Spaces of Discrimination:
Residential Segregation in Indian Cities

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Abstract

This paper looks at residential segregation in India's seven largest cities. We use ward level 2001 census data and the index of dissimilarity to examine the degree of residential segregation by caste and socioeconomic status in the cities of Ahmadabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata, and Mumbai. We find high levels of residential segregation by caste in each city, especially when compared against a baseline measure of residential segregation by gender. Our analysis additionally suggests that in every city residential segregation by caste surpasses the level of residential segregation by socioeconomic status. We compare the level of residential segregation by caste among cities that have a similar median ward size, because we find a correlation between median ward size and dissimilarity levels across a sample of Indian cities. We create two groups of comparison cities (1) Chennai and Kolkata; (2) Hyderabad, Mumbai, Delhi and Ahmadabad. We are unable to compare Bangalore with another city in our study given its median ward size. In the first comparison, we find that Kolkata (D=0.364) is approximately 19.5 percent more segregated by caste than Chennai (D=0.293). In the second comparison, we find that Ahmadabad (D=0.325) has the highest residential segregation by caste, followed closely by Delhi (D=0.304), while Mumbai (D=.222) and Hyderabad (D=0.194) are considerably less segregated. We offer some preliminary explanations for the observed differences in levels of residential segregation and conclude with a discussion of the limitations of our findings.

1. Background

In India and the United States, respectively, caste and race have been long-standing social categories that have hierarchically structured socioeconomic relations and spatial organization in each society. As early as the19th century, northern abolitionists in the US began to draw parallels between caste discrimination in India and racial oppression in the United States (Immerwahr, 2007)1. More recently, a scholarship comparing the Dalit (the historically outcaste group) experience in India and of African-Americans in the US has emerged (Ashton 2001; Kapoor 2004; Brown & Sitapati 2008). While researchers in the US have developed a plethora of quantitative measures to investigate the persistence and multi-faceted impact of discrimination, including residential segregation by race, such research is largely missing in empirical investigations of caste, particularly in the urban Indian context. This paper seeks to extend the contemporary techniques used to measure residential segregation by race in the US to empirically test whether segregation by caste exists in India's seven largest cities.

[1] Interest in caste in United States first found its expression in the abolitionist movement in 1830s, eventually leading to the creation of '*caste school of race relations'* within the social sciences in 1930s when Lloyd Warner published a four page article in the *American Journal of Sociology*. This was followed by the production of a decade of academic literature on this subject by, most famously John Dollard's Caste and Class in a Southern Town (1937). Operating within a Marxist framework, these earlier works argued for the need to conceptually differentiate race from class, as black economic elites were segregated from their economic equals who were white. The work of these scholars advancing the 'caste school of race relations' became the central thesis for Gunnar Myrdal's seminal work *An American Dilemma* (1944) and concluded that there was a widely acknowledged and shared "American dream" of social mobility and equality of opportunity that was frustrated for blacks due to "caste limitations" that prevented it from ever being a reality (Sutherland, 1942). These scholars emphasized the lack of biological foundation for race and argue that race, like caste is socially constructed. However, Myrdal's conclusions were not shared by all social scientists and were especially opposed greatly by three highly acclaimed black sociologists of their times, Oliver C. Cox, E. Franklin Frazier, and Charles S. Johnson in the 1940s.

The study of residential segregation by caste is important for several reasons. First, there is little empirical research on the salience of caste in urban India. Urban theory argues that as individuals and groups adapt to the city-life prior forms of social organization—such as caste, family, and religion—weaken and modify (Park 1967). Many Indians, including policymakers and academic researchers, believe that the significance of caste has greatly diminished as India has urbanized (e.g. Prasad 2010). At the same time, the limited social science research on caste in the urban Indian context suggests that caste remains highly relevant in schooling decisions, educational outcomes and securing jobs (Weiner 1991; Munshi & Rosenzweig 2006; Thorat & Newman 2010). We wish to contribute to the emerging body of research on whether caste matters in the urban context in India. Second, one of the recurring arguments against affirmative action programs for historically discriminated castes is that in contemporary Indian society economic status structures one's life opportunities more strongly than caste. We seek to compare within the context of India's largest cities—arguably where the traditional caste system should have the least stronghold—whether spatial segregation by socioeconomic status is greater than residential segregation by caste. By comparing residential segregation across these two measures, this paper seeks to add another dimension to our understanding of spatial segregation in Indian cities. Third, this paper seeks to extend existing techniques to a new context. Just as conceptions of caste influenced how social scientists in the US thought about race in the early 1800s and throughout the first half of the twentieth century, the tools used to measure residential inequality in the US offer a powerful way to empirically test if caste determines where people live in urban India.

Using ward-level data from the 2001 Indian census, and focusing on India's seven largest cities, we find high levels of residential segregation by caste. Our analysis additionally suggests that residential segregation by caste surpasses that by socioeconomic status. We offer some preliminary explanations for the observed differences in the level of residential segregation by caste across India's mega-cities with similar median ward sizes. We conclude with a discussion of limitations of our analysis.

2. Context

The origins of caste system in India are complex and have been a center of a lively debate among social scientists, especially historians. While it is beyond the scope of this paper to engage in depth with the debates around origins and evolution of caste system, a few (contested) points are worth highlighting to set the context for the analysis presented in this paper. First, the roots of caste system lie in the ancient practices of Hindu religion that gave rise to classifications of people based initially on occupational categories; the occupational categories and related social position in society became inherited through birth. The caste system, though dynamic and evolving over several millennia, has structured peoples lives—from defining the social groups within which a marriage is socially-permissible to limiting where an individual or family is able to live within a village or town.

Second, during the British colonial period, the caste system as the *varna* system of classification solidified the boundaries of caste lines and emerged as national level hierarchical

framework for conceptualizing caste (Cohn 1987). This system includes the Indian upper and middle castes (consisting broadly of Brahmins, Kshatriyas and Vaishyas), the backward castes (which roughly includes Shudras) and the outcastes (who were seen and treated as "untouchables"). The outcastes in this social system were not only the most underprivileged and deprived of accumulating capabilities to enhance life-chances but also severely spatially segregated in their residential arrangements from the upper and middle castes. The social interactions between outcastes and others were strictly circumscribed by relatively rigid social and religious rules. While caste is often portrayed as nation-wide social system, the local nature of caste and the proliferation of subcastes have created serious difficulties in colonial and post-colonial attempts to create a nation-wide system of classification and in the emergence of national-level social movement along caste lines (Dirks 2001).

In post-independence India, the state has taken several measures to address the depressed status of most oppressed castes, particularly those classified as outcastes, by creating the constitutional categories of Scheduled Castes (SC) and Scheduled Tribes (ST). Under the Indian constitution in 1950, SC and ST were afforded with affirmative action in the form of reservation quotas in government jobs, higher education institutions, and legislative seats. India's first generation of post-colonial leaders hoped that these active measures to secure spaces for the historically outcaste in public institutions would decrease the relevance of caste as a form of social organization, particularly in urban India. In the 60 years since the inception of India's system of reservations, Weiner (2001) argues that affirmative action programs and other efforts to end untouchability have lead to a decline in the moral legitimacy as a hierarchical social structure.

3. Methodology

This section discusses the source of data, the methods employed, measurement details and challenges in our examination of whether there is residential segregation by caste in India's mega-cities as well as how it varies across cities.

3.1 Data

This project utilizes data from the 2001 Census. The decennial Indian Census aims to compile information on every household in the country, through the use of more than 2 million enumerators who collect data in-person. The enumerators collect household level data (e.g. housing quality and materials, number of rooms in the house, ownership status) and individual-level characteristics (e.g. age, gender, years of schooling, literacy status, caste membership, migration history and economic activity of workers) for each member of the household. The caste question inquires whether an individual is SC or ST[2]; if an individual is not SC or ST they are marked as "other." The 2001 Indian Census classifies 24% of Indians as belonging to SC and ST. Figure 1 lists the

[2] The Indian Constitution specifies that "no person who professes a religion different from the Hindu, the Sikh or the Buddhist religion shall be deemed to be a member of a Scheduled Caste." (Indian Constitution 1950)

percentage of SC and ST in India's seven largest cities. There is no specific question on income or consumption level in the Indian census. (Bose 2001)

In this analysis, we use data for select urban municipal corporations. Municipal corporation boundaries coincide with the city-limits within which municipal governments provide several key public services. In the Indian context, municipalities consist of numerous wards. Municipal councilors are elected at the ward-level; therefore, this geographic unit has both administrative and political saliency. In our analysis, we use aggregated individual level data provided at the ward level for each municipal corporation. Figure 2 lists the total population, number of wards, and median ward size for the seven largest Indian cities: Ahmadabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai.

3.2 Methods

In order to explore whether there is residential segregation by caste in India's mega-cities, we look at the variation in residential segregation across three measures for each city: gender, caste and socioeconomic status. Figure 3 provides the descriptive statistics for these three measures for the cities in our study. We find that Delhi has the highest percentage of SC/ST, close to 16 percent of its population, and Mumbai and Kolkata the lowest at approximately 6 percent. Hyderabad (8.3 percent), Bangalore (12.2 percent), Ahmadabad (13.1 percent) and Chennai (13.9 percent) fall in between with regards to their SC/ST population.

As a baseline measure, we first calculate the degree of residential segregation by gender. We would expect the residential segregation by gender to be very low within each city and provide a point of comparison for our social indicators of substantive interest. The exception to the expected even distribution of men and women across a city is likely to be in the case where slums are geographically concentrated and house a large proportion of single migrant men who have moved to the city without their families.

We then calculate residential segregation by caste. We combine the data on scheduled caste and scheduled tribe populations (hereafter, SC/ST) and compare it to individuals who have not identified as belonging to SC and ST (hereafter, non-SC/ST). We combine these two groups for two reasons. One, the number of scheduled tribe individuals is very low in many cities at the ward level. In addition, as both scheduled caste and scheduled tribe have been the most excluded and discriminated groups, they have been afforded similar constitutional rights in the form of affirmative action policies. This gives us a reason to believe that both of these groups are most likely to experience residential segregation in contemporary urban India. By comparing the degree of residential segregation by gender to the segregation by caste in each city, we observe whether residential segregation by caste exists within each of India's mega-cities.

Finally, we calculate the level of residential segregation by socioeconomic status. This final measure helps us compare whether segregation by socioeconomic status or by caste is the more powerful axis of residential stratification in urban India. As mentioned earlier, the Indian Census does not include information on income or consumption—two common indicators of socioeconomic status. We use data on male literacy as a blunt measure of socioeconomic status. As females in many part of the country have been excluded from schooling at high levels, even among

many middle and upper class households, particularly among the older generations of women, female literacy fails to correlate as strongly with socioeconomic status in the Indian context. Therefore, to determine the degree of residential segregation by socioeconomic status we calculate the degree of residential segregation by male literacy. By comparing this measure to the level of residential segregation by caste within each city, we empirically test whether it is socioeconomic status or caste that plays a stronger role in structuring patterns of urban residence in India.

We end our discussion of results by exploring how residential segregation by caste varies across Indian cities. We compare the level of caste segregation across cities that have a similar median ward size in order to avoid the possibility of drawing spurious conclusions due to high correlation between our measure of segregation and median ward size (as will be illustrated in the next section).

3.3 Measurement

To calculate the level of residential segregation for each measure, we use the index of dissimilarity. We use this measure of evenness for two reasons. First, the two group limitation is not a concern given the dichotomous nature of the variables of interest. The three indicators used in this analysis—caste, gender, and socioeconomic status—are dichotomous in our data. Our measure of caste creates two groups: SC/ST versus other castes. Gender consists of two categories: male or female. Socioeconomic status is operationalized through the measure of male literacy, which has two categories; each male is either literate or illiterate. The other reason for using the dissimilarity index is that it has an easy to comprehend verbal interpretation: "the fraction of one group that would have to relocate to produce an even (unsegregated) distribution" (White & Kim 2005).

There are two methodological challenges in our analysis of residential segregation given the nature of the data. First, within each city the ward size varies. Second, there is a substantial variation in mean and median ward size across cities. To address the first challenge of varying ward size within a city, we compare the degree of residential segregation within each city across different measures: the deviation in residential segregation between gender and caste, as well as between caste and socioeconomic status. This within-city comparison helps us make sense of the dissimilarity level for caste in each city.

The second challenge of varying ward sizes across cities raises the question of whether differences in dissimilarity across cities are mere reflections of differences in median ward size. The construction of the measure raises a concern that as median ward size increases, dissimilarity may decrease. Given our small sample of cities, testing for the correlation between median ward size and the dissimilarity level does not provide convincing results. Therefore, we increased our sample of cities to include the 3 to 5 biggest cities across a sample of states to represent east, west, north and south regions of the country. In doing do, we increased our sample size from 7 cities to 31 cities. We then calculated the correlation between median ward size and dissimilarity and found a correlation of -0.36. This level of correlation convinced us to restrict our comparisons to cities with similar median ward size. Therefore, for the seven mega-cities we carry out comparisons among groups of cities with similar median ward sizes. By comparing cities of similar median ward size, we avoid the problem of high correlation between dissimilarity and median ward size.

In addition to these issues, Fossett and Dang (2010) have argued that the conventional formulation of the index of dissimilarity is subject to measurement bias when the group sizes within the census tract (or ward in our case) are very small. Massey and Denton (1992:171) argue that "the index of dissimilarity is inflated by random variation when group sizes get small (Massey 1978)." Considering that we had relatively small percentage of SC/ST population in some cities, for example 5.9% in Mumbai, we were worried that we might be introducing measurement bias in our findings. We therefore used the modified formula suggested by Fossett and Zang (2010) to calculate index of dissimilarity but found that our dissimilarity values did not change. This is probably due to the large size of Indian population such that small percentages of these groups still translate into relatively reasonable sizes to warrant the use of the conventional formula for dissimilarity measure, which is what we present in this paper.

4. Results

For our baseline measure in each city, we calculate the degree of residential segregation by gender (Figure 4, column 1). We find that the degree of residential segregation by gender is small across India's seven largest cities though it does vary from a dissimilarity of .006 (Hyderabad) to .065 (Kolkata). In Hyderabad and Ahmadabad we find that the residential segregation by gender is negligible—less than 1percent of men would have to relocate to produce an even distribution of men across the city. The degree of residential segregation by gender is also small in Bangalore, Chennai, Delhi and Mumbai, ranging from a dissimilarity of .016 to .035 across the four cities. Mumbai is highest among the four; 3.5 percent of men would have to relocate in Mumbai to produce an even distribution. In the case of Kolkata we find the highest degree of residential segregation by gender, with a dissimilarity index of .065. Preliminary investigations find a spatial concentration of wards with a high proportion of the city's slum population. Kolkata's relatively higher dissimilarity value for gender could be due to the concentration of male migrants living in a cluster of wards with a high concentration of slums.

Next, we calculate residential segregation by caste to see how it compares to our baseline of residential segregation by gender in each city (Figure 4, column 2). We find that for each city the degree of residential segregation by caste is substantially greater than the degree of residential segregation by gender. Ahmadabad has the greatest jump; while only 0.8 percent of men would have to move—32.5 percent of SC/ST would have to move—to produce an even distribution across the city. Bangalore and Chennai have comparably low dissimilarity indexes for gender (.016 and .017, respectively); but both cities have much higher levels of residential segregation by caste—.278 and .293, respectively. In the case of Kolkata, compared to 6.5 percent of men having to move to produce an even distribution by gender, 36.4 percent of SC/ST would have to move to produce an even distribution by caste. Hyderabad and Mumbai have the lowest relative increases in dissimilarity between gender and caste, but they are still sizable and substantively significant increases; while 0.6 percent and 3.5 percent of men would have to move in Hyderabad and Mumbai, respectively—19.4 percent and 22.2 percent of SC/ST would have to move in Hyderabad and Mumbai, respectively—to produce an even distribution across each city.

In order to compare the residential segregation by caste and socioeconomic status for each city, we then calculate the dissimilarity index for socioeconomic status using male literacy as our proxy (Figure 4, column 3). We find that the degree of residential segregation by SES across India's seven largest cities varies from a dissimilarity of .098 (Ahmadabad) to .021 (Kolkata). We find that for all seven cities the degree of residential segregation by caste is greater than the degree of residential segregation by socioeconomic status. We also find the level of residential segregation by socioeconomic status is greater than the residential segregation by gender. Ahmadabad has the greatest percentage difference between segregation by socioeconomic status and caste—while 9.8 percent of literate men would have to move—32.5 percent of SC/ST would have to move—to produce an even distribution across the city. Within each city, the dissimilarity index for residential segregation by caste is substantially greater than the dissimilarity index for segregation by SES.

We now return to our calculation of dissimilarity for residential segregation by caste, which as stated previously varies from .194 to .364 across the cities in our study (Figure 4, column 2). Given our previous findings that dissimilarity and median ward size are correlated, we compare the level of caste segregation across mega cities with a similar median ward size (see Figure 2). Based on this criterion we are able to create two groups of comparison cities (1) Chennai and Kolkata (2) Hyderabad, Mumbai, Delhi and Ahmadabad. We are unable to compare Bangalore with any other mega city given its ward size[3].

In the first comparison, we find that Kolkata (D=0.364) is approximately 19.5 percent more segregated by caste than Chennai (D=0.293). One potential explanation for the lower level of residential segregation by caste in Chennai is the long history of successful lower caste social movements in Tamil Nadu (the state of which Chennai is the capital city). The Dravidian Nationalist movement, also known as the Self-Respect Movement, originated in Tamil Nadu in 1925 and sought to end the oppression of lower castes by upper castes, particularly *Brahmins* (upper castes). For the comparison city Kolkata, Chakrobarty (2005) argues that the spatial segregation legacy of colonial period has continued into post-colonial Kolkata on several dimensions, including socio-economic status, caste, and religion. Clark and Landes (2010) in a unique study utilizing a large sample of 2.2 million surnames from the 2010 Kolkata voters rolls find that *Brahmin* castes cluster in the same

[3] Bangalore's level of segregation cannot be compared to the other cities but a few comments about the city are worth mentioning. Bangalore's recent population growth rate is second only to the capital city of Delhi. In 1991, the city of Bangalore had a population of 2.67 million people; ten years later the city's population had increased by 38% to 4.2 million (Nanda 1992; Government of India. 2005e). An additional component to Bangalore's growth has been the expansion of the city's geographic area. In 1991, the city of Bangalore had an area of 192 square kilometers; in 2001 the city's area was 226 sq km (Government of India 2001a & 2001b). The additional land that was incorporated into the city forms an uneven ring around the previous municipal boundary. The city's highly-publicized rise in the global information economy and related growth in the information technology (IT) and biotechnology sectors have resulted in high levels of regional in-migration across socio-economic groups and an increased demand for new patterns of residential living and commercial land use (Patni 1999). For example, the growth of the IT sector, and the related increases in wages and in the number of high wage earners, has produced new demands for luxury apartments in the urban core and for gated suburban communities and industrial technology parks in the periphery (Audriac 2003; Benjamin 2001). At the same time, the in-migration of individuals from rural areas to work in the booming construction and other low-wage service industries has changed the dynamics in Bangalore's historically small slum population and rapidly urbanizing peri-urban areas; for example, Bangalore's slum population in 1991 was less than half of Delhi's, Mumbai's and Kolkata's (Schenk 2001). An increased percentage of slums might correlate with a residential higher segregation of individuals and families belonging to the SC and ST population. The periphery of Bangalore has been a place where the "new demands of international capital and existing demands of local firms and populations" compete for land and resources (Keivani & Mattingly 2007).

postal codes, or residential space; thus pointing to a persistent role of caste in spatial patterning of social groups in Kolkata[4].

Within our second comparison group, we find that Ahmadabad (D=0.325) has the highest residential segregation by caste, followed closely by Delhi (D=0.304), while Mumbai (D=.222) and Hyderabad (D=0.194) are considerably less segregated. In the case of Ahmadabad, a proposed study of inter-communal and inter-caste "ghettoism" suggests that "the city has grown into pockets of particular communities or castes" (Sapovadia 2007). The author further notes that distinct *Harijan* (scheduled castes that experienced pre-independence untouchability practices) pockets can be identified in the city neighborhoods of Behrampura, Bhudarpura, Asarwa, Jivraj Park and Asarwa. The city has also been a site of two significant caste conflicts in the 1980s, pointing to the uneasy nature of caste relations.

With respect to Delhi, Dupont (2001) provides useful insights into the reasons for prevailing caste segregation, especially pertaining to the Scheduled Castes. Although Dupont (2004) does not calculate a summary measure of segregation, she highlights the clustering of SC/ST populations in various parts of Delhi by mapping ward level 1991 Census data on proportion of SC/ST in each ward[5]. The author puts forward two reasons for the expected high levels of caste based segregation. First, *Harijan* settlements in surrounding rural areas, where the outcastes were forced to live, have overtime been incorporated into the city limits as Delhi's municipal boundaries have expanded. Second, the long term slum resettlement efforts by the government aim to relocate people on the peripheries of the city, thus contributing to caste segregation as the slums are often heavily populated by Scheduled Caste migrants who are unable to find other affordable housing.

Considering the remaining two cities in this group, Hyderabad (D=0.194) appears to be the least segregated and Mumbai (D=0.222) follows close on its heels. In the case of Mumbai, a relatively low level of caste segregation as compared to Delhi could be due to the even spatial distribution of slums within the urban municipality. Takeuchi et al (2008:68) argue that slum-dwellers in Mumbai are "considerably more integrated among non-slum dwellers than in other cities: 40 percent of slum-dwellers live in central Mumbai (zones 1–3)." Given that a majority of slum dwellers in Mumbai are Scheduled Castes and Scheduled Tribes (Slum Rehabilitation Authority, 2007), the integrated nature of slum locations is likely to contribute to the city's relatively lower dissimilarity index.

Unlike other cities discussed so far, Hyderabad's population of Muslims is approximately triple the country's average, and significantly larger than the comparison cities. In case of Hyderabad, as in the other cities in this study, it would be interesting to calculate residential segregation by religion; we speculate that in the case of Hyderabad religion is a more important axis of residential segregation to consider. We are unable to perform this analysis because census

[4] West Bengal, the state within which Kolkata is located, is well known for its strong presence of the Communist Party of India. However, within Kolkata, our calculations and existing research finds relatively high levels of segregation both by caste and class (and ethnic group). With regards to class, residential segregation is not confined to the poor in Kolkata but also to clustering of business elite who are mainly prosperous entrepreneurs from Rajasthan who tend to live in the Burrabazaar or Park Street area; professional South Indians who tend to reside around the Lakes, and professional Bengalis who live in south Calcutta (Clark and Landes 2010).

[5] Note that due to changes in the number and size of wards between Census 1991, 2001 and again more recently, we are unable to do comparative longitudinal analysis of caste segregation index across the cities.

data on religion is made available at the district level, which does not allow us to analyze residential segregation within a city.

5. Conclusion

We find that caste is a real axis of urban residential segregation in contemporary urban India. In each city in our study, residential segregation by caste is sizably larger than the level of segregation by socioeconomic status; both of these measures are notably larger than our baseline measure of residential segregation by gender.

Some limitations of this study are worth highlighting. First our measure of socioeconomic status is extremely blunt. By using a dichotomous measure, we are dividing the urban population into the very poor (those adult men who had virtually no formal education) and everyone else (the much larger category of adult men who share basic literacy). Within the category of men who are literate, especially in India's mega cities where literacy is much higher than the national average, other measures of socioeconomic status (i.e. income, consumption, etc) may vary considerably. We are dissatisfied with our operationalization of socioeconomic status, but we believe it is the best available measure among the individual-level data available at the ward level in the Indian Census.

Second, we compare the level of residential segregation across three social categories within cities to control for the unique nature of each city. Ideally, we would have liked to compare the change in residential segregation by caste over time for each city. Modifications to the number and size of wards in each city between the 1991 and 2001 Indian Censuses make a longitudinal analysis of caste segregation using ward level data for each city very difficult.

Third, the ward sizes in India's largest cities are quite large. Although the median ward size across India's seven largest cities varies—whether it is approximately 25,000 or 70,000—they are large when compared to the median ward size in many other countries. The largeness of the ward size is likely to mask other segregation processes at the sub-ward level that we are not able to account for. More importantly, these processes are likely to differ across wards within the same city and across cities making comparisons difficult.

Fourth, while much of the urban story of residential segregation by SC/ST seems to overlap with the spatial configuration of slums in India's largest cities, we have not analyzed data on slums in this paper. Our story relies on the contribution of past research which finds a high correlation between SC/ST population and slum population in Indian cities. Unfortunately, the lack of ward level data on the slum population does not allow us to test for this overlap in this paper.

Despite this paper being a first cut at quantifying caste segregation in Indian cities and faced with several data limitations that prevent in-depth insights into the underlying mechanisms of caste segregation, we believe that this study provides important findings about stratification by caste in modern urban India. For example, it is striking that despite being the site one of the most successful lower caste movements, Chennai's segregation by caste was found to be far from negligible in 2001. The lack of micro-data, especially longitudinal data, prevents us from understanding the individual or household characteristics that affect social and spatial mobility over time within these cities.

A comparative historical study of groups or pairs of cities would be a worthwhile future exercise to better understand differences in segregation across cities. Such historical perspective would also complement future efforts to collect primary data and find methods to improve the comparability of census or survey data across cities. Another extension of research on caste based residential segregation could be the undertaking of housing audit studies, similar to those used by scholars in the US to document housing discrimination against African Americans since the1980s (Yinger, 1986, 1995; Glaster, 1990; Smith and Cloud 1996; Squires 2003; Fischer and Massey 2004). While sociologists in 1930s and 1940s attempted to substantively understand the race relations in US via the lens of caste discrimination in India, Indian studies on residential segregation by caste would benefit from the methodological innovations in studies of race stratification in US. A successful transportation of such methods is seen in the work showcased in the edited volume by Thorat and Newman (2010) applied to the context of caste and religious discrimination in job-seeking within the corporate sector in India.

Residential segregation by religion is itself a separate and important area of examination that future studies should examine using survey data, given aggregated nature of available data for religion in the Indian Census. For example, in the case of Ahmadabad, while caste riots took place in 1980s, Hindu-Muslim religious riots have raised their ugly head more recently in 2002 (see Varshney (2002) for an analysis of communal conflicts in Indian cities). Finally, we intend to extend this analysis to study the caste segregation in smaller sized Indian cities where global forces as well as urbanization have been less pervasive. Another advantage of looking at smaller cities is that the ward size is generally smaller than big cities, thus rendering an even more meaningful measurement of spatial segregation. In doing so, we hope to be able to shed light on caste relations in India across different urban scales in the future.

FIGURES

Figure 1: Percentage of Scheduled Caste and Scheduled Tribes in India's seven largest cities in 2001. (2001 Indian Census)

City	% SC	% ST	% SC/ST
Ahmadabad	12.1	.97	13.09
Bangalore	11.11	1.06	12.17
Chennai	13.76	.15	13.92
Hyderabad	7.38	0.88	8.26
Mumbai	4.88	0.76	5.64
Delhi	15.87	-	15.87
Kolkata	6.01	0.21	6.22

Figure 2: Total Population, number of ward and median ward size in India's seven largest cities in 2001. (2001 Indian Census)

City	Total Population	No. of wards	Median ward size
Ahmadabad	3520085	43	74957
Bangalore	4301326	100	39729.5
Chennai	4343645	155	24145
Hyderabad	3637483	24	64419
Mumbai	11978450	100	77667
Delhi	10091855	128	76691
Kolkata	4572876	141	29647

Figure 3: Percentage male, SC/ST and, literate males in India's seven largest cities in 2001. (2001 Indian Census)

City	% Male	% SC/ST	% literate, male
Ahmadabad	0.530	0.131	0.776
Bangalore	0.521	0.122	0.797
Chennai	0.511	0.139	0.811
Hyderabad	0.518	0.083	0.730
Mumbai	0.553	0.056	0.814
Delhi	0.548	0.159	0.760
Kolkata	0.547	0.062	0.770

Figure 4: Dissimilarity by gender, caste and socioeconomic status in India's seven largest cities (2001 Indian Census)

City	(1) D_Gender	(2) D_Caste	(3) D_SES
Hyderabad	0.006	0.194	0.110
Mumbai	0.035	0.222	0.104
Bangalore	0.016	0.278	0.138
Chennai	0.017	0.293	0.126
Ahmadabad	0.008	0.325	0.098
Kolkata	0.065	0.364	0.211
Delhi	0.029	0.319	0.137

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