per population	2.868	(1.476) *	3.176	(1.713) *	3.176	(1.713) *
ln energy generated per population	0.005	(0.473)	−0.050	(0.524)	−0.050	(0.524)
ln surfaced road length per population	2.001	(1.105) *	2.147	(1.196) *	2.147	(1.196) *
ln disputes per worker	0.048	(0.227)	0.059	(0.241)	0.059	(0.241)
ln literacy rate	2.234	(3.663)	2.403	(3.730)	2.403	(3.730)
R^2	0.194		0.185		0.185	
F Statistics (p-value)	5	(0.0000)	4.14	(0.0000)	4.14	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	6.27	(0.0020)	6.27	(0.0020)	6.27	(0.0020)
Underidentification test						
rk LM statistic (p-value)	11.09	(0.0039)	11.17	(0.0038)	11.17	(0.0038)
Weak identification test						
rk Wald F statistic	6.27		6.27		6.27	
Stock-Yogo weak ID test critical vlalue	7.25	25%	7.25	25%	7.25	25%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of particiapnts in violent conflicts per person for the last two years	−0.040	(0.018) **	−0.123	(0.033) ***	0.005	(0.003)
ln energy generated per population	0.090	(0.046) *	−0.125	(0.053) **	0.037	(0.015) **
ln surfaced road length per population	0.066	(0.077)	0.301	(0.165) *	−0.070	(0.020) ***
ln disputes per worker	0.002	(0.017)	0.044	(0.031)	−0.012	(0.007) *
ln literacy rate	0.416	(0.208) **	−0.031	(0.457)	0.006	(0.050)
R^2	0.634		−0.352		0.266	
F Statistics (p-value)	36.41	0	10.28	0	7.84	0
Overidetification test						
chi-sq(2) test statistic (p-value)	0.528	(0.4675)	0.396	(0.5293)	0.638	(0.4243)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.841	(0.0157)	52.133	(0.0000)	0.876	(0.3493)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Our estimation results on the impact of the total number of participants in violent conflicts per population for the last two years on economic performance are presented in Table 6. Panel A shows the results of the first stage estimation. The validity tests are reasonably well passed except for the weak instrument test, where the test statistic is below 7.25, which is 25% of the critical level. Again, the test for endogeneity in column (3) is not passed.

Panel B presents the estimation results of the second stage estimation. Columns (1) and (2) show that the number of participants in violent conflicts per population has a negative coefficient at the five percent level for gross value added per worker

and at the one per cent level for the capital labor ratio. A one percent increase in the number of participants per population reduces gross value added per worker by 0.04% and reduces the capital labor ratio by 0.123%. These results mean that a one standard deviation increase in the number of participants (6957) at the mean number of participants (1161) reduces gross value added per worker by 24% and reduces the capital labor ratio by 74%. This would indicate that the impact is not of a small scale.

Summarizing our estimation results, we were able to conclude that the intensity of violent conflicts measured in terms of the numbers of incidents, deaths and participants all significantly reduce both the gross value added per worker and the capital labor ratio. These results indicate that, when facing violent conflict, firms in the manufacturing sector would decrease investment in physical assets relative to labor, move physical assets to other states, or substitute labor for physical assets. These reductions in capital labor ratio or gross value added per worker are economically important in extent. In contrast, the intensity of violent conflicts measured by three variables does not produce any significant effect on total factor productivity.

6. Differential impact of various violent conflicts

6-1. Cause-related classification

In this section we examine whether ethnic and religious violent conflicts have a more adverse impact on the economic performance of the manufacturing sector.

Table 7. Relation of the number of ethnic violent conflicts to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of ethnic violent conflicts per person for the last two years		ln the sum of the number of ethnic violent conflicts per person for the last two years		ln the sum of the number of ethnic violent conflicts per person for the last two years	
Muslim/Hindu population ratio	8.917	(3.452) ***	8.193	(3.413) **	8.193	(3.413) **
ln policemen per population	1.931	(0.514) ***	2.159	(0.530) ***	2.159	(0.530) ***
ln energy generated per population	−0.026	(0.189)	−0.077	(0.200)	−0.077	(0.200)
ln surfaced road length per population	0.177	(0.345)	−0.109	(0.325)	−0.109	(0.325)
ln disputes per worker	−0.071	(0.077)	−0.075	(0.080)	−0.075	(0.080)
ln literacy rate	3.341	(0.970) ***	3.476	(0.974) ***	3.476	(0.974) ***
R^2	0.121		0.1331		0.1331	
F Statistics (p-value)	1.8	(0.0035)	1.99	(0.0007)	1.99	(0.0007)
F test of excluded instruments						
F(x,y) (p-value)	13.38	(0.0000)	15.73	(0.0000)	15.73	(0.0000)
Underidentification test						
rk LM statistic (p-value)	22.9	(0.0000)	24.63	(0.0000)	24.63	(0.0000)
Weak identification test						
rk Wald F statistic	13.38		15.73		15.73	
Stock-Yogo weak ID test critical vlalue	19.93	10%	19.93	10%	19.93	10%
	11.59	15%	11.59	15%	11.59	15%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of ethnic violent conflicts per person for the last two years	−0.067	(0.029) **	−0.230	(0.042) ***	0.007	0.0055966
ln energy generated per population	0.091	(0.047) *	−0.129	(0.041) ***	0.037	0.0147611 **
ln surfaced road length per population	−0.001	(0.061)	0.002	(0.089)	−0.060	0.0206533 ***
ln disputes per worker	−0.005	(0.016)	0.020	(0.022)	−0.011	0.0065516 *
ln literacy rate	0.5484571	(0.187) ***	0.4459558	(0.265) *	−0.0083553	0.0505626
R^2	0.720		0.4494		0.294	
F Statistics (p-value)	54.7	(0.000)	23.4	(0.000)	8.51	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	1.257	0.2621	0	(0.9951)	0.942	(0.3317)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	4.745	(0.0294)	52.926	(0.0000)	0.18	(0.6712)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Panel A of Table 7 presents the results of the first stage estimation. All the validity tests are passed reasonably well. Note that, if we focus on ethnic violent conflicts, our instrumental variable estimations easily pass the weak IV test.

Panel B presents the results of the second stage estimation. Column (1) of Panel B shows that the number of ethnic violent conflicts per population has a negative coefficient at the five percent significance level. The estimated coefficient indicates that a one percent increase in the number of ethnic violent conflicts per population pushes down gross value added per worker by 0.067%. For instance, if a state with the average number of ethnic violent conflicts per population (0.153) experienced a one standard deviation increase of that number (0.708), then the gross value added

per worker would decline by about 31% (= 0.067*463).

In Column (2) of Panel B we obtain a negative coefficient at the one percent significance level for number of ethnic violent conflicts. A one percent increase in the number of ethnic violent conflicts per population decreases the capital labor ratio by 0.23 percent. This result indicates that, if a state with the average number of violent conflicts per population (0.153) experienced a one standard deviation increase of that number (0.708), then the capital labor ratio would decrease by about 106% (= 0.23*463). This is unrealistic, but the marginal impact would not be small.

Table 8. Relation of the number of deaths in ethnic violent conflicts to economic performanceof manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of deaths in ethnic violent conflicts per person for the last two years		ln the sum of the number of deaths in ethnic violent conflicts per person for the last two years		ln the sum of the number of deaths in ethnic violent conflicts per person for the last two years	
Muslim/Hindu population ratio	14.769	(5.811) **	13.702	(5.748) **	13.702	(5.748) **
ln policemen per population	2.905	(0.836) ***	3.275	(0.846) ***	3.275	(0.846) ***
ln energy generated per population	−0.046	(0.286)	−0.157	(0.297)	−0.157	(0.297)
ln surfaced road length per population	0.202	(0.571)	−0.152	(0.521)	−0.152	(0.521)
ln disputes per worker	−0.104	(0.125)	−0.100	(0.125)	−0.100	(0.125)
ln literacy rate	5.471	(1.508) ***	5.602	(1.504) ***	5.602	(1.504) ***
R^2	0.123		0.129		0.129	
F Statistics (p-value)	1.88	0.0018	2.04	(0.0005)	2.04	(0.0005)
F test of excluded instruments						
F(x,y) (p-value)	12.09	(0.0000)	14.76	(0.0000)	14.76	(0.0000)
Underidentification test						
rk LM statistic (p-value)	22.2	(0.0000)	24.2	(0.0000)	24.2	(0.0000)
Weak identification test						
rk Wald F statistic	12.09		14.76		14.76	
Stock-Yogo weak ID test critical vlalue	19.93	10%	19.93	10%	19.93	10%
	11.59	15%	11.59	15%	11.59	15%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of deaths in ethnic violent conflicts per person for the last two years	−0.043	(0.019) **	−0.145	(0.027) ***	0.005	(0.004)
ln energy generated per population	0.090	(0.047) *	−0.136	(0.040) ***	0.037	(0.015) **
ln surfaced road length per population	−0.004	(0.062)	0.007	(0.091)	−0.060	(0.021) ***
ln disputes per worker	−0.005	(0.016)	0.023	(0.022)	−0.011	(0.007) *
ln literacy rate	0.562	(0.190) ***	0.464	(0.265) *	−0.010	(0.051)
R^2	0.712		0.414		0.291	
F Statistics (p-value)	54.38	(0.000)	23.49	(0.000)	8.46	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	1.019	(0.3128)	0.038	(0.8456)	0.876	(0.3492)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.332	(0.0209)	53.729	(0.0000)	0.295	(0.2950)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Column (1) of Panel B of Table 8 shows that number of deaths per population in ethnic violent conflicts has a negative coefficient at the five percent significance level. The estimated coefficient indicates that a one percent increase in the number of deaths per pop in ethnic violent conflicts reduces gross value added per worker by 0.043%. For instance, if a state with the average number of deaths in ethnic violent conflicts per population (4.78) experienced a one standard deviation increase of that number (42.17), then the gross value added per worker would decline by about 38% (= 0.043*882).

In Column (2) of Panel B we obtain a negative coefficient at the one percent significance level for the number of deaths per population in ethnic violent conflicts. A one percent increase in the number of deaths per population in ethnic violent conflict decreases the capital labor ratio by 0.145 percent. This indicates that, if a state with the average number of deaths in ethnic violent conflicts per population (4.78) experienced a one standard deviation increase of that number (42.7), then the capital labor ratio would decrease by about 128% (= 0.145*882). Again, this number is unrealistic, but we are sure that the marginal impact would not be small.

Table 9. Relation of the number of participants in ethnic violent conflicts to economic performanceof manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of participants in ethnic violent conflicts per person for the last twoe years		ln the sum of the number of participants in ethnic violent conflicts per person for the last two years		ln the sum of the number of participants in ethnic violent conflicts per person for the last two years	
Muslim/Hindu population ratio	18.888	(8.827) **	17.376	(8.795) **	17.376	(8.795) **
ln policemen per population	4.647	(1.348) ***	5.259	(1.442) ***	5.259	(1.442) ***
ln energy generated per population	−0.097	(0.494)	−0.328	(0.531)	−0.328	(0.531)
ln surfaced road length per population	0.628	(0.905)	0.146	(0.885)	0.146	(0.885)
ln disputes per worker	−0.141	(0.206)	−0.149	(0.215)	−0.149	(0.215)
ln literacy rate	9.142	(2.570) ***	9.503	(2.586) ***	9.503	(2.586) ***
R^2	0.119		0.127		0.127	
F Statistics (p-value)	1.99	(0.0007)	2.09	(0.0003)	2.09	(0.0003)
F test of excluded instruments						
F(x,y) (p-value)	11.01	(0.0000)	12.74	(0.0000)	12.74	(0.0000)
Underidentification test						
rk LM statistic (p-value)	19.76	(0.0001)	21.87	(0.0000)	21.87	(0.0000)
Weak identification test						
rk Wald F statistic	11.01		12.74		12.74	
Stock-Yogo weak ID test critical vlalue	19.93	10%	19.93	10%	19.93	10%
	11.59	15%	11.59	15%	11.59	15%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of participants in ethnic violent conflicts per person for the last two years	−0.029	(0.013) **	−0.100	(0.020) ***	0.003	(0.002)
ln energy generated per population	0.091	(0.047) *	−0.142	(0.045) ***	0.037	(0.015) **
ln surfaced road length per population	0.006	(0.062)	0.040	(0.097)	−0.061	(0.020) ***
ln disputes per worker	−0.005	(0.017)	0.022	(0.025)	−0.011	(0.007) *
ln literacy rate	0.585	(0.200) ***	0.587	(0.291) **	−0.011	(0.051)
R^2	0.707		0.310		0.290	
F Statistics (p-value)	51.62	(0.000)	19.77	(0.000)	8.51	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	1.414	(0.2344)	0.062	(0.8027)	1.042	(0.3073)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	4.797	(0.0285)	52.571	(0.0000)	0.355	(0.5513)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Our estimation results on the impact of the sum of the number of participants per population in violent conflicts for the last two years on economic performance are presented in Table 9. Panel A shows the results of the first stage estimation. Validity tests are reasonably well passed, apart from the endogeneity test in column (3).

Panel B presents the results of the second stage estimation. Column (1) shows that the number of participants per population in ethnic violent conflicts has a negative coefficient at the five percent level for gross value added per worker. A one percent increase in the number of participants reduces gross value added per worker by 0.04%. These results mean that one standard deviation increase in the number of

participants (6590) at the mean number of participants (975) reduces gross value added per worker by 27%.

Column (2) of Panel B shows that the coefficient of participants per pop has a negative coefficient at the one percent significance level. The results indicate that a one percent increase in participants per population reduces capital labor ratio by 0.123 percent. This implies that, if a state with the average number of participants in ethnic violent conflicts per population (975) experienced an increase of one standard deviation (6590), then the capital labor ratio would decrease by 88%. Thus, it would seem that the impact is not of a small scale.

Similarly, we found evidence that religious violent conflicts have a negative impact on the gross value added per worker and capital labor ratio of the manufacturing sector.[19] However, we do not find evidence that other types of violent conflicts also reduce the economic performance of the manufacturing sector.

[19] Estimation results are available from authors upon request.

6-2. Nested relationship of conflicts

In this section, we investigate whether violent conflicts nested in a larger conflict exert a more significant influence on the economic performance of the manufacturing sector than discrete violent conflicts.

Table 10. Relation of the number of violent conflicts nested in a larger conflict to economic performanceof manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of violent conflicts nested in a larger conflict per person for the last two years		ln the sum of the number of violent conflicts nested in a larger conflict per person for the last two years		ln the sum of the number of violent conflicts nested in a larger conflict per person for the last two years	
Muslim/Hindu population ratio	12.660	(3.071) ***	12.223	(3.090) ***	12.223	(3.090) ***
ln policemen per population	1.529	(0.596) **	1.782	(0.684) ***	1.782	(0.684) ***
ln energy generated per population	−0.028	(0.172)	−0.024	(0.189)	−0.024	(0.189)
ln surfaced road length per population	0.719	(0.423) *	0.700	(0.451)	0.700	(0.451)
ln disputes per worker	−0.053	(0.078)	−0.057	(0.082)	−0.057	(0.082)
ln literacy rate	3.552	(1.311) ***	3.702	(1.330) ***	3.702	(1.330) ***
R^2	0.169		0.1613		0.1613	
F Statistics (p-value)	4.24	(0.0000)	3.65	(0.0000)	3.65	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	13.7	(0.0000)	14.17	(0.0000)	14.17	(0.0000)
Underidentification test						
rk LM statistic (p-value)	23.29	(0.0000)	23.81	(0.0000)	23.81	(0.0000)
Weak identification test						
rk Wald F statistic	13.7		14.17		14.17	
Stock-Yogo weak ID test critical vlalue	11.59	15%	11.59	15%	11.59	15%
	8.75	20%	8.75	20%	8.75	20%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of violent conflicts nested in a larger conflict per person for the last three years	−0.065	(0.026) ***	−0.194	(0.038) ***	0.008	(0.005)
ln energy generated per population	0.087	(0.045) *	−0.126	(0.033) ***	0.037	(0.015) **
ln surfaced road length per population	0.034	(0.064)	0.177	(0.101) *	−0.066	(0.020) ***
ln disputes per worker	−0.003	(0.016)	0.026	(0.020)	−0.011	(0.007) *
ln literacy rate	0.561	(0.186) ***	0.404	(0.279)	−0.012	(0.053)
R^2	0.718		0.4292		0.281	
F Statistics (p-value)	49.54	(0.000)	22.82	(0.000)	8.22	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	0.312	(0.5766)	1.424	(0.2327)	0.53	(0.4668)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.018	(0.0251)	47.439	(0.0000)	0.923	(0.3367)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Panel A of Table 10 presents the results of the first stage estimation. All the validity tests are passed reasonably well. Note that, if we focus on nested violent conflicts, our instrumental variable estimation more easily passes the weak IV test.

Panel B presents the results of the second stage estimation. Column (1) of Panel B shows that number of violent conflicts nested in a larger conflict per population has a

negative coefficient at the one percent significance level. The estimated coefficient indicates that a one percent increase in the number of nested violent conflicts per population reduces gross value added per worker by 0.065%. For instance, if a state with the average number of nested violent conflicts per population (0.153) experienced a one standard deviation increase of that number (0.699), then the gross value added per worker would decline by about 30% (= 0.065*457).

In Column (2) of Panel B we obtain a negative coefficient at the one percent significance level for number of violent conflicts nested in a larger conflict per population. A one percent increase in the number of nested violent conflicts per population decreases the capital labor ratio by 0.194 percent. This indicates that, if a state with the average number of nested violent conflicts per population (0.153) experienced a one standard deviation increase of that number (0.699), then the capital labor ratio would decrease by about 87% (=0.194*457). Again, the number is unrealistic, but the impact would not be small in scale.

Table 11. Relation of the number of deaths in violent conflicts nested in a larger conflict to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of deaths in violent conflicts nested in a larger conflict per person for the last two years		ln the sum of the number of deaths in violent conflicts nested in a larger conflict per person for the last two years		ln the sum of the number of deaths in violent conflicts nested in a larger conflict per person for the last two years	
Muslim/Hindu population ratio	20.992	(5.292) ***	20.078	(5.258) ***	20.078	(5.258) ***
ln policemen per population	2.272	(0.925) **	2.696	(1.022) ***	2.696	(1.022) ***
ln energy generated per population	−0.016	(0.263)	−0.071	(0.285)	−0.071	(0.285)
ln surfaced road length per population	0.480	(0.650)	0.440	(0.656)	0.440	(0.656)
ln disputes per worker	−0.064	(0.129)	−0.062	(0.130)	−0.062	(0.130)
ln literacy rate	6.066	(1.917) ***	6.421	(1.943) ***	6.421	(1.943) ***
R^2	0.202		0.198		0.198	
F Statistics (p-value)	4.5	0	3.98	(0.0000)	3.98	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	12.23	(0.0000)	12.91	(0.0000)	12.91	(0.0000)
Underidentification test						
rk LM statistic (p-value)	22.66	(0.0000)	23.07	(0.0000)	23.07	(0.0000)
Weak identification test						
rk Wald F statistic	12.23		12.91		12.91	
Stock-Yogo weak ID test critical vlalue	11.59	15%	11.59	15%	11.59	15%
	8.75	20%	8.75	20%	8.75	20%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of deaths in violent conflicts nested in a larger conflict per person for the last two years	−0.041	(0.016) ***	−0.120	(0.024) ***	0.005	(0.003)
ln energy generated per population	0.087	(0.045) **	−0.131	(0.033) ***	0.038	(0.015) **
ln surfaced road length per population	0.006	(0.062)	0.097	(0.096)	−0.063	(0.020) ***
ln disputes per worker	−0.002	(0.016)	0.030	(0.019)	−0.011	(0.007) *
ln literacy rate	0.578	(0.187) ***	0.462	(0.273) *	−0.015	(0.054)
R^2	0.713		0.416		0.275	
F Statistics (p-value)	49.05	(0.000)	23.3	(0.000)	8.11	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	0.212	(0.6451)	2.006	(0.1567)	0.481	(0.4879)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.349	(0.0207)	45.919	(0.0000)	1.296	(0.2550)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Column (1) of Panel B of Table 11 shows that number of deaths per population in violent conflicts nested in a larger conflict has a negative coefficient at the one percent significance level. The estimated coefficient indicates that a one percent increase in the number of deaths per pop pushes down gross value added per worker by 0.041%. For instance, if a state with the average number of deaths in nested violent conflicts per population (5.59) experienced a one standard deviation increase of that number (43.6), then the gross value added per worker would decline by about

32% (= 0.041*780).

In Column (2) of Panel B we obtain a negative coefficient at the one percent significance level for the number of deaths per population in violent conflicts nested in a larger conflict. A one percent increase in the number of deaths per population decreases the capital labor ratio by 0.12 percent. This indicates that, if a state with the average number of deaths in nested violent conflicts per population (5.59) experienced a one standard deviation increase of that number (43.6), then the capital labor ratio would decrease by about 94% (= 0.12*780). Again, the number is unrealistic, but the impact would not be a small scale one.

Table 12. Relation of the number of participants in violent conflicts nested in a larger conflict to economic performance of manufacturing sector: two-stage least squares estimation results

Panel A: First Stage

Dependent Variable:	ln the sum of the number of participants in violent conflicts nested in a larger conflict per person for the last twoe years		ln the sum of the number of participants in violent conflicts nested in a larger conflict per person for the last two years		ln the sum of the number of participants in violent conflicts nested in a larger conflict per person for the last two years	
Muslim/Hindu population ratio	29.407	(7.405) ***	28.165	(7.452) ***	28.165	(7.452) ***
ln policemen per population	4.070	(1.470) ***	4.849	(1.668) ***	4.849	(1.668) ***
ln energy generated per population	−0.080	(0.456)	−0.200	(0.507)	−0.200	(0.507)
ln surfaced road length per population	1.654	(1.071)	1.838	(1.143)	1.838	(1.143)
ln disputes per worker	−0.127	(0.201)	−0.129	(0.209)	−0.129	(0.209)
ln literacy rate	7.461	(3.336) **	8.138	(3.375) **	8.138	(3.375) **
R^2	0.190		0.184		0.184	
F Statistics (p-value)	4.89	(0.0000)	4.25	(0.0000)	4.25	(0.0000)
F test of excluded instruments						
F(x,y) (p-value)	14	(0.0000)	14.77	(0.0000)	14.77	(0.0000)
Underidentification test						
rk LM statistic (p-value)	22.89	(0.0000)	23.56	(0.0000)	23.56	(0.0000)
Weak identification test						
rk Wald F statistic	14		14.77		14.77	
Stock-Yogo weak ID test critical vlalue	7.25	25%	7.25	25%	7.25	25%

Panel B: Second Stage

	(1)		(2)		(3)	
	ln gross value added per worker		ln capital labor ratio		ln total factor productivity	
ln the sum of the number of participants in violent conflicts nested in a larger conflict per person for the last two years	−0.027	(0.011) **	−0.081	(0.016) ***	0.003	(0.002)
ln energy generated per population	0.087	(0.045) *	−0.135	(0.034) ***	0.038	(0.015) **
ln surfaced road length per population	0.031	(0.064)	0.185	(0.104) *	−0.066	(0.020) ***
ln disputes per worker	−0.003	(0.016)	0.027	(0.020)	−0.011	(0.007) *
ln literacy rate	0.526	(0.184) ***	0.329	(0.283)	−0.008	(0.051)
R^2	0.710		0.372		0.278	
F Statistics (p-value)	48.23	(0.000)	20.99	(0.000)	8.24	(0.000)
Overidetification test						
chi-sq(2) test statistic (p-value)	0.486	(0.4858)	0.743	(0.3886)	0.63	(0.4273)
Endogeneity test (p-value)						
chi-sq(2) test statistic (p-value)	5.245	(0.0220)	49.371	(0.0000)	1.07	(0.3010)
No. of obs.	635		596		596	

Notes: *** indicates 1% significance level, ** 5%, and * 10%.
Numbers in parentheses are standard errors, unless otherwise indicated.
See the notes of Table 1 for the explanation of variables.

Source: Authors' calculations.

Our estimation results on the impact of the sum for the last two years of the number of participants per population in violent conflicts nested in a larger conflict on the economic performance are presented in Table 12. Panel A shows the results of the first stage estimation. Validity tests are reasonably well passed, including the weak instrument tests, where the test statistic is more than 14. Again, the endogeneity test in column (3) is not passed.

Panel B presents the results of the second stage estimation. Columns (1) and (2)

show that the number of participants in nested violent conflicts has a negative coefficient at the five percent significance level for gross value added per worker and at the one per cent level for the capital labor ratio. A one percent increase in the number of participants reduces gross value added per worker by 0.027% and reduces the capital labor ratio by 0.081%. These results mean that a one standard deviation increase in the number of participants (6789) at the mean number of participants (992) reduces gross value added per worker by 18% and capital ratio by 55%. Thus, it would seem that the impact is not of a small scale.

In summary, consistent with our fourth hypothesis, violent conflicts nested in a larger conflict have been shown to affect negatively the economic performance of the manufacturing sector, while discrete violent conflicts do not. Among nested violent conflicts, those nested in a mega conflict have a larger negative impact than those nested in a meta conflict.

7. Discussion

Our analysis found evidence in support of our hypotheses. Violent conflicts measured by the number of incidents, the number of deaths and the number of participants all reduce both the gross value added per worker and the capital labor ratio of the manufacturing sector, but not total factor productivity. These results are consistent with our intuition that violence would deprive people in a target group of physical assets (or lives) but not of ideas about the mode of production or transaction.

When we separated violent conflicts into subcategories, we found that ethnic and religious violent conflicts have a negative impact on the economic performance of the manufacturing sector, while the other three types of violent conflicts (i.e., political, economic and caste) do not. These results are consistent with our hypothesis that conflict along social cleavage based on a stable identity has the most serious negative effect on economic performance.

Moreover, our analysis presents evidence that violent conflicts nested in a larger violent conflict have statistically significant adverse effects but discrete violent conflicts do not. This seems to indicate that people change their economic behavior more in response to nested violent conflict than to discrete violent conflict. Furthermore, although it is not shown in the paper, only violent conflicts nested in a mega conflict have a statistically significant negative impact; those nested in a meta

conflict do not have an impact.[20]

In a nutshell, the deleterious effects of violent conflicts are most salient in conflicts that are ethnic, religious or nested in a larger conflict. Hence, communal conflicts between Muslim and Hindu, the Sikh separatist movement, the Assamese exclusion movement, or the Jammu & Kashmir conflicts have the most serious negative effects on the economy. Other conflicts, such as riots that sporadically occur during elections, or riots that occurred intensively when the expansion of reservation policy was recommended and adopted, do not have as large an economic impact.

8. Conclusion

In this paper we investigated the impact of internal violent conflicts on the economic performance of the manufacturing sector at sub-national state level. Our dataset covers various forms of violent conflicts, including civil wars, riots and terrorist attacks in twenty eight states in India in the period from 1973 to 2004. Our analysis shows that violent conflicts reduce the capital labor ratio of the manufacturing sector, through which they reduce the gross value added of the manufacturing sector, while they do not have significant effects on total factor productivity. Both ethnic and religious violent conflicts exert negative effects on gross value added per worker and capital labor ratio. Moreover, we obtain empirical evidence that violent conflicts nested in larger conflicts (especially, in a mega conflict) have a seriously negative impact on those two dependent variables. Our empirical evidence implies that state governments that seriously seek to promote industrialization of the state economy have to restrain violent conflict in the state. Needless to say, state governments should not encourage or support violent conflicts in any case.

Appendix A: Construction of violent conflict-related dataset.

Within the India Sub-national Problem Set, the events identified with conflict tab number at level 1 equal to 0, 1 and 2 are excluded from our data set because they are the mega- and meta-events to which each micro-conflict event may belong. Among the events listed in the dataset, those with LSTATE identifier equal to 88 occurred in more than one state. For those events, if additional location information is available in the columns LLOCAL or DESC, we allocate one to every state or evenly allocate

[20] Estimation results are available from authors upon request.

the number of deaths and participants across those multiple states. For some of the events with LSTATE equal to 99, meaning that the state where the conflict happened is unknown, further locality information is available in either the LLOCAL or DESC columns. If we could identify the states of conflicts, we applied the same procedures as above. However, the locations of 69 events in the dataset remain unknown. For those conflicts we refer to the Varshney and Wilkinson Dataset, Communal Riots in India: A Chronology (1947–2003) (Rajeshwari 2004), and various issues of the Times of India, Mumbai edition. Then we assign state identity as follows: cnum (conflict number) 336 -> NG; 358 -> TN and KA; 380 -> UP, BI, MP, WB, RJ, PJ, GJ, TN, KE, KA, AP and HP; 418 -> UP and BI; 445 -> MH; 495, 499, 507 and 438 -> PJ; 1118 -> GJ, RJ, UP, AS MH and BI; 1124 -> AP, KA and MP; 1173 -> MH, MP, GJ, RJ, BI, KA, WB, UP, DE, OR, AS and AP; 1269 -> TN and KE; 1291 -> BI, AP, MZ, NG and WB; 1318 -> AP; 1344 -> GA, KA and AP, where AP indicates Andhra Pradesh, AS Assam, BI Bihar, DE Delhi, GA Goa, GJ Gujarat, HP Himachal Pradesh, KA Karnataka, KE Kerala, MH Maharashtra, MP Madhya Pradesh, MZ Mizoram, NG Nagaland, PJ Punjab, RJ Rajasthan, OR Orissa, TN Tamil Nadu, UP Uttar Pradesh, and WB West Bengal.

Moreover, cnum 351 was deleted because the article related to this conflict was not found in the Times of India, while cnum 360 and cnum 1130 were deleted because it was a nationwide conflict.

In the cases where more than two states are assigned to one conflict, the number of deaths and participants are evenly assigned to each state, even if additional information on the death toll in a specific state is available in the above information source, for consistency and reproducibility of data construction.

We could not identify the states that were involved for the following conflict cases: cnum 343, 351, 364, 1098, 1116, 1130, and 1141.

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