Crime, Gender, and Society in India: Insights from Homicide Data

JEAN DRÈZE
REETIKA KHERA

FREEDOM FROM VIOLENCE, as an aspect of the quality of life, is a neglected issue in development studies. Most people would rather avoid being mugged, beaten, wounded, or tortured, and it is also nice to live without fear of these traumatic experiences. Thus, protection from violence may be thought of as one of the "capabilities" that contribute to the quality of life (Sen 1985). Violence also affects human wellbeing in indirect ways, as when armed conflicts undermine economic growth or the functioning of public services. If development is concerned with improving the quality of life, the issue of violence should be a major interest of the discipline. Yet, it tends to receive little attention outside specialized circles.

There is another reason why protection from violence is a "capability" of much interest: it does not necessarily improve as income levels rise. Many other basic capabilities, such as nutrition, longevity, and literacy, are positively related to per capita income and tend to improve with economic growth even in the absence of direct intervention. Protection from violence, however, is not a convenient byproduct of economic growth, and indeed there are spectacular cases of violence rising against a background of rapid improvement in per capita income and other development indicators. Dealing with violence in a society is, therefore, intrinsically a matter of public action. The latter, in turn, calls for careful investigation of the causes of violence.

One possible reason (among others) why violence is an under-researched issue in development studies is the paucity of relevant data. War-torn zones are not the best site for a household survey, and even basic data on criminal violence in developing countries are seldom available in a convenient and reliable form. The Indian government, however, publishes a

good deal of information on murders; this study is a preliminary attempt to analyze these data.

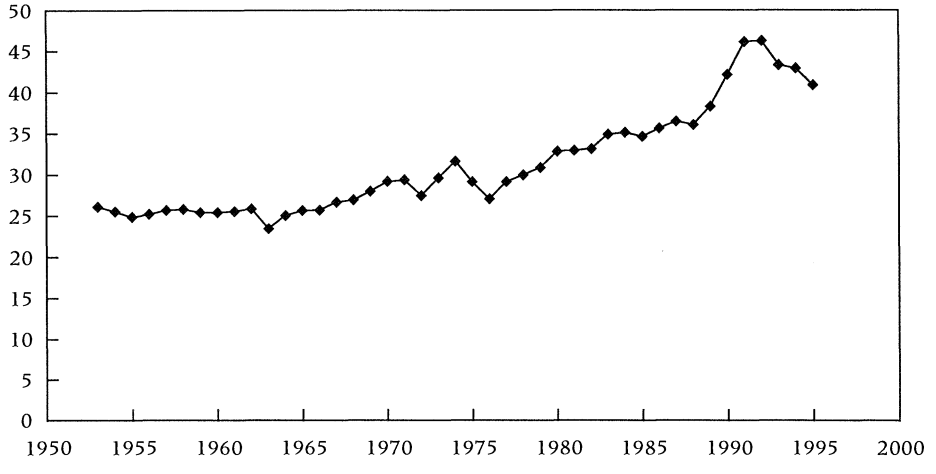
Our main concern is to explore the links between murder rates at the district level and such socioeconomic variables as poverty, urbanization, literacy, and the demographic and social composition of the population.[1] Regression analysis points to a robust negative correlation between murder rates and the female–male ratio in the population. This pattern receives special attention in this study.

Data and issues

Crime in India, an annual publication of the Government of India (Ministry of Home Affairs), presents district-level data on a range of "crimes" such as murder, rape, kidnapping, theft, burglary, and arson. These statistics are compiled from police records. One suspects a good deal of underreporting for most of these crimes, but murder data are likely to be fairly accurate.[2] Accordingly, we restrict our attention to murders.[3] It is worth noting that crime rates are not well correlated across different types of crime. For instance, the ranking of Indian states by level of crime varies a great deal depending on which crime one is looking at (an exception is Kerala, which has low levels of crime across the board). Similarly, trends over time often diverge between different types of crime.[4] Thus, the findings of this study may not apply to crimes other than murder.

Figure 1 plots the all-India murder rate (murders per million persons) from 1953 to 1995. A significant upward trend can be seen from the mid-

FIGURE 1 Murder rate in India, 1953–95 (murders per million population)



SOURCE: Calculated from *Crime in India 1995,* pp. 4 and 8.

1970s onward. In 1995, the murder rate was 41 per million. This is a relatively low murder rate for a country in the "medium human development" category.[5] Interestingly, the *Crime in India* data suggest that murder rates are not markedly higher (on average) in urban areas than in rural areas.[6] A striking pattern is the wide variation between major cities, where murder rates in 1995 ranged from 7 per million in Calcutta to 164 per million in Patna.

Some basic features of homicide in India can be gleaned from case studies, police reports, and related sources.[7] Offenders are mainly young men. Murders by women are extremely rare and are usually committed in response to provocations such as harassment or infidelity. (Infanticide is another significant category, largely unrecorded.) In the case of murders committed by men, folklore has it that the main motives are "*zan, zar,* and *zamin*" (women, gold, and land).[8] Despite an element of stereotype here, the general notion that disputes relating to property and women account for a substantial proportion of murders is consistent with the evidence (such as it is) from police records and court proceedings.[9] Altercations and vendettas are other common antecedents. Scattered evidence suggests that perpetrator and victim often belong to the same family, caste, community, or peer group. In a case study of 144 convictions for murder in central India, Driver (1961) found that victim and offender belonged to the same caste in 84 percent of the cases.[10] The main motives for murder were disputes over property, living arrangements, sexual matters, and transgressions of social norms.

Earlier statistical analyses of Indian crime data are few and far between. A noteworthy contribution is Baldev Raj Nayar's *Violence and Crime in India* (Nayar 1975).[11] The author focuses on temporal and regional patterns in crime rates and how these might be explained. Unfortunately, his statistical analysis of the determinants of "murder and kidnapping" (pp. 121–122) produced little result, partly because it was based on a mere 18 observations (one for each state). Interestingly, "police strength" had a positive coefficient in this regression, but this finding has to be interpreted with caution, given the possibility of reverse causation.[12]

In the concluding pages of his book, Nayar pointed out that "district level data may provide more satisfactory results in respect of the social and economic correlates of violence and other crime" (p. 128), but no one seems to have pursued this useful hint. Philip Oldenburg (1992), however, noticed an interesting pattern based on district-level data for Uttar Pradesh: there is a negative correlation between the incidence of murders and the female–male ratio in the population. As we shall see, this pattern also applies to India as a whole (even after controlling for a wide range of other variables), though probably for reasons different from those suggested by Oldenburg.

Aside from extending the earlier work of Nayar and Oldenburg, our analysis investigates two further issues. First, we examine the possible link

between murder rates and various indicators of modernization and development such as urbanization, literacy, and the level of poverty. One common assumption in this respect is that modernization is associated with high murder rates. This conjecture receives little support from empirical studies of crime in Europe and North America (Rogers 1989), but it is worth reexamining in the Indian context.[13] Second, we scrutinize the relation between crime rates and the social composition of the population.

Regression variables

Little material is available to construct a plausible "model" of crime in India, and we shall not attempt to do so.[14] Instead, our starting point is the "statistical approach" to regression analysis (Deaton 1997: 63), where the regression function is simply interpreted as a conditional expectation: in this case, the expectation of the murder rate conditional on various socioeconomic variables of interest.

The regression variables and their means are listed in Table 1. The unit of analysis is the district, and the reference year is 1981.[15] The relevant data are available for 319 districts, accounting for about 90 percent of India's total population.

The district is a useful unit of analysis in this context. It is, indeed, natural to focus on the murder rate as a characteristic of the society, rather than on the propensity of particular individuals or households to commit

TABLE 1 Regression variables and their mean values

Variable name	Definition	Variable mean
MURDER	Murders per million persons, 1980–82 (unweighted average of annual figures for 1980, 1981, 1982)	33.4
LITERACY	Crude literacy rate, 1981 (%)	34.1
URBAN	Proportion of the population living in urban areas, 1981 (%)	20.5
POVERTY	Sen index of rural poverty for the region where the district is situated, 1972–73 (%)	17.8
SC	Proportion of scheduled-caste persons in the population, 1981 (%)	16.0
ST	Proportion of scheduled-tribe persons in the population, 1981 (%)	9.2
FMR	Female–male ratio: females per 1,000 males, 1981	933
Q5RATIO	Ratio of male q_5 to female q_5 (q_5 is the probability of dying before age 5), 1981	0.91

SOURCES: *Crime in India* (Government of India, annual) for MURDER; Government of India (1988) for Q5RATIO; Jain, Sundaram, and Tendulkar (1988) for POVERTY; Census of India 1981 for the other variables. The "variable means" are unweighted averages of district values.

murders. A higher level of aggregation than the district, on the other hand, would miss local variations in murder rates and their social context. A state-level analysis, in particular, would be too coarse, as there are wide inter-district variations in murder rates within states. In Uttar Pradesh, for instance, the annual murder rate varies from 2.9 per million persons in Garhwal to 106 per million in Pilibhit.

Our dependent variable is the murder rate (MURDER), defined as the annual number of murders per million persons. For this variable, we have taken an unweighted average of the annual values for 1980, 1981, and 1982. This helps to even out transient variations in murder rates, which are unlikely to have much to do with the right-hand-side variables. State-level means of the murder rate for India's "major states" are given in Table 2. These range between 25 and 32 per million in most states, with much higher murder rates in Madhya Pradesh and Uttar Pradesh, and much lower rates in Kerala.[16]

Table 2 also gives state-level means of the independent variables. The latter require little elaboration, except for the poverty indicator. In the absence of district-level poverty estimates, our poverty indicator is the "Sen index" for the region where the relevant district is situated. The "region" is an intermediate unit between the district and the state. Most states have three to five regions, each made up of a collection of contiguous districts. The implicit assumption here is that poverty levels do not vary a great deal between districts within a specific region.[17] Another qualification is that the reference year for our poverty indicator is not 1981 but 1972–73, the clos-

TABLE 2 State-level means of the regression variables

	MURDER	LITERACY	URBAN	POVERTY	SC	ST	FMR	Q5RATIO
Kerala	15	70.4	15.4	20.9	10	1.0	1032	1.12
Orissa	21	34.2	13.1	32.1	13	24.9	981	1.03
Maharashtra	25	44.3	26.0	23.6	7	10.1	961	1.01
Karnataka	25	38.5	24.5	14.5	15	4.9	963	1.02
Gujarat	26	43.7	26.4	15.5	7	14.2	938	0.92
Andhra Pradesh	26	29.9	23.3	15.8	15	5.9	975	1.06
Haryana	27	35.4	21.9	3.7	19	0.0	871	0.82
Rajasthan	27	24.4	19.3	14.8	17	13.8	923	0.89
West Bengal	27	38.8	23.2	28.4	22	7.2	916	0.98
Tamil Nadu	31	46.8	33.0	17.6	18	1.1	977	1.02
Bihar	32	26.2	12.5	24.8	15	8.3	946	0.86
Punjab	36	39.1	27.7	3.8	27	0.0	880	0.88
Uttar Pradesh	50	28.2	18.0	13.0	21	0.5	892	0.84
Madhya Pradesh	51	27.9	19.6	19.3	14	21.1	933	0.96

NOTE: States are arranged in ascending order of the murder rate (first column). For Assam (where the 1981 census did not take place), the relevant data are not available. All entries are unweighted averages of the relevant district values.

est year for which region-level poverty estimates are available. For further discussion of these qualifications, see Murthi, Guio, and Drèze (1995).

Aside from those listed in Table 2, we tried a number of other independent variables, including population density, the proportion of agricultural laborers in the population, and the Gini coefficient of per capita expenditure.[18] However, these variables had unstable coefficients and were not statistically significant. To reduce multicolinearity problems, we dropped them from the regressions reported in the next section.

We begin with ordinary least squares (OLS) estimation. The possibility of a feedback effect from murder rates to female–male ratios will be addressed through instrumental-variable (IV) estimation.

Empirical findings

The main results are presented in Table 3. Our "baseline" regression appears in the first column. Among the development-related variables (literacy, urbanization, and poverty), only literacy has a significant coefficient, with a negative sign. This lends support to the hypothesis that education exercises a moderating influence on criminal violence.[19] In this connection, it is worth recalling that Kerala has some of the lowest crime rates in the country, not only for murders but also for other crimes.

The finding that urbanization bears no significant association with murder rates defies the popular notion that criminal violence is relatively high in cities. As noted earlier, however, this notion is not supported by available crime data. Also, bearing in mind that the main causal antecedents of murder in India appear to be disputes about property, family, and related matters, and that the disputes in question usually involve closely related persons, we would not expect particularly high murder rates in urban areas, with their more anonymous environment and formalized property rights.[20] What does seem to be a matter of concern is the emergence of a culture of high violence in certain cities, such as Patna and Lucknow.

Poverty, like urbanization, bears no significant association with murder rates; to the extent that there is any association, it is negative (that is, higher poverty levels are associated with lower murder rates). This goes against another common belief, namely that murder rates are particularly high among the poor. This view was quite influential among colonial administrators during the preindependence period.[21] It is also a standard prediction of Becker's model of crime, with its focus on the opportunity cost of time (Glaeser 1999). The poor, so goes the argument, have lower returns to legal activity and a lower opportunity cost of jail time, both of which raise the incentive to commit crimes. It is not difficult to see that this argument, on its own, is far from convincing in the Indian context. For one thing, poverty is associated not only with low wages but also with high levels of

TABLE 3 Regression coefficients showing the relationship of murder rates to independent variables

Dependent variable:	MURDER	MURDER	MURDER-PM[a]	MURDER	MURDER
Estimation method:	OLS	OLS	OLS	IV	OLS
Independent variables					
Constant	173.09	43.07	198.86	141.46	169.70
Literacy rate	−.28**	−.50**	−.28**	−.33**	−.20*
(LITERACY)	(−2.65)	(−4.65)	(−2.56)	(−2.62)	(−1.82)
Level of urbanization	−.10	.21**	−.12	−0.02	−0.06
(URBAN)	(−1.07)	(2.46)	(−1.23)	(−0.17)	(−.59)
Sen index of poverty	−.13	−.36**	−.13	−.19	−.08
(POVERTY)	(−.85)	(−2.32)	(−.81)	(−1.08)	(−.52)
Scheduled castes' population share	.20	.51**	.20	.27	.24
(SC)	(1.06)	(2.68)	(1.04)	(1.27)	(1.31)
Scheduled tribes' population share	.26**	.26**	.26**	.26**	.33**
(ST)	(2.92)	(2.72)	(2.70)	(2.74)	(3.53)
Female–male ratio	−.14**	—	−0.16**	−.11**	−.11**
(FMR)	(−6.88)		(−7.74)	(−2.42)	(−4.51)
Ratio of male to female child mortality	—	—	—	—	−31.69**
(Q5RATIO)					(−2.21)
R^2	0.27	0.16	0.30	0.17	0.28
Number of observations	319	319	319	319	319

*significant at 10 percent level (*t*-ratio in parentheses); **significant at 1 percent level.
[a]Murders per million males (multiplied by two, to facilitate comparison with other columns).
NOTES: OLS = ordinary least squares. IV = instrumental-variable estimation.

risk aversion. For another, the risk of being caught and convicted in the event of committing a murder tends to be much higher among the poor than among the rich. Indeed, the Indian judicial system is anything but impartial between different classes. While it is not uncommon for a privileged and influential person to "get away with murder," the poor live in terror of the police and the courts.

These findings pertaining to development-related variables are broadly consistent with those of Bhatnagar (1990). Among the various socioeconomic variables and development indicators examined by the author (pp. 59–67), none showed a statistically significant correlation with murder rates at the state level. The author also found a negative (though not statistically significant) relationship between literacy and all types of crime, with the notable exception of "cheating."

The baseline regression also indicates that districts with a higher proportion of scheduled-caste or scheduled-tribe persons in the population have higher murder rates (in the case of scheduled tribes, this association is statistically significant). It is tempting to conclude that these sections of society have a higher propensity to kill their fellow human beings, but this does not necessarily follow. At least two alternative explanations are possible. First, members of these social groups may be special targets of criminal violence. Indeed, they are "soft" targets, with a limited ability to retaliate or take legal action. Second, it is possible that a significant proportion of murders arise from caste or communal conflicts, and that such conflicts are particularly likely in areas where disadvantaged groups account for a larger share of the population. While these explanations may seem unconvincing in light of the fact that the social distance between offender and victim appears to be quite small in many cases, available evidence on the social background of offenders and victims is too scant to rule out these explanations.

The strongest pattern emerging from the baseline regression pertains to the female–male ratio, which is negatively correlated with the murder rate (i.e., murder rates are higher in districts with low female–male ratios). This correlation is very robust: no matter which other variables are included or excluded from the regression, we found that the female–male ratio remained highly significant, always with a negative sign.[22] Further, the size of the coefficient of the female–male ratio is quite large: it implies, for instance, that the "predicted" murder rate for a district with Kerala's female–male ratio (holding other independent variables at the mean) is only about half as large as the predicted murder rate for a district with, say, Uttar Pradesh's female–male ratio.

The second column of Table 3 shows what happens if the female–male ratio is dropped from the regression. The main difference vis-à-vis the baseline regression is that urbanization is statistically significant, with a positive sign (i.e., more-urbanized districts have higher murder rates). However, this regression equation is misspecified, since it omits a variable of crucial importance, namely the female–male ratio. Thus, while urbanization appears to have a positive effect on murder rates (Table 3, column 2), this effect is entirely "accounted for" by the higher masculinity of the population in the more-urbanized districts (Table 3, column 1). The more general lesson is that analyses of crime in India are likely to be seriously incomplete, perhaps even distorted, if they fail to take into account the gender dimension of the problem.

Gender and crime

Let us now consider some explanations for the negative coefficient of the female–male ratio in the baseline regression.

Demographic weights

The first explanation that comes to mind is a plain "arithmetic" one: since men are far more violent than women, populations with a higher proportion of men naturally have higher murder rates.[23] Closer scrutiny of the results, however, indicates that the observed association between female–male ratios and murder rates is mediated principally by variations in sex-specific murder rates, rather than by variations in the demographic weights (i.e., male and female population shares) used to aggregate these sex-specific murder rates to obtain the overall murder rate. Formally, the murder rate (the number of murders divided by the total population, say k for short) may be written as

$$k \equiv mk_m + (1-m)k_f \qquad (1)$$

where m is the proportion of men in the population, k_m is the "male murder rate" (i.e., number of murders committed by men divided by male population), and k_f is the female murder rate, similarly defined. Equation (1) substantiates the arithmetic explanation: if sex-specific murder rates do not vary across districts, the overall murder rate is bound to be negatively correlated with the female–male ratio as long as k_m is larger than k_f. If sex-specific murder rates vary across districts, a regression of k on the female–male ratio would still produce a negative coefficient as long as inter-district variations in sex-specific murder rates are uncorrelated with the female–male ratio. However, equation (1) also suggests an elasticity of k with respect to m of at most 1 in absolute value.[24] By contrast, using the baseline regression (Table 3, first column) and the identity

$$m \equiv 1/(1+\frac{f}{m})$$

where f/m is the female–male ratio, we find that the implicit elasticity of k with respect to m is larger than 8 in absolute value. In other words, the estimated effect of the female–male ratio on the murder rate is much larger than we would expect from the arithmetic explanation alone.

To illustrate the point, consider the aforementioned contrast between Garhwal and Pilibhit in Uttar Pradesh. Since the proportion of males in the population is about 13 percent higher in Pilibhit than in Garhwal, we would expect the murder rate itself to be up to 13 percent higher in Pilibhit, based on the arithmetic explanation alone (i.e., assuming identical sex-specific murder rates in the two districts). In fact, the murder rate is about 35 times as high in Pilibhit (106 per million) as in Garhwal (2.9 per million); further, the baseline regression suggests that about one-third of this gap is accounted

for by the contrast in female–male ratios (0.85 in Pilibhit versus 1.08 in Garhwal).

To look at this issue from another angle, we can shift the focus from the murder rate to the number of murders per male, that is, the number of murders divided by the male population (MURDER-PM in Table 3). Note that when k_f is close to zero, as is the case in India, MURDER-PM is essentially the same as k_m. As the third column of Table 3 shows, the regression results are much the same when MURDER is replaced with MURDER-PM on the left-hand side, reinforcing the notion that the results are driven by variations in sex-specific murder rates (specifically, k_m) rather than variations in the demographic weights used in aggregating these sex-specific murder rates to obtain k. In fact, if sex-specific murder rates were independent of the female–male ratio, we would expect the latter to have a positive coefficient in this regression, bearing in mind the identity

$$\frac{\text{murders}}{\text{male population}} \equiv k_m + k_f \frac{f}{m} \tag{2}$$

(the latter follows from dividing both sides of (1) by m). Contrary to this prediction, the coefficient of the female–male ratio in the third regression presented in Table 3 is negative.

Violence-induced preference for males

Next, we turn to Oldenburg's (1992) explanation for the negative bivariate correlation between murder rates and the female–male ratio in Uttar Pradesh. Oldenburg hypothesized that, in areas with high levels of violence, preference for male children is particularly strong, because sons are valued as a protection against violence as well as for the exercise of power: "[M]y hypothesis [is] that families in west central UP want (or need) more sons than families elsewhere because additional sons enhance their capacity to literally defend themselves or to exercise their power" (p. 2659). In this line of explanation, the direction of causation runs from violence to low female–male ratios, rather than the other way around.

Oldenburg's hypothesis prompted an incisive rejoinder from Arup Mitra (1993), who argued that it gives too much weight to the "physical security" factor in fertility decisions: "protection from violence such as disputes with neighbours (leading to murders) is just one single component of the huge spectrum of social security the parents expect to derive from having more sons" (p. 67). This statement, however, merely challenges the idea that regional variations in female–male ratios might be primarily due to variations in levels of violence. Even if that it is not the case, Oldenburg's hypothesis

may still have some merit in explaining the observed correlation between female–male ratios and murder rates.

To test this hypothesis, we turn from OLS estimation to a standard two-stage procedure, where the female labor force participation rate is used as an "instrumental variable" for the female–male ratio. More precisely, in the first stage the female–male ratio is regressed on the female labor force participation rate and the other independent variables listed in Table 3. In the second stage, we rerun the baseline regression (Table 3, first column), with the female–male ratio in each district being replaced by the predicted female–male ratio derived from the first-stage regression. Roughly speaking, this procedure amounts to using female labor force participation as an exogenous proxy for the female–male ratio.[25] If Oldenburg's hypothesis were correct, and provided that the murder rate does not influence (and is not influenced by) the level of female labor force participation, we would expect the coefficient of FMR in the second-stage regression to be devoid of significance.[26] Instead, as the fourth column of Table 3 shows, the coefficient of FMR in this two-stage regression remains negative and statistically significant. The size of the coefficient is now smaller, as one would expect, but the reduction is not large. This suggests that the reverse causation effect, such as it may be, is not the driving force behind the observed association between the murder rate and the female–male ratio.[27]

This leaves two possibilities. First, a direct causal link may run from the female–male ratio to the murder rate. Second, both variables may be jointly influenced by some other feature of the society, not captured by any of the variables included in the regression.[28]

The notion of a direct causal influence of the female–male ratio on the murder rate (leading the latter to rise where there is a shortage of women) has some intuitive appeal, but is difficult to formalize. Various ideas can be invoked here: male competition for women; social stress associated with a shortage of women; the taming effect of female companionship on men; the violent tendencies of unmarried men; and so on. Effects of this type have indeed been plausibly invoked in specific contexts, such as the high incidence of criminal violence among Indian migrant laborers in the British Caribbean colonies.[29] In the latter case, however, a large proportion of murders (notably those described as "wife murders" by the colonial administration) were directly related to sexual matters. In general, it is not easy to specify how and why a shortage of women should translate into a large number of murders, many of which have no direct connection with sexual matters.

Violence and patriarchy

Turning to the second possibility, one line of argument is that low female–male ratios and high murder rates are simply two manifestations of a patri-

archal environment: patriarchal values and practices manifest themselves both in high levels of violence and in a strong preference for male children (leading, in turn, to low female–male ratios). In fact, one can argue that patriarchy, in the broad sense of the subjugation of women, is intrinsically based on violence or at least the threat of it. From this perspective, it is not surprising that areas of high violence are associated with sharp gender inequalities, of which low female–male ratios are one manifestation.

This reasoning would have particular force if regional variations in murder rates were largely driven by variations in the propensity to kill women. In this case, low female–male ratios (reflecting parental neglect of female children) and high murder rates (reflecting large numbers of murders of women) would simply be two manifestations of one phenomenon—violence against females. In the absence of information on the gender of murder victims, it is difficult to probe this hypothesis.

A related version of the argument focuses on the historical role of violence in the emergence of patriarchal norms and institutions. Marvin Harris (1993), among others, has stressed "the importance of warfare in shaping gender hierarchies"; specifically, the author notes that "wherever conditions favored the development of warfare among bands and villages, the political and domestic subordination of women increased" (p. 61).[30] It is possible that the history of warfare in specific parts of India, such as the Gangetic plain, has left a legacy both of continuing violence and of gender inequality and male preference. The so-called martial castes of North India, in particular, are notorious for their fiercely patriarchal culture and low female–male ratios.[31] There is also some evidence (and not just from Hindi films) that they have high murder rates.[32] While these communities represent a small section of the population, the fact that they are often seen as role models by large sections of Indian society (Srinivas 1989) gives them much social influence in some areas.

Another possible aspect of the nexus between violence and patriarchy relates to land ownership. In India, both regional contrasts and comparisons between communities suggest a close relation between gender inequality and landed property. For instance, female–male ratios tend to be particularly low among the property-owning castes (Miller 1981). Similarly, areas of densely populated fertile land, with a long history of settled agriculture and private land ownership (e.g., the western Gangetic plain), tend to be associated with low levels of female labor force participation, an emphasis on the joint family, patrilocal postmarital residence, the practice of dowry, and related patriarchal norms.[33] All these, in turn, lead to a devaluation of female children relative to male children, and low female–male ratios. These particular communities and regions are also likely to be prone to property-related conflicts and violence. Given that a substantial proportion of all murders are property-related, we might expect a negative association between female–male ratios and murder rates, mediated by property relations.

Sex-specific migration

Inter-district variations in female–male ratios have two main sources: (1) variations in the relative survival rates of boys and girls and (2) sex-specific migration. Thus, a district with a low female–male ratio may be characterized either by a sharp anti-female bias in child survival or by high levels of net male in-migration.[34] While the former may be seen as a symptom of patriarchy, the latter is an entirely different phenomenon. To distinguish between the two, the last column of Table 3 presents one more variant of the baseline regression, where the ratio of male to female child mortality (Q5RATIO) is included as an additional right-hand-side variable. The results are much the same as before, and, interestingly, both FMR and Q5RATIO are highly significant, with a negative sign. This suggests that a strong connection between female–male ratios and murder rates remains even after controlling for the "patriarchy effect" (captured by Q5RATIO). One possible reason for this is that male in-migration, like patriarchy, simultaneously reduces the female–male ratio and enhances the murder rate. The underlying causes of the latter effect remain speculative.

Concluding remarks

Three significant patterns emerge from the tentative analysis presented in this study. First, murder rates in India bear no significant relation to urbanization or poverty. Second, education appears to exercise a moderating influence on criminal violence. Third, the strongest correlate of the murder rate is the female–male ratio: districts with higher female–male ratios have lower murder rates.

The causal relationships underlying this connection between female–male ratios and murder rates call for further investigation. What seems clear is that there is a strong link of some kind between gender relations and criminal violence (not just violence against women, but violence in the society as a whole). Earlier studies of crime in India seem to have missed this essential link. Similarly, standard criminology textbooks pay little attention to the relation between gender and crime (except through the specific prism of "crime against women"). Yet, this issue may be crucial in understanding criminal violence in many societies.

We end with an important qualification, which also points to possibilities of further research. This study has taken a "static" view of crime, which relates murder rates to various district characteristics at a single point in time. The sociology of crime, however, suggests that the changes taking place in society may also have much influence on crime rates.[35] For instance, while there may be little relation between the level of urbanization and the murder rate at a given point in time, a high rate of growth of cities may be associated with a high murder rate in urban areas (and perhaps

even in rural areas). Similarly, the absence of a significant correlation between poverty and the murder rate in cross-sectional data does not preclude the possibility that economic recessions are associated with high levels of violent crime.[36] Given the ready availability of annual data on crime in India, there is much scope for further investigation of these dynamic effects.

Notes

The authors are grateful to Pranab Bardhan, André Béteille, Robin Burgess, Robert Cassen, Arvind Das, Angus Deaton, Anne-Marie Goetz, Madhu Kishwar, Prabhu Mohapatra, Mamta Murthi, and Amartya Sen for helpful comments and suggestions.

1 This approach is similar to that of the "cartographic school" of criminology, pioneered by Adolphe Quételet and others in the nineteenth century; on the history and contribution of the cartographic school, see Gibbons (1977): 131–133, and the literature cited therein.

2 The main qualification is that most cases of female infanticide are likely to be unrecorded. The findings of this study should be read in that light.

3 What counts as a murder is, of course, partly a matter of interpretation and social construction. In this study, which relies on official data, we are constrained to rely on the definition given by the Indian Penal Code. The Code states that murder is "an act of commission or omission by a person who has the knowledge and the intent that his act will cause death or such bodily injury as will result in the death of another" (Driver 1961: 154).

4 According to Jean-Claude Chesnais (1981), the combination of declining homicide rates and rising overall crime rates is a typical feature of economic development (p. 443).

5 The 1999 *Human Development Report* (UNDP 1999) presents some international data on "intentional homicides" (Table 23, pp. 221–224). Among 47 "medium human development" countries for which data are available, India ranks 30th in descending order of murder rate. In "high human development" countries, murder rates tend to be comparatively low. On these and related patterns, see also Fajnzylber, Lederman, and Loayza (1998).

6 See, e.g., *Crime in India 1995*, p. 51. For crimes other than murder, urban crime rates do seem to be higher than rural crime rates in many cases (e.g., burglary and theft), even after generous adjustments for underreporting in rural areas; on this, see also Clinard and Abbott (1973): 17.

7 Useful studies include Kerawalla (1959), Driver (1961), Bayley (1963), Ahuja (1969), Unnathan and Ahuja (1988), Das and Chattopadhyay (1991), Dube (1996a, 1996b). There is also something to learn from studies pertaining to the preindependence period, despite major changes in the social context of crime in India; see, e.g., Edwardes (1924), Somerville (1931), Walsh (1929, 1930), Haikerwal (1934).

8 According to Edwardes (1924), "most of the murders committed in districts as widely separated as the Panjab, Bombay, and Burma" relate to these "three powerful stimuli" (p. 18). The source of this information, however, is not clear from the text.

9 See, e.g., Driver (1961): Table 4, and Unnathan and Ahuja (1988): 65. *Crime in India 1995* includes a table on "motives of murder" (pp. 290–291). The percentage distribution, based on 37,464 murders committed in 1995 throughout India, is as follows: "personal vendetta or enmity," 15.2 percent; "property dispute," 10.6 percent; "love affairs and sexual causes," 6.7 percent; "gain," 4.7 percent; "dowry," 2.2 percent; "class conflict," 0.6 percent; "lunacy," 0.3 percent; "casteism," 0.3 percent; "communalism," 0.3 percent; "other motives," 59.1 percent. Obviously, the large share of the residual category "other motives" (which presumably includes all cases where no specific motive was identified) makes it difficult to interpret these figures.

10 In the case of murders committed by women, the association between offender and victim is even closer. In a study of 77 murders in Rajasthan and Punjab, Ahuja (1969) found that "in 61 cases, the victim was a member of

the offender's family" (p. 123); in 42 cases, the victim was the offender's husband.

11 See also Venugopala Rao (1981, 1988a, 1988b), Bhatnagar (1990), Subramanian (1992) for related analyses of violent crime in India.

12 In a similar vein, Glaeser (1999) notes that in the United States "there is a very high positive correlation between the number of police per capita and the amount of crime per capita" (p. 11), most likely because the latter affects the former.

13 Bhatnagar (1990: 69) argues that in India "increasing level of socio-economic development...is inversely related to the volume of crimes." However, this conclusion receives only weak support from his own statistical analysis. The latter, like Nayar's, is based on cross-sectional regressions at the state level, with only 20 observations.

14 There have been few attempts to develop formal analyses of the causes of crime in developing countries; for a useful introduction, see Glaeser (1999).

15 The motivation for this choice of reference year is the availability of a wide range of district-level data from the 1981 census. A similar analysis based on 1991 census data (combined with the 1981 data) is in progress.

16 Another area of exceptionally low murder rates is the hill region of northern India, consisting of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand (the hill districts of Uttar Pradesh). The states of Jammu and Kashmir and Himachal Pradesh are not included in our analysis, for lack of relevant data. In Jammu and Kashmir, there is some evidence of a sharp increase in murder rates in the 1990s, possibly associated with rising political violence in the state; see, e.g., *Crime in India 1995*, p. 51.

17 Strictly speaking, unbiased estimation only requires intraregional variations in poverty levels to be uncorrelated with the right-hand-side variables in the regression equations.

18 The Gini coefficient, like the poverty index, is available as a region-level variable for 1972–73. This is likely to be a poor indicator of "trend" levels of economic inequality around 1981, as the Gini coefficient varies a great deal from year to year (see Drèze and Srinivasan 1996). It is possible that a better index of economic inequality would have more explanatory power. Fajnzylber, Lederman, and Loayza (1998) find a strong positive association between inequality and violent crime in international data; on this issue, see also Hsieh and Pugh (1993) and Kennedy et al. (1998) and the literature cited therein.

19 In Chesnais's (1981: 409) assessment, the progress of elementary education was the major force behind the secular decline of criminal violence in Europe during the nineteenth and twentieth centuries. As the author eloquently puts it: "Echec du dialogue, la violence commence là où s'arrête le pouvoir du verbe" (violence is a failure of dialogue, which begins where the power of the word ends). Also relevant here are recent surveys in the United Kingdom and the United States indicating exceptionally high rates of dyslexia among offenders: around 50 percent, compared with 4 to 20 percent in the general population (Klein 1998). Fajnzylber, Lederman, and Loayza (1998), however, find no significant association between criminal violence and literacy in international cross-sectional data. This "crime–education puzzle," as the authors call it, may be due to higher reporting rates in countries with higher educational levels.

20 Urbanization presumably enhances the incidence of greed-motivated murders (e.g., those linked with burglary); as things stand, however, such murders appear to be quite rare in India.

21 On this point, see Kerawalla (1959): 19–20. It is possible, of course, that this view had greater credibility at that time than it has today.

22 Preliminary analysis of 1991 data generates the same pattern (and also supports our 1981 results in other respects).

23 There is ample evidence that most murders in India are committed by men; see, e.g., *Crime in India 1995*, p. 147. This is, in fact, a worldwide pattern; see Chesnais (1981) and Spierenburg (1998).

24 To see this, note first that for given k_m, the elasticity of k with respect to m is largest when k_f is zero. In that case, $k \equiv mk_m$ and the elasticity in question is 1.

25 The two variables are highly correlated, mainly because female labor force participation has a strong (positive) influence on the female–male ratio. This influence seems to

work mainly through differential survival rates of boys and girls: boy preference is particularly strong in areas with low rates of female labor force participation. See, e.g., Rosenzweig and Schultz (1982), Kishor (1993), Murthi, Guio, and Drèze (1995).

26 The possibility of a direct interaction between female labor force participation and the murder rate cannot be ruled out. In particular, high levels of violence may deter women from working outside the household. As an alternative, we also tried using the 1901 female–male ratio as an instrumental variable; the results are very similar.

27 A Hausman-Wu test rejects the hypothesis of exogeneity of the female–male ratio. This suggests that Oldenburg's hypothesis does have some merit, even though it explains only a small part of the observed association between murder rates and female–male ratios.

28 Strictly speaking, female labor force participation also has to be influenced by the unobserved variable; otherwise this hypothesis would fail to explain why the coefficient of FMR remains significant in the IV regression.

29 For an extensive discussion and critique of the arguments, see Mohapatra (1995). One referee suggests that this line of analysis also applies to the nineteenth-century "wild West" in America, and adds that "young males in the absence of female companions are apt to get into a very bad mood."

30 Harris (1993) makes an important distinction between internal warfare and external warfare with distant enemies. The latter type of warfare "enhances rather than worsens the status of women since it results in avunculocal or matrilocal domestic organizations" (p. 66). The author gives the example of the matrilineal Iroquois, but the observation is also relevant to the Nairs of Kerala (who, like the Iroquois, have a history of distant warfare as well as of matriliny).

31 See Drèze and Gazdar (1997): 105–107 and the literature cited therein.

32 In a study of the village of Palanpur (western Uttar Pradesh) spanning five decades, Drèze and Sharma (1998) note that most murders over this period were committed by Thakurs. The authors also mention various other indicators of the continuing influence of militaristic values among the Thakurs: they have the monopoly of guns in the village, spend time in body-building, strive to get jobs in the army and the police, etc.

33 These associations need not apply if land inheritance is matrilineal; this is one possible reason why they have limited relevance in Kerala, which has a tradition of matrilineal inheritance for a substantial section of the population.

34 Female migration can be plausibly overlooked here. Women do "migrate" at the time of marriage (from their natal home village to their husband's village), but this is unlikely to have a major effect on district-specific female–male ratios; the same applies to postmarital female migration, since married women in India rarely migrate without their families. Similarly, the female–male ratio at birth is unlikely to vary significantly between different regions, though this may have changed in recent years with the spread of sex-selective induced abortion.

35 See, e.g., Robert Merton's (1938, 1957) "strain" theory of crime, which builds on Emile Durkheim's (1951 [1897]) notion of *anomie* ("normlessness"), most likely to prevail at times of rapid social change. Various other sociological theories of crime also involve an explicit or implicit focus on the pace of social change.

36 A strong argument in this direction (for the preindependence period) is presented in Haikerwal (1934).

References

Ahuja, Ram. 1969. *Female Offenders in India*. Meerut: Meenakshi Prakashan.

Bayley, David H. 1963. "Violent public protest in India: 1900–1960," *The Indian Journal of Political Science* 24.

———. 1969. *The Police and Political Development in India*. Princeton: Princeton University Press.

Bhatnagar, R. R. 1990. *Crimes in India: Problems and Policy*. New Delhi: Ashish Publishing House.

Chesnais, Jean-Claude. 1981. *Histoire de la violence en Occident de 1800 à nos jours*. Paris: Laffont.

Clinard, M. B. and D. J. Abbott. 1973. *Crime in Developing Countries: A Comparative Perspective*. New York: Wiley & Sons.

Das, S. and B. Chattopadhyay. 1991. "Rural crime in police perception: A study of village crime notebooks," *Economic and Political Weekly* 19 January: 129–135.

Deaton, Angus. 1997. *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Baltimore: Johns Hopkins University Press.

Drèze, Jean and P. V. Srinivasan. 1996. "Poverty in India: Regional estimates, 1987–8," Discussion Paper No. 70, Development Economics Research Programme, London School of Economics; forthcoming in *Journal of Quantitative Economics*.

Drèze, Jean and Haris Gazdar. 1997. "Uttar Pradesh: The burden of inertia," in J. Drèze and A. K. Sen (eds.), *Indian Development: Selected Regional Perspectives*. Oxford and New Delhi: Oxford University Press.

Drèze, Jean and Naresh Sharma. 1998. "Palanpur: Population, society, economy," in P. Lanjouw and N. H. Stern (eds.), *Economic Development in Palanpur over Five Decades*. Oxford and New Delhi: Oxford University Press.

Driver, Edwin D. 1961. "Interaction and criminal homicide in India," *Social Forces* 40.

Dube, Saurabh. 1996a. "Telling tales and trying truths: Transgressions, entitlements and legalities in village disputes, late colonial central India," *Studies in History* 12(2): 171–201.

———. 1996b. "Village disputes and colonial law: Two cases from Chattisgarh," in N. Jayaram and S. Saberwal (eds.), *Social Conflict*. Delhi: Oxford University Press.

Durkheim, Emile. 1951 [1897]. *Suicide: A Study in Sociology*, translated by J. Spaulding and G. Simpson. Glencoe, IL: Free Press.

Edwardes, S. M. 1924. *Crime in India*, reprinted 1988. Jaipur: Printwell Publishers.

Fajnzylber, P., D. Lederman, and N. Loayza. 1998. "What causes violent crime?" mimeo, World Bank, Washington, DC.

Gibbons, Don C. 1977. *Society, Crime, and Criminal Careers: An Introduction to Criminology*. Englewood Cliffs, NJ: Prentice-Hall.

Glaeser, Edward L. 1999. "An overview of crime and punishment," mimeo, National Bureau of Economic Research, Cambridge, MA.

Government of India (annual). *Crime in India*. New Delhi: Ministry of Home Affairs.

———. 1988. "Child mortality estimates of India," Occasional Papers, No. 5 of 1988, Demography Division, Office of the Registrar General, New Delhi.

Haikerwal, Bejoy Shanker. 1934. *Economic and Social Aspects of Crime in India*. London: Allen & Unwin.

Harris, Marvin. 1993. "The evolution of human gender hierarchies: A trial formulation," in B. D. Miller (ed.), *Sex and Gender Hierarchies*. Cambridge: Cambridge University Press.

Hsieh, C. and M. D. Pugh. 1993. "Poverty, income inequality, and violent crime: A meta-analysis of recent aggregate data studies," *Criminal Justice Review* 18.

Jain, L. R., K. Sundaram, and S. D. Tendulkar. 1988. "Dimensions of rural poverty: An inter-regional profile," *Economic and Political Weekly*, November (43–45): 2395–2408.

Kennedy, B. P. et al. 1998. "Social capital, income inequality, and firearm violent crime," *Social Science and Medicine* 47: 7–17.

Kerawalla, Perin C. 1959. *A Study in Indian Crime*. Bombay: Popular Book Depot.

Kishor, Sunita. 1993. "'May God give sons to all': Gender and child mortality in India," *American Sociological Review* 58: 247–265.

Klein, Cynthia. 1998. *Dyslexia and Offending: Intervention for Change*. London: Dyspel Project.

Merton, Robert K. 1938. "Social structure and anomie," *American Sociological Review* 3.

———. 1957. *Social Theory and Social Structure*. New York: Free Press.

Miller, Barbara D. 1981. *The Endangered Sex: Neglect of Female Children in Rural North India*. Ithaca: Cornell University Press.

Mitra, Arup. 1993. "Sex ratio and violence: Spurious results," *Economic and Political Weekly* 2–9 January: 67.

Mohapatra, Prabhu. 1995. "'Restoring the family': Wife murders and the making of a sexual contract for Indian immigrant labour in the British Caribbean colonies, 1860–1920," *Studies in History* 11(2): 227–260.

Murthi, M., A-C. Guio, and J. Drèze. 1995. "Mortality, fertility, and gender bias in India: A district-level analysis," *Population and Development Review* 21: 745–782.

Nayar, Baldev Raj. 1975. *Violence and Crime in India: A Quantitative Study.* Delhi: Macmillan.

Oldenburg, Philip. 1992. "Sex ratio, son preference and violence in India: A research note," *Economic and Political Weekly* 5–12 December: 2657–2662.

Rogers, John D. 1989. "Theories of crime and development: An historical perspective," *Journal of Development Studies* 25: 314–328.

Rosenzweig, M. R. and T. P. Schultz. 1982. "Market opportunities, genetic endowments, and intrafamily resource distribution: Child survival in rural India," *American Economic Review* 72: 803–815.

Sen, Amartya. 1985. *Commodities and Capabilities.* Amsterdam: North-Holland.

Somerville, Augustus. 1931. *Crime and Religious Beliefs in India.* Calcutta: "The Criminologist."

Spierenburg, Petrus. 1998. *Men and Violence: Gender, Honor, and Rituals in Modern Europe and America.* Ohio: Ohio State University Press.

Srinivas, M. N. 1989. *The Cohesive Role of Sanskritization and Other Essays.* Delhi: Oxford University Press.

Subramanian, K. S. 1992. "Political violence, social movements and the state in India," Discussion Paper 308, Institute of Development Studies, University of Sussex.

UNDP (United Nations Development Programme). 1999. *Human Development Report 1999.* New York: Oxford University Press.

Unnathan, T. K. N. and Ram Ahuja. 1988. "Sub-culture of violence: The Indian context," in Venugopala Rao (1988a).

Venugopala Rao, S. 1981. *Dynamics of Crime: Spatial and Socio-economic Aspects of Crime in India.* New Delhi: Indian Institute of Public Administration.

——— (ed.). 1988a. *Perspectives in Criminology.* Delhi: Vikas.

———. 1988b. "Contemporary trends of crime," in Venugopala Rao (1988a).

Walsh, Cecil. 1929. *Indian Village Crimes: With an Introduction on Police Investigation and Confessions.* London: Ernest Benn.

———. 1930. *Crime in India: With an Introduction on Forensic Difficulties and Peculiarities.* London: Ernest Benn.