Caste versus Class: Social Mobility in India, 1860-2012

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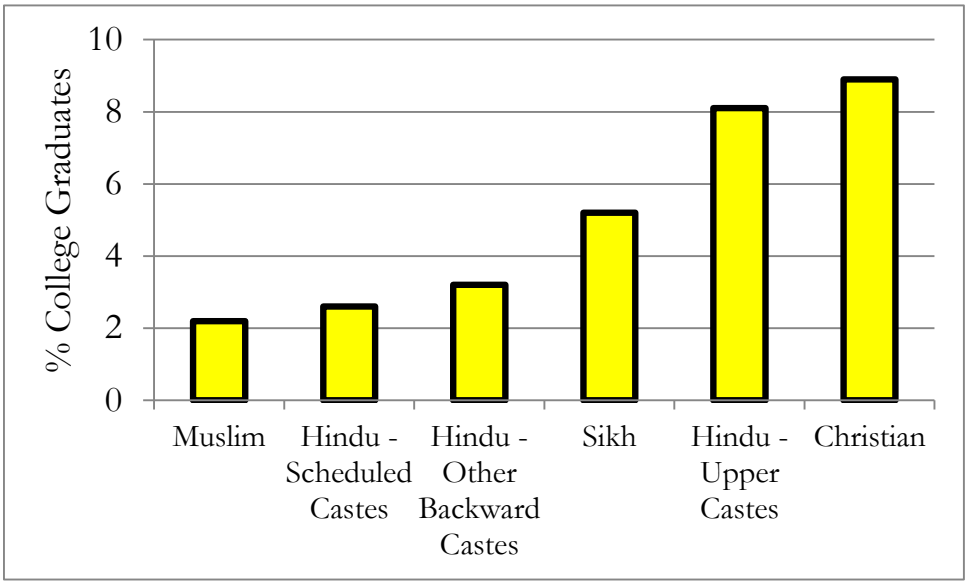
Using surname distributions, we compare long run social mobility rates for elite and underclass groups in India 1860-2012, with those of other societies such as Sweden and the USA. It is not clear whether recent social mobility rates in India should be higher or lower than in the West. The caste system notoriously embedded privilege in elite castes. But since Independence a quota of places in higher education, and in government jobs, have been reserved for the former lower castes. These quotas are now as great as half of such positions. Social mobility rates in India, however, prove to be extremely low, and not any higher now than under the Raj. Despite extensive social engineering India seems to be an unusually immobile society. We hypothesize that this immobility stems from continued strong marital endogamy in India.

Introduction

India is an interesting society in which to study rates of social mobility. On the one hand it entered the modern era with the legacy of the Hindu caste system, which found echoes also in Muslim society, which limited intermarriage, and even social intercourse, between those of different castes. This system of exclusion was so powerful that different castes and sub-castes, even within small geographic areas, have distinct DNA profiles.[2] There is the underfunded and poorly functioning primary and secondary public education system, which those of means have largely abandoned in favor of private schooling. Further many of the poor are located in rural areas for which educational provision is particularly poor, and private

[1] With thanks to Lincoln Atkinson for his great help in digitizing the 2.2 million names of the Kolkata voters roll of 2010.
[2] Reich et al., 2009.

Figure 1: College Graduation Rates by Social Group, India, 2000



Source: University Grants Commission, 2008, 105.

alternatives limited. Thus when we look at College graduation rates by social group, we still see great differences, as portrayed in figure 1, which shows the percent of 23 year olds who had graduated from colleges in India in 2000 by caste and religion. Caste affiliations determined centuries ago still strongly predict current outcomes.

On the other hand, since Independence there has been an extensive system of reservation of positions in universities and government employment, which sets aside up to half of positions for traditionally disadvantaged groups. Table 1, for example, shows the candidates admitted to the All India Institute of Medical Sciences for the MBBS degree in 2012, as well as their rank on the entrance exam. Of 72 admissions, only half are in the unreserved category. The lowest ranked admit in the unreserved category is 36, compared to 2,007 for the reserved. Suppose the caste system trapped many potentially talented people at the lower levels of the society in the pre-modern era. Then the modern reservation policy could lead to a period of rapid social mobility.

Table 1: Admissions to the All India Institute of Medical Sciences, Delhi, 2012

Category	Number	Rank on Admission Test
Unreserved	36	1-36
Scheduled Caste	11	288-1164
Scheduled Tribe	5	177-2007
Orthopedic Physically Handicapped	1	1201
Other Backward Classes (Non Creamy Layer)	19	41-116
All	72	1-2007

Source: Posted Admission List, AIMMS.

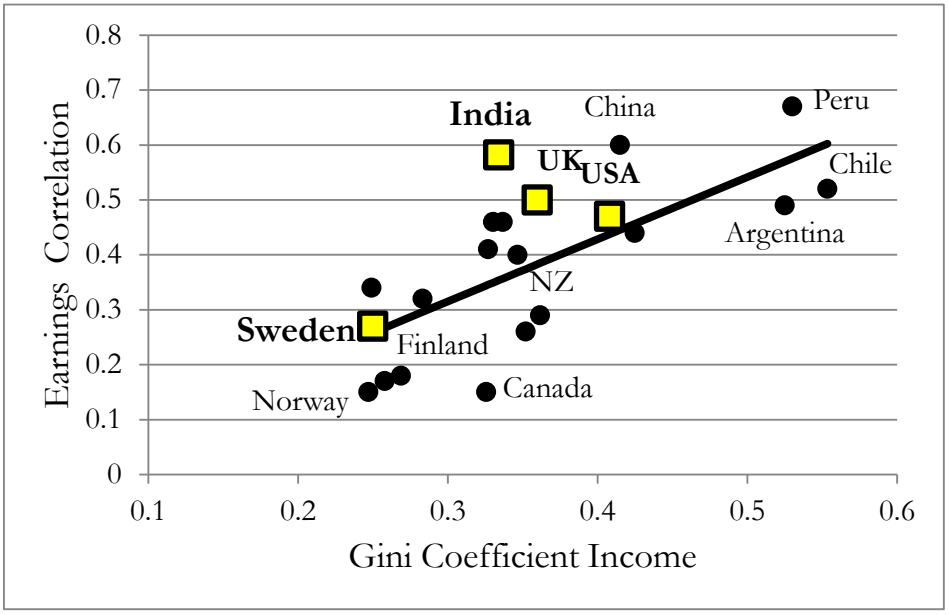
Thus while the the situation in figure 1 may speak of continuing dramatic social inequalities, it is not clear whether we should expect high or low rates of social mobility currently.

Formal studies of social mobility in India are, however, modest in number.[3] Thus two recent international surveys of social mobility, one for earnings and the other for education, do not feature India (Corak, 2012, Hertz et al, 2011). However a recent study suggests the Indian intergeneration income elasticity is 0.58 (Hnatkovska et al., 2012).[4] This would indeed classify India on an international scale as one of the world's more immobile societies, as is shown in figure 2. However, since the estimated intergenerational income elasticity for the UK is 0.5, and the US 0.47, this also implies that social mobility rates in India are not too much lower than

[3] The large numbers of people still engaged in agriculture make occupational status classifications difficult. Studies of mobility based on occupational classification are thus difficult to interpret, and to compare with those from more developed economies. See for example, Nijhawan, 1969, Kumar et al., 2004, Hnatkovska et al., 2012.

[4] This value corrects for measurement error in income through IV techniques.

Figure 2: Intergenerational Earnings Elasticities and Inequality



Source: Corak, 2012, Figure 2 (coefficient for Canada, personal communication from Miles Corak). Income elasticity for India from Hnatkovska et al., 2012, table S12. Gini for India from the World Bank.

in the UK or USA (Corak, 2012). Since $(.58)^2 = 0.34$ measures the share of income variance in the next generation explained through inheritance from parents it also implies that even in India the majority if people's position in the income ranks is not derived from inheritance.

This paper uses surname distributions to measure intergenerational social mobility in Bengal from 1860 to 2010, and to ask two questions. The first is, what are long run social mobility rates are in India compared to modern western economies? The second is what are modern social mobility rates are compared to those of India under the Raj? We shall see that measured this way social mobility rates are dramatically lower than suggested by the Hnatkovska et al., 2012 study. The true b seems to be close to 0.9. There is also little sign for many groups of any increase in mobility since the times of the British Raj. However, these long run social mobility rates turn out to be only again modestly higher than the equivalent rates for the UK, USA, and Sweden.

Using Surnames to Measure Social Mobility

The measures we have of status at any time for various surname groups in Bengal is their share in an elite occupation or educational status compared to their population share. We thus measure over time the relative frequency of elite names like Banarji among attorneys, doctors, university attendees, and also of lower class surnames like Shaw.

We define the *relative representation* of each surname or surname type, z, in an elite group as

$$relative\ representation\ of\ z = \frac{Share\ of\ z\ in\ elite\ group}{Share\ of\ z\ in\ general\ population}$$

With social mobility any surname which in an initial period has a relative representation differing from 1 should tend towards 1, and the rate at which it tends to 1 is determined by the rate of social mobility.

The measure we will derive of social mobility is the b in the equation

$$y_{t+1} = by_t + e_t$$

where y is some measure of socio-economic status such as occupation or education.

To extract implied bs from information on the distribution of surnames among elites and underclasses over time we proceed as follows. Assume that social status, y, follows a normal distribution, with mean 0 and variance σ^2. Suppose that a surname, z, has a relative representation greater than 1 among elite groups. The situation looks as in figure 3, which shows the general distribution of status (assumed normally distributed) as well as the distribution for an elite group.

The overrepresentation of the surname in this elite could be produced by a range of values for the mean status, $\bar{y}_{z0}$, and the variance of status, σ^2_{z0}, for this surname. But for any assumption about $(\bar{y}_{z0}, \sigma^2_{z0})$ there will be an implied path of relative representation of the surname over generations for each possible *b*. This is because

$$\bar{y}_{zt} = \bar{y}_{z0} b^t$$

Also since $var(y_{Zt}) = b^2 var(y_{Zt-1}) + (1 - b^2)\sigma^2$,

Figure 3: Initial Position of an Elite

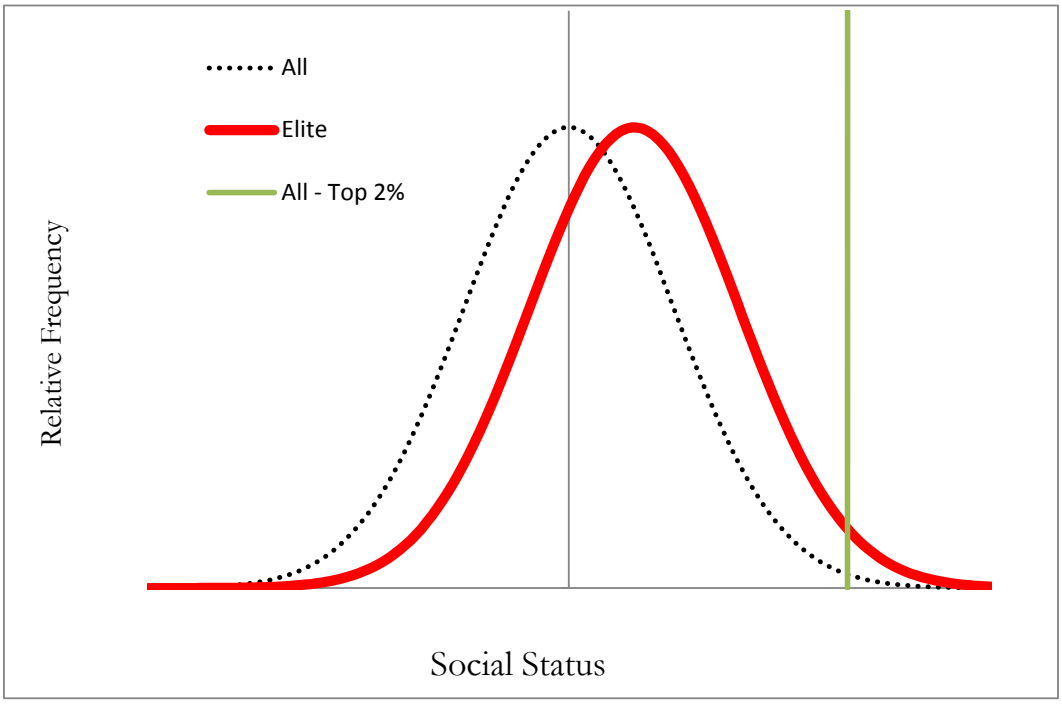
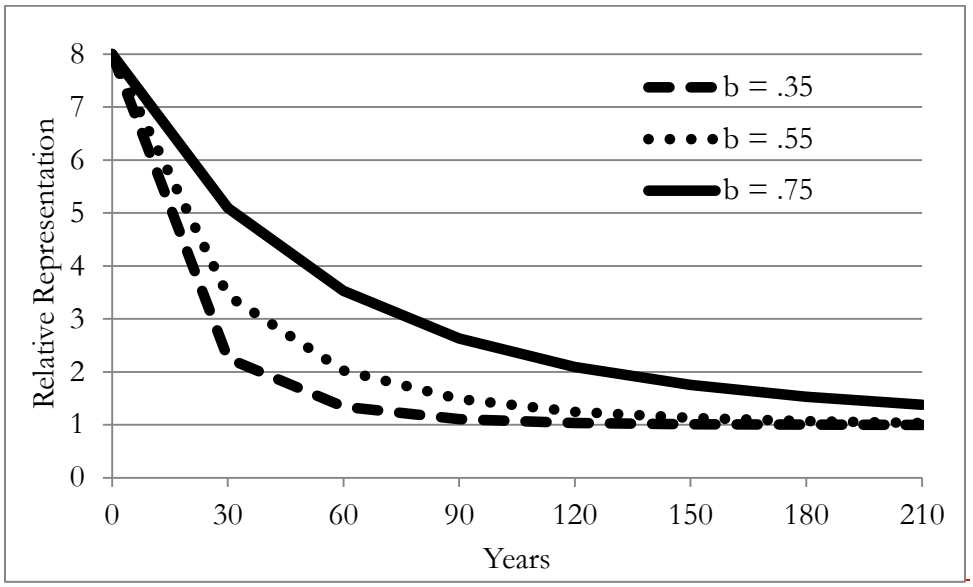


Figure 4: Relative Representation by Generation with Different bs



$$var(y_{zt}) = b^{2t}\sigma_{z0}^2 + (1 - b^{2t})\sigma^2$$

With each generation, depending on *b,* the mean status of the elite surname will regress towards the population mean, and its variance increase to the population variance (assuming that $\sigma_{z0}^2 < \sigma^2$). Its relative representation in the elite will decline in a particular pattern.

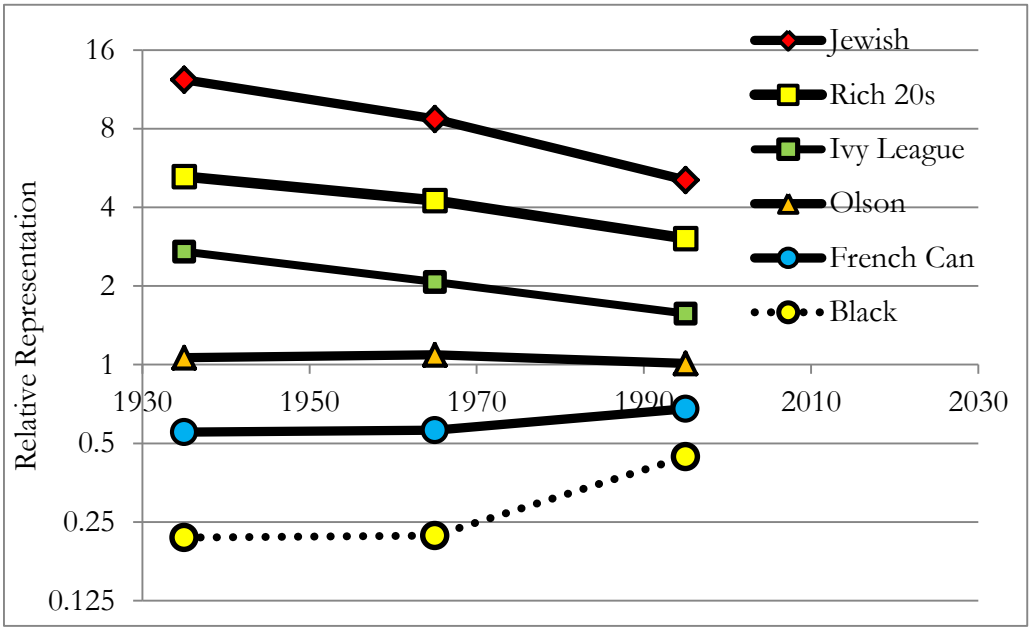
Thus even though we cannot initially fix $\bar{y}_{z0}$ and σ_{z0}^2 for the elite surname just by observing its overrepresentation among an elite in the first period, we can fix these by choosing them along with *b* to best fit the relative representation of the elite surname z in the social elite in each subsequent generation. In the case of India

where elite surnames were established mainly before 1800, we can safely assume that the variance of status among the elite is by the modern period as great as that for the general population (it turns out to matter little to the estimated size of b what specific initial variance is assumed). We shall see below that we can confirm this assumption.

Figure 4 shows what we would expect the relative representation of a surname, which had a relative representation of 8 times its share in the population in the first period, to have in each subsequent 30 year interval with different assumptions about b. Figure 5 shows how the process works in practice in the case of the last two generations in the USA. This shows the relative representation of six groups of surnames among US doctors. The three elite groups are the surnames of the Jewish population, the descendants of the rich of the 1920s, and the descendants of those attending Ivy League universities before 1850. The two underclass groups are the surnames of the Black population, and of those of French Canadian origin. The surname Olson is included as a representation of a group always close to the social average.

This US pattern where elites systematically regress to the mean is echoed in England and Sweden. The rate of social mobility is slow, but there is a consistent regression to the mean by advantaged and disadvantaged surname groups, as in figure 5.

Figure 5: Convergence to the Mean among US Surname Types, 1920-2011



Social Mobility in Bengal, 1860-2011

For the upper classes in Bengal family surnames date from the eighteenth century or earlier. Thus petitioners to the East India Company courts in Bengal in the 1770s typically have surnames, and these are the same surnames still common in Bengal: *Banarji, Basu, Chattarji, Datta, Ghosh, Haldar, Khan, Mandal, Mitra, Sen.*[5] If there had been substantial social mobility in Bengal, even a b as high as 0.6, then over the last 200-250 years, 7-8 generations, common surnames would all have regressed towards having an average representation at the top and the bottom of society. However, as figure 6 illustrates, common surnames vary enormously in their relative representation among elites in modern Bengal such as doctors or attorneys.

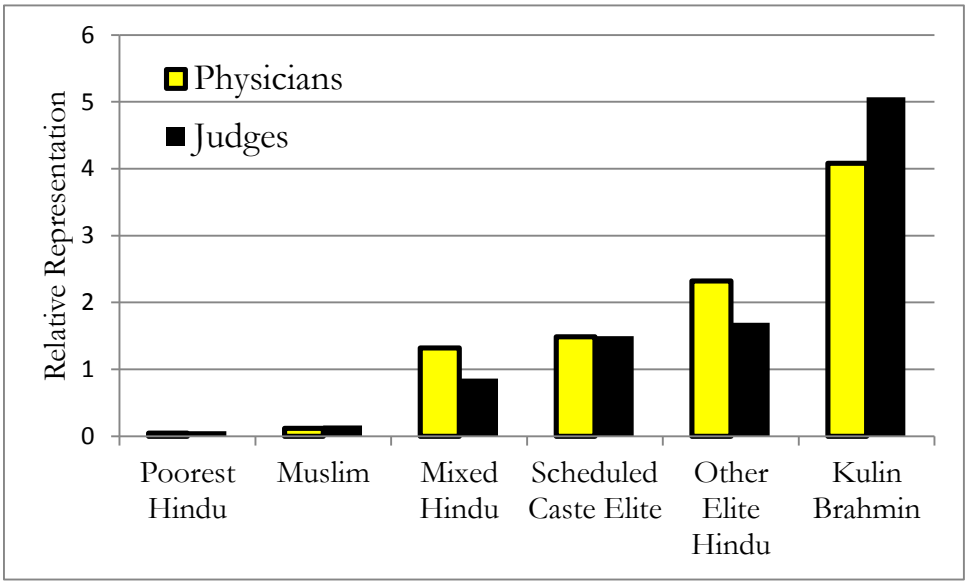
The Hindu community in India was traditionally divided into four castes in descending order of status, Brahmins (priests), Kshatriya (rulers, administrators, soldiers), Vaishya (farmers, bankers, traders) and Shudra (laborers and servants). Even within each castes there were sub-castes of different levels of prestige. The highest status group within the Brahmins of Bengal were the Kulin Brahmins. There are a set of seven surnames that are associated with this group: *Mukhopadhyaya (Mukherjee), Bandopadhyaya (Banerjee), Chakraborty (Chakravarty), Chattopadhyaya (Chatterjee), Bhattacharya (Bhattacharjee), Gangopadhyaya (Ganguly)*, and *Goswami (Gosain).*[6] This sub-caste of Brahmins supposedly migrated to Bengal from north India in the tenth or eleventh centuries CE. If they maintained this status by descent into the modern era then this implies a society of astonishing social rigidity. The surnames of the Kulin Brahmins, however, are generally the most over-represented of all surnames among modern elites in Bengal. They are more than four times as common among doctors first registering in 1980-2011 than their share in the population.

Similarly other surnames associated with the high status Brahmin and Kayastha castes in Bengal are both still overrepresented among doctors and judges in figure 6, under "other elite Hindu" surnames, even though not as prominent as the Kulin Brahmin surnames. Other elite Hindu surnames includes *Basu/Bose, Datta/Dutta, Ghosh, Kundu, Mitra,* and *Sen* or *Sengupta,* which were all high status in the nineteenth century. *Basu, Ghosh,* and *Mitra,* for example, are associated with the Kulin Kayastha

[5] Government of Bengal, Political Department, 1930.

[6] The association of these surnames with the Kulin Brahmin sub-caste can be confirmed by looking at the surnames of those listing themselves as Kulin Brahmin on matrimonial web sites. All these surnames are found also, however, under other sub-castes of Brahmins.

Figure 6: Relative Representation of Surnames among Doctors and Judges, 2011



Sources: Surname frequency among doctors in West Bengal from Indian Medical Register, doctors first registering 1950-2009. Surname frequency among West Bengal judges, 2011, from the High Court Roll of High Court and District Judges. Surname frequency in the population estimated as in the appendix.

(scribe) subcastes, which were regarded as next in status after Brahmins in premodern Bengal. As with Brahmins, *Kulin* denotes a superior subcaste.

In contrast the surnames of the Muslim population are dramatically underrepresented among both physicians and judges. Muslims formed a large proportion of the population in Bengal before Independence and continue to do so in the contemporary state of West Bengal. Because Muslim and Hindu first names are also distinctive, the fraction of Muslim physicians in Bengal in the years 1860-2011 is easily estimated.

Also still very underrepresented are some Hindu surnames that are included here because they had little or no representation among physicians before Independence. The main one is *Shaw/Show,* held by 3.7 percent of men on the Kolkata voting rolls. Others are *Rauth/Routh, Paswan, Dhanuk, Balmiki,* and

Mahata/Mahato. Together these surnames are held by 7 percent of the population of West Bengal. These constitute the "poor Hindu" surname group in figure 6.

Two additional surname groups of intermediate social status are tracked. First surnames heavily associated with scheduled castes (those eligible for reserved positions), identified from those admitted to universities in West Bengal and police jobs in Kolkata. These names are *Barman/Burman, Biswas, Haldar/Halder, Mandal/Mondal,* and *Naskar*. They account for 3.8 percent of the population age 20–29 in Kolkata. Because they are overrepresented among physicians and attorneys in Bengal, they are labeled in figure 6 as "scheduled caste elite."

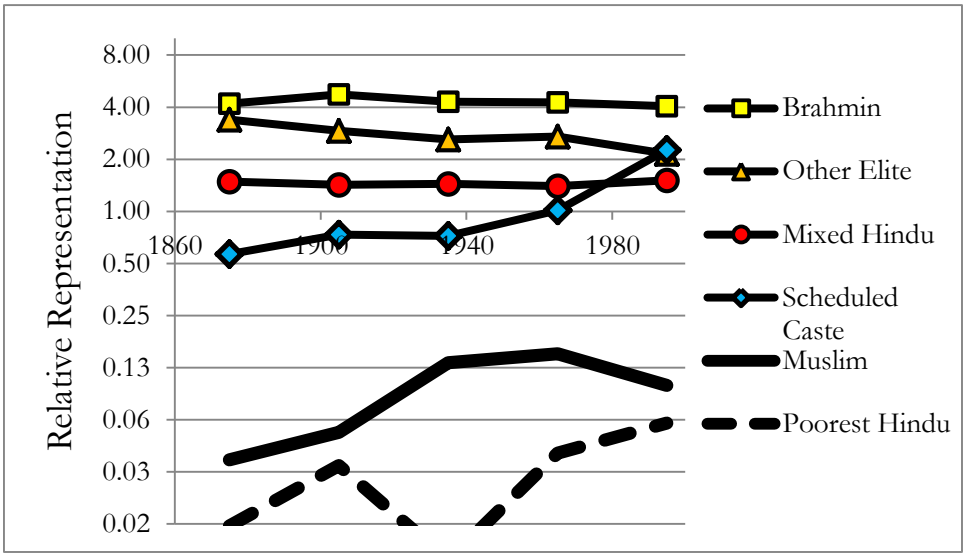
The second intermediate group is "mixed Hindu" surnames. These are mixed in the sense that they are found mainly in the general admission lists for universities and the police but also in significant numbers in the scheduled caste lists. These surnames are *Das/Dasgupta, Majumdar, Ray/Roy, Saha,* and *Sarkar*.

The extraordinary small share of Muslim surnames among elites such as doctors and attorneys in West Bengal, and their large share of the population, means that Hindu surnames all tend to be overrepresented among doctors. In considering social mobility rates we shall see that they have to be low overall in West Bengal 1947-2011 because there is essentially no upwards social mobility among a large sector of society, the Muslim population.

To measure social mobility over generations in Bengal we look at the relative representation of surname types among doctors in Bengal and West Bengal, 1860-2011. Doctors are just one of a number of high status occupations in West Bengal, but figure 6 suggests that what is true for doctors will be true for other occupations such as attorneys and engineers.

The information for the years 1910-2011 comes from the Indian Medical Register, which includes doctors registering in Bengal from 1915 onwards. Before 1910 we estimate the surname frequencies among doctors from a list of register doctors in the Province of Bengal, 1903, and from lists of doctors registered in Bihar and Orissa, and in Burma (but trained in Bengal) in 1930. Muslim and Hindu first names are also quite distinct, so we can easily track the fraction of Muslim doctors in Bengal 1860-2011. Figure 7 shows the relative representation of each of these surname groups across five thirty year generations beginning 1860.

Figure 7: A summary of social mobility by surname type, 1860–2011



The share of doctors with each type of surname in each period is relatively easy to calculate from the available sources. But these relative representations for the surnames depend on the shares of the population with such surnames in each generation, and there is much more uncertainty about this for earlier years. The population share calculations are discussed in the appendix. Table 2 shows the estimated population shares for each group circa 2010 for the 20-29 year old cohort.

The data underlying figure 7 leads to the intergenerational persistence estimates in table 2. These Bengali surname groups show extraordinary persistence across generations. This persistence is observed both in the period of British rule, and since independence in 1947.

Table 2: b Calculated for Various Groups and Periods

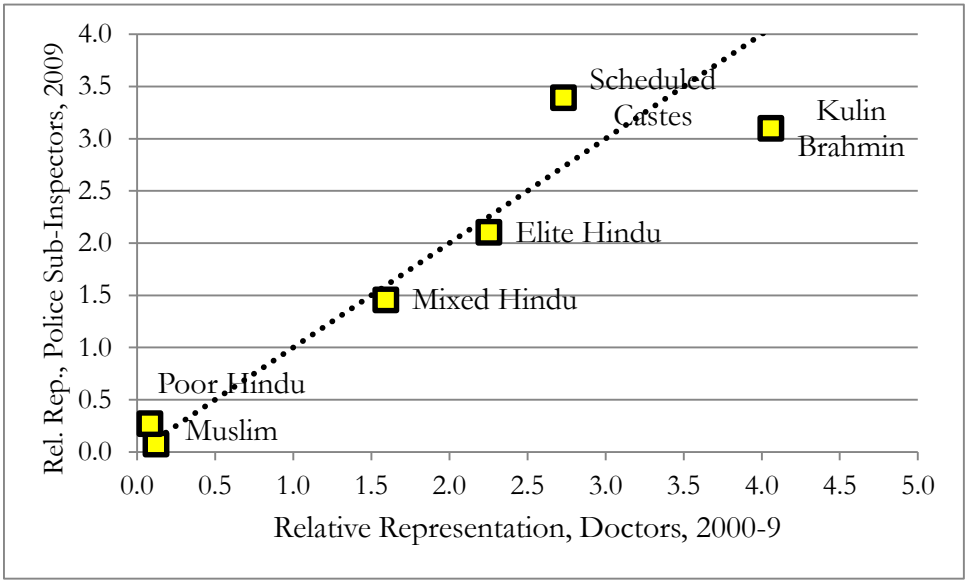
Surname group	Share of Population 2010 (%)	b 1860-1947 All	b 1950-2009 All	b 1860-1947 Non-Muslims	b 1950-2009 Non-Muslims
Muslim	31.1	0.91	1.20	-	-
Kulin Brahmin	3.4	1.05	1.05	1.03	0.97
Other Elite Hindu	5.0	0.87	0.85	0.86	0.85
Poorest Hindu, pre 1947	7.0	1.01	0.85	1.02	0.83
Scheduled Caste Elite	3.8	-	-	0.84	-
Mixed Hindu	11.8	1.10	1.70	-	-
Average All	-	0.88	1.13	0.91	0.88

Source: Figure 7.

Census reports exist giving the Muslim share of the population in Bengal and West Bengal for each decade from 1871 on. Thus there are good measures of the relative representation among physicians in Bengal from 1860 on. The striking feature is the very low representation of Muslims among physicians in all periods. Under British rule, Muslims experienced limited upward mobility. The implied persistence of status was high, with a calculated intergenerational correlation of 0.91.

However, from the 1970s until very recently, the Muslim community in West Bengal saw a further decline in representation among physicians, with no implied regression to the mean. Indeed, starting with the generation entering practice since Independence in 1947, the implied persistence coefficient is 1.2, indicating that the Muslim community has been diverging further from the mean.

Figure 8: Relative Representation of Surnames, Doctors versus Police Sub-Inspectors



The system introduced in Bengal after Partition that reserves 22-28% of places in all higher education institutions and government employments for Scheduled Castes and Scheduled Tribes, explicitly excludes anyone of the Muslim or Christian religion from the reservation. Only Hindus, Sikhs, and Buddhists qualify for a Caste or Tribe certificate. Bengal has not yet introduced in education any reservation for "Other Backward Classes" which would include Muslims.[7] Thus Muslims would be disadvantaged in admission to medical practice compared to the Hindu, Sikh and Buddhist population from 1947 onward. They can compete on equal terms for the 72% of non-reservation positions. But the existence of the reservation will hit particularly hard such an excluded group whose members would be concentrated on the lower rungs of the admissions if all 100% were open. This may partly explain the surprising negative social mobility implied by these statistics for the West Bengal Muslim community.

[7] In 2012 a Law was passed reserving 17% of government jobs for these groups. For education such a reservation of places for "other backward classes" will take effect in state educational institutions in 2014.

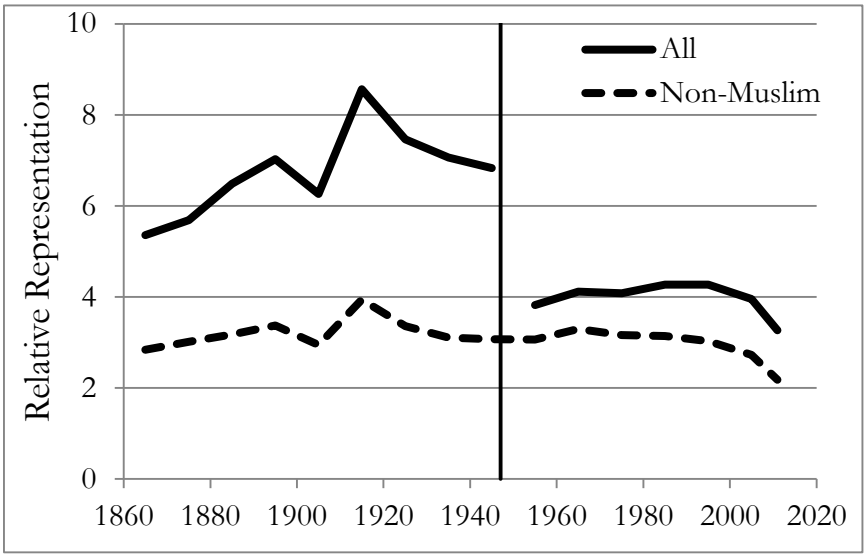
Since Muslim representation among doctors, a high status group, is limited it might be thought that the relative representation among doctors does not capture well overall movements in the status of the Muslim minority. However, even in much lower status occupations Muslims seem to be similarly underrepresented. Figure 8, for example, shows the relative representation of Muslims among those admitted as Sergeants and Sub-Inspectors in the Kolkata Police Force, 2009, compared to their relative representation among doctors, 2000-9. These lower level police posts are still coveted positions, but with an education requirement only of High School Graduation. As can be seen Muslims are equivalently underrepresented in promoted positions in the police.

Social Mobility of the Kulin Brahmin Population

The seven Kulin Brahmin surnames have always been well represented among physicians in Bengal. Since Independence, they have accounted, on average, for more than 16 percent of physicians. The Brahmin-surname population share from 1860 to 2011 is estimated as described in the appendix. Figure 9 shows the implied relative representation of Kulin Brahmin surnames among physicians in Bengal under British rule and in West Bengal after Independence. Relative representation declines from 5.8 times the average in 1860–89 to 4.2 in 1980–2011. This result implies very low social mobility rates.

However, as the figure shows, the apparent decline in the relative status of Kulin Brahmins is mostly due to the partition of Bengal at Independence in 1947 and the loss of a large portion of the low-status Muslim population. After Independence, these surnames show little sign of regressing toward average representation among physicians. Only since 2000 has Brahmin overrepresentation declined, and this may just be a blip. During the colonial period, Kulin Brahmin relative representation was rising, though this was mainly because of the relative growth of the poor Muslim population.

Figure 9: Share of Doctors with Kulin Brahmin Surnames, by decade, 1860-2011, Bengal and West Bengal



Notes: See appendix on how the Kulin Brahmin population share was estimated.

Looking at the representation of Brahmin physicians among only the non-Muslim population (as represented by the dotted line in the figure), the relative representation of Brahmins shows very little sign of regression to the mean in either epoch. Even in the period since Independence, the persistence coefficient is 0.97. Surprisingly, the reservation system in Bengal, which sets aside 28 percent of medical-school places for scheduled castes and tribes, has produced little downward mobility among the Kulin Brahmin surname group since the colonial era.

As shown below, the reservation system did sharply increase the representation of a group of surnames associated with scheduled castes. What would the rate of downward mobility of the Brahmin surnames have been had the system not been implemented? Assuming that the system caused the Brahmin community to lose access to 28 percent of medical-school places and adjusting the data accordingly, the relative representation in the final period 1980–2011 would rise to 4.1 among the non-Muslim population, which is higher than the rate before Independence.[8] The implication is that absent reservation, there would have been no downward mobility

[8] Scheduled caste and tribe candidates who score high enough on the general list are admitted under that list. So the reservation takes away from competition of the higher castes that number of seats at the educational institution.

among the Brahmin community in Bengal from the mid-nineteenth century to the present. India would be an example of a society with no mobility for some social groups.

Other Elite Hindu Surnames

Our group of other surnames associated with high status shows a nearly fivefold overrepresentation among physicians in Bengal in the years 1860–89. The implied intergenerational correlation of status for the colonial period differs modestly depending on whether it is calculated for the population as a whole or only for the non-Muslim population. But, as table 2 shows, across both the colonial and Independence eras, it is around 0.86, also a high rate (though lower than for the Brahmin surname group). Somewhat lower on the social scale than the Kulin Brahmins, this group seemingly faced more competition for unreserved places at universities. But again, the implied rates of downward social mobility for this group of surnames remain low, even despite the expected effects of the reservation system in reducing their share of physicians. As with the Kulin Brahmin surnames, without the reservation system, the relative representation of these surnames among the non-Muslim population in the period 1980–2011 would be 2.2, very modestly less than the rate of 2.4 in the period 1860–89 under British rule. The underlying rate of social mobility for this group between 1860 and 2011 is consistent with an intergenerational correlation of 0.95 or higher. Thus inherent mobility rates are again very low.

The Poorest Hindu Surnames, 1860-1947

Despite the establishment of the reservation system, surnames associated with the poorest Hindu groups of the colonial era are extremely rare among physicians even now. Among the non-Muslim population, they appear among physicians at 4 percent of the expected rate. They are also greatly underrepresented among lower-status occupations such as police sergeants and subinspectors in Kolkata (see figure 8).

As table 2 shows, the implied persistence rate for this group is 1.01 under British rule, implying no upward mobility. Since Independence, the calculated

persistence rate has fallen to 0.83–0.85, depending on the reference group. But representation of this surname group among physicians is so low that this change in measured mobility rates may be the result of random chance. Despite ample room for improvement of status, these surname groups have benefited little from the reservation system. Some of these surnames, such as *Dhanuk,* belong to groups which, although poor, did not qualify as scheduled castes because the British did not list them as such in 1931.[9] While at least some *Shaw/Shows* were among the scheduled castes, many clearly were not. Thus in the list of nearly five hundred recruits to the Kolkata police with the rank of sergeant or subinspector, the four *Shaws* were all found in the "general," or unreserved, category. In a sample of medical-school admissions for 2010–11, three of the four *Shaws* were in the general category.

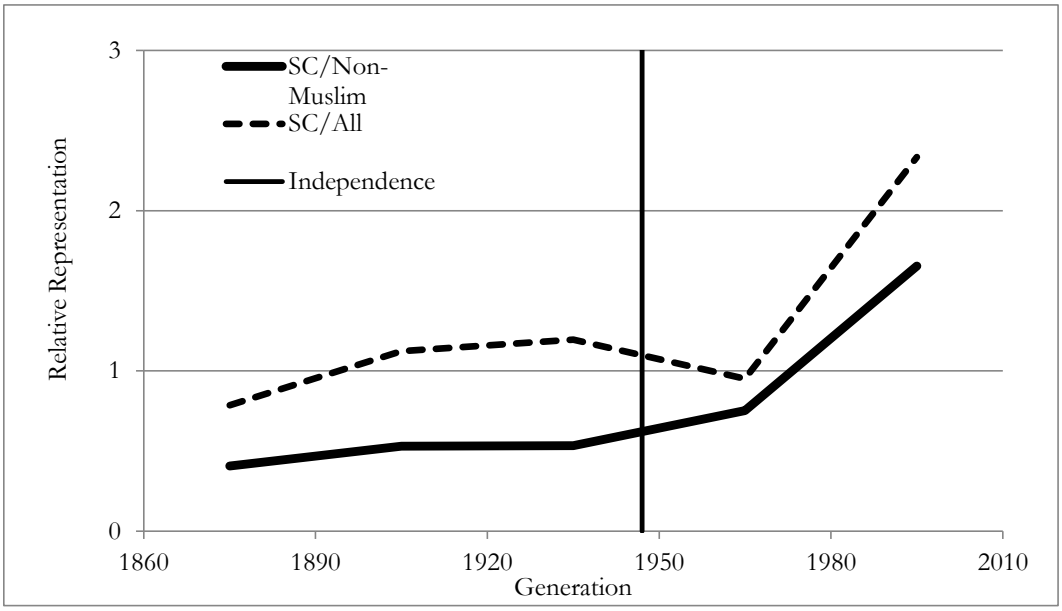
The Scheduled Caste Elite

From lists of those admitted to colleges in West Bengal in recent years, and from lists of successful candidates for Police posts in Kolkata, we can identify some surnames where the majority of holders appear in the Scheduled Caste reservation. These names, as noted above, are *Barman/Burman, Biswas, Haldar/Halder, Mandal/Mondal, and Naskar*. These names account for 3.8% of the population of Kolkata in 2010.

The peculiarity of the scheduled caste surnames identified above is that although all of them figure prominently in the scheduled caste list, they also figure significantly in the list of Bengal physicians from before Independence. Indeed, as figure 10 shows, these surnames were already fully represented among physicians relative to their share in the population in the last generation before Independence. Looking just at the share of these surnames among the non-Muslim population, they were at less than half their expected representation in the period 1860–89 but were converging toward proportional representation, with a persistence rate of 0.84. The success of this surname group under the reservation system has led to these surnames becoming as overrepresented as many higher-caste Hindu surnames among both physicians and police recruits (see figure 2). Because they start just

[9] This list was initially promulgated by the British in 1936 based on Untouchable Castes identified in the 1931 Census. The British classification was largely adopted by the Government of India in 1953 in establishing its Reservation Policy. Jadhav, 2008.

Figure 10: The Curious History of the Scheduled Caste Surname Group



below the mean representation in the first generation after Independence, there is no implied regression to the mean for this group.

This recent overrepresentation of these surnames among physicians, even with respect to the non-Muslim population only, seems to be driven by the reservation system. In a list of recent admissions to medical schools in West Bengal that identifies some students by their reservation-system category, this surname group, accounting for 141 admissions, was at double the average representation for the non-Muslim community. Only 30 percent of this group were admitted to unreserved places; the rest were assigned places reserved for scheduled castes.[10] In the absence of reserved places, only fifty-eight surnames from this group would have appeared, and the group would have had a relative representation of only 0.84 instead of 2.04.[11]

[10] Bankura Medical College, entry year 2012, and Kar Medical College, entry years 2010 and 2011, had admissions lists showing candidates' reservation-system status. These give the status of 395 admitted students in total.

[11] This assumes that absent the reservation system, admissions rates for this surname group in the unreserved category would remain as they are currently.

These results seem to be driven by the arbitrariness of the original scheduled caste and scheduled tribe lists drawn up by the British, which ended up classifying even moderately prosperous groups as "untouchables" and reserving places for them. These misclassified groups thus gained a disproportionate advantage from the reservation system.

The Mixed Hindu Surnames Group

The group of mixed Hindu surnames includes surnames that were elite during the colonial era and showed no tendency then to regress to the mean. Since Independence, these names have tended to diverge from the mean, becoming more elite relative to the general population. But with respect to the non-Muslim population, these surnames show close to average representation among physicians both during the colonial period and since Independence. It is thus not possible to estimate a rate of regression to the mean for them because they already are at the mean.

This surname group both benefits and suffers from the reservation system. Those not designated as members of scheduled castes have a lower chance of admission to university, but those who are members of scheduled castes have a comparable advantage. Looking at lists of admissions from the two medical schools that made public their admissions in the reservation-system categories, 58 percent of this surname group were admitted to unreserved places. In the absence of reserved places for this group, the relative representation of this group of surnames, compared to other non-Muslim surnames, would have dropped from slightly above 1 to 0.8.

Social Mobility Rates Without the Reservation System

The strange pattern of convergence and divergence seen in figure 7 and table 2 seems to be an artifact of the reservation system for university admissions.

Table 3 shows the relative representation of each of the six surname groups among physicians first registering in Bengal 2000-2011. Using the cases noted above from universities that reported the reservation-system status of their admitted students, it is possible to estimate the share of reserved-place admissions to medical school for each surname group. Because this sample is small, for one group, the poorest Hindu surnames, there are only four people observed.

With this information, we can estimate the representation of the various surname groups for the years 2000–2011 had all admission been by open competition. Column 4 of the table shows the implied relative representation in this case. Figure 11 shows the estimated relative representation for each group for 1920–2011 without the reservation system.[12]

From this counterfactual estimate of relative representation, the implied persistence coefficient between the generation of physicians in the periods 1920–47 and 2000–2011 (seventy years or 2.33 generations later) is estimated. These estimates are shown in the rightmost column of the table. These calculations imply that without the reservation system, for Kulin Brahmins, other high-status Hindus, and Muslims, there would have been little or no regression to the mean. The mixed and poorest Hindu surname groups regress toward the mean at a slow rate. For the poorest Hindu surname group, however, the numbers of physicians observed is so low that this result has no precision.

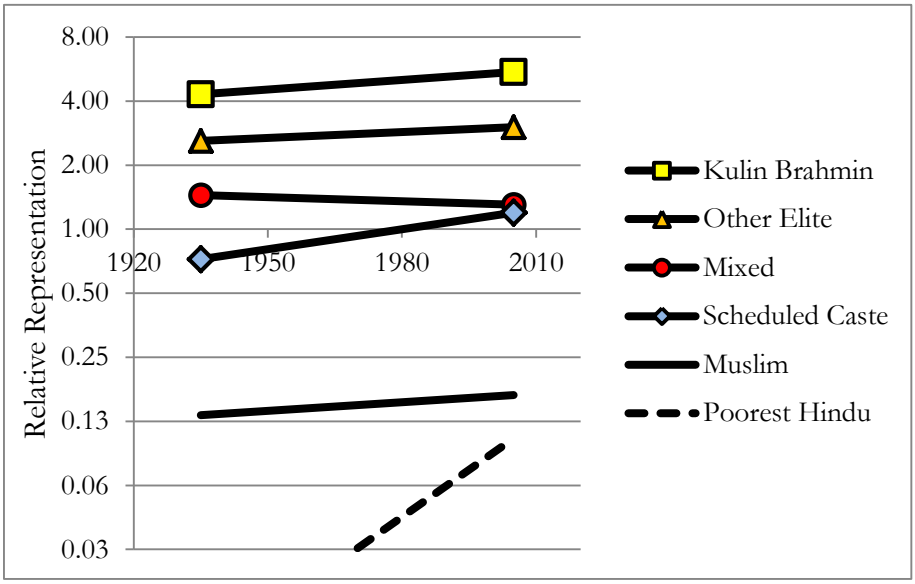
The scheduled caste surname group still shows the odd transition from an underrepresented to an overrepresented group among physicians. But the attempt here to control for the effects of the reservation system is only partial: it does not control for the effect of the reservation system on the previous generation, which might have created more middle-class families whose children were better able to

[12]The relative representation of the surnames in the period 1920–47 was calculated assuming (counterfactually) that the Muslim population share was the same as in 1980–2011. This was done to exclude from this exercise the effects of a changing Muslim population share on measured social mobility rates.

Table 3: Implied b without Reservation Policy, Doctors, Bengal

Surname Group	Relative Representation 2000-11	Share Admitted Through Reservation 2010-12	Relative Representation 2000-11 no reservation	Implied b 1935-2005, no reservation
Kulin Brahmin	3.96	0	5.49	1.08
Other Elite Hindu	2.25	3	3.02	1.07
Mixed Hindu	1.70	45	1.30	0.87
Scheduled Caste	2.90	70	1.20	-
Poorest Hindu	0.10	25	0.10	0.77
Muslim	0.12	0	0.17	0.96

Figure 11: Social Mobility by Surname Type without Reservations, 1920-2011



compete for unreserved places. The effects of the reservation system between 1950 and 1999 cannot be fully inferred. On balance, it may have reduced the persistence rate for the initially high-status groups. But it has also served to increase persistence for a large and growing underclass of Muslims and poor Hindus who are ineligible for scheduled caste status.

It is also not clear whether the system is doing much to increase these overall slow rates of social mobility. As evidenced by surname distributions, the two-thirds of the population outside the reserved categories in Bengal has seen little change in relative social position over the past two generations. Among the groups included in the reserved categories, a few seem to have reaped disproportional gains, while others seem to have experienced few benefits. Thus despite the intergenerational mobility injected by the reservation system in the short run, the impression from the surname-group analysis is of an overall rate of social mobility close to zero. India seems to be a uniquely immobile society.

However, the objection could be raised that while the bs implied by the surname grouping mobilities is low, could there be considerable social mobility within these surname groupings. Thus while the surname *Banarjee* may be consistently overrepresented among elite groups, could it be that completely different groups of *Banarjee*s are found in the elite occupations each generation?

Even if there was considerable random movement up and down within families within each of these surname groups, however, the surname data shows that this individual mobility data will not predict the social mobility of larger groups of advantaged and disadvantaged castes, religions, or classes within Indian society. The question of the social mobility of classes or of castes would not then be amenable to answer from estimated individual mobility rates.

The second answer is that based on experience in other countries the high persistence of surname groupings in relative status is echoed by the high persistence of individual families within these groupings.

Why is Social Mobility so Low in Bengal?

The social mobility rates for modern West Bengal estimated in table 3 are among the lowest observed in a series of surname studies for England, 1300-2012, USA 1920-2012, Sweden, 1700-2010, China, 1700-2010, Japan, 1870-2010, and Chile, 1920-2010. Table 4 shows the persistence rates estimated in these other cases in recent years, as well as in some earlier periods. The typical rate is 0.7-0.8, still very high, but significantly less than the average of 0.89 observed in West Bengal since Independence. Why are these persistence rates so high in Bengal?

Why are rates of social mobility consistently so low in Bengal? The hypothesis offered here is that this is caused by low rates of intermarriage between different surname groups in Bengal. There has been surprisingly little study of intermarriage rates between different social groups in India in general and in Bengal specifically, despite the importance of the caste system in Indian history and politics. As late as the 1960s caste endogamy still seemed to be the rule for most marriages in Bengal, as seen in a detailed study of a modest sized town in Bengal in the late 1960s (Corwin, 1977). Another study of a high caste group in Hyderabad, Kayasths, looking at marriages 1900-1975, found that rates of marriage within the caste were 98.5%, 1900-25, 97.1% 1926-50, and 94.8% 1951-75 (Leonard and Weller, 1980, tables 1-3). But information on the endogamy rates of marriages in Bengal in the 1970s to 1980s, which produced the most recent crop of doctors, is not readily available.

One source we do have on the likely rate of endogamy is the 2010 Kolkata voter roll, which gives surnames, first names and ages. There are many first names that are highly specific to the Hindu, Muslim, and Christian/Jewish communities. Table 5 shows the most common ten first names for women in each category. If we take, for example, the Kulin Brahmin surnames then women who married into this surname group from the Muslim or Christian communities would almost always have different first names than women born into this group. Also if families with these surnames were identifying as Muslim or Christian, as a result of intermarriage and adoption of at least some elements of the culture of the wives, then the children would again have different first names. However, as table 6 reports, the percentage of women in the Kulin Brahmin surname group having non-Hindu first names is extremely small. Since Muslims are nearly a quarter of the Kolkata population this implies that intermarriage rates between Kulin Brahmin men and women of Muslim origin must be extremely low, in the order of 0.1%. A similar result holds for other high caste Hindu surnames.

More women with Muslim surnames have first names that are Hindu in origin, 0.9%. But given the absence of sign of any intermarriage with high caste Hindu groups, if these reveal marriage alliances it is likely with lower caste Hindus.

Table 4: Estimates of b from Surnames, other Societies

Country	Measure	Period	b
USA	Attorneys	1950-2011	0.67-0.77
USA	Doctors	1950-2011	0.73-0.74
England	Attorneys, Doctors	1950-2012	0.69-1.00
England	Wealth	1950-2012	0.70
England	Education	1950-2012	0.77
England	Education	1300-1500	0.75
Chile	Occupations	1940-2010	0.74
China	Education	1905-2011	0.71
Japan	Education	1940-2012	0.84

Sources: England, Clark and Cummins, 2013a, 2013b**,** China, Hua and Clark, 2012, Japan, Clark and Tatsuya, 2012, USA, Clark et al., 2013. Chile communication from Daniel Diaz.

Table 5: Most Common Female First Names by Community

Kulin Brahmin	Other High Caste Hindu	Muslim	Christian/ Jewish
Krishna	Geeta/Gita	Salma	Mary
Soma	Krishna	Yasmin	Elizabeth
Geeta/Gita	Soma	Shabana	Maria
Arati	Arati	Asma	Margaret
Swapna	Meera/Mira	Sultana	Helen/Helena
Meera/Mira	Namita	Anwari	Agnes
Kalpana	Kalpana	Shabnam	Veronica
Ratna	Anjali	Afsana	Rosemary
Sumita	Swapna	Shahnaz	Dorothy
Anjali	Pratima	Farzana	Teresa

Table 6: Female First Name Origins by Surname Group

Female First Names	Kulin Brahmin	Other High Caste Hindu	Muslim	Christian
Hindu	99.6	99.3	0.9	30.2
Muslim	0.1	0.1	98.9	0.4
Christian	0.3	0.6	0.2	57.4
Hindu and Christian	0.0	0.0	0.0	11.9

Source: Kolkata Voter Roll, 2010.

There is sign of potentially much more intermarriage between Christians and high caste Hindus. Christian origin surnames are a very small share of the surname stock in Kolkata, about 0.3%, and are mainly Portuguese in origin, indicating their long history in India. The small share of women with high caste surnames who have Christian surnames is compatible with significant intermarriage, given the small Christian population share. But these female Christian first names may alternately stem from daughters from some high caste Hindus being given Christian surnames at birth, as opposed to intermarriage. The possibility of significant intermarriage between Christians and Hindus is, however, supported by 30% of women with Christian surnames having first names that are Hindu. Also 12% of women with Christian surnames have a mixture of Christian and Hindu first names. But again there is little sign of marriages that cross the Muslim-Christian social divide.

The surname evidence thus suggests almost no intermarriage between the largely poor Muslim community and either Hindus or Christians. Within the Hindu community it is not see easy with the first name evidence to see whether there is still marital endogamy within the surnames that are associated with the high caste groups. This is because there is not such dramatic variation in surname frequencies between high status and low status Hindu groups in first name types. There are only a few female first names that vary dramatically between high caste and low caste Hindus.

One of these is *Munni*, found at the rate of 0.007% among high caste surname women, and at the rate of 0.20% among other Hindu surname groups. If *Munni* was distributed representatively in the rest of the Hindu population, maintaining this incidence disparity would require than less than 4% of elite surname men married women from the general Hindu population. Again there would be a high degree of marital endogamy among elite populations. However there is clear indication that the poorer the Hindu surname the more prevalent is the first name *Munni*. For the poorest Hindu surnames it is found at a rate of 0.9%. Thus the failure of the first name *Munni* to appear among women with elite surnames may not reflect a general marital endogamy among these groups, but only a failure to marry women drawn from low in the social scale.

Another source of evidence of the continuing strength of marital endogamy are web sites advertising for potential wedding partners in Bengal. A survey of 200 women identified as Kulin Brahmin finds that 83% specify that they are seeking a Brahmin husband, 2% specify Brahmin or other high caste, and only 15% state that caste status is no barrier to a potential union.[13] However, among that 15% open to any caste, 8% list this in a form such as "Brahmin - Kulin, Caste no bar". Thus a full 93% of advertisements indicate a preference for a Brahmin spouse.

Why would marital endogamy among surname groupings slow the rate of social mobility? We hypothesize that this stems from the fact that the current status of a person, y_t, on any of the various aspects of social status in generation t – income, wealth, education, occupation - has two components, a systematic one and a random element. Specifically $y_t = \theta x_t + e_t$, where x_t, is some the fundamental social competence or status of families, and e_t is some random component. The random component exists for two reasons. First there is an element of luck in the status attained by individuals given their underlying aptitudes. People happen to choose a successful field to work in, or firm to work for. They just succeed in being admitted to college, as opposed to just failing. But, second, people trade off income and other aspects of status. They choose to be philosophy professors as opposed to finance executives. The systematic component is strongly inherited, it could be by social or genetic inheritance (they would be observationally equivalent), but the random component is not inherited at all.

If people match up in marriage based on the current status of families only, then they look just at how the family ranks on current status y_t. High ranked families will tend to be those with positive luck, and the children of these unions getting on average no such bonus, will tend to regress to the mean. This is the normal process of social mobility. Even if castes and the associated surname groups differ in terms of the average value of the underlying competence, x , as long as matching in

[13] bengalimatrimony.com

marriage is by attained current status, *y*, the average underlying competence or abilities of the castes and associated surname groups will converge over time.

However if marriage is endogenous to caste or religion, then while there will be social mobility within each caste, there is no mechanism to eliminate the underlying differences in the average level of ability or competence of different castes. At the level of castes and the associated surname groupings there will be little or no social mobility. The differences in socio-economic rankings between these groups diminishes little, or not at all, over time.

Conclusions

Long run social mobility rates in India as measured by the frequency of surname types in high status occupations such as doctors or judges turn out to be even lower than the low rates observed in countries such as England, the USA and Sweden using equivalent methods. The underlying b before the effects of the reservation system is estimated at 0.95 in West Bengal (from table 3), higher even than in medieval England. This is what allows the maintenance even today of the great social disparities illustrated in figure 1, despite 60 years, two generations of extensive Reservations in education for lower castes.

This unusually low rate of social mobility, we argue, is the result of high rates of marital endogamy among social groups in India. We show that in Kolkata there is little or no intermarriage between Muslims and high caste Indians and Christians. There is also sign of significant continued endogamy within caste groups within the Hindu population.

Appendix: Population Share Estimates, 1861-2011

Table A.1 shows the population shares by census year in Bengal, and then West Bengal, of Muslims and Hindus, as well as Muslims and Hindus aged 20-29. The Muslim population 1871-1931 was growing slightly faster than that of Hindus, but for the years 1951 and earlier we assume the share aged 20-9 was the same as the share in the population as a whole. In recent years the Muslim population has grown by nearly 10% more per decade than the population as a whole, which means that the share of the Muslim population aged 20-29 would be, based on the Kolkata Electoral Register of 2009, about 6% greater than the total population share. Equivalent adjustments were made for earlier years.

We take the Hindu population share to be the rest of the population, allowing for the small Christian and Buddhist populations. In 2009 in the Kolkata electoral roll the share of each Hindu surname group for ages 20-9 was

Kulin Brahmin	5.28%
Other elite	7.32%
Mixed	17.22%
Poor	9.51%
Scheduled Caste Elite	5.55%

To estimate the share over time of the seven Kulin Brahmin surnames, we proceed as follows. We start by analyzing the data from imperial censuses, which show the Brahmin share of the Hindu population for all of India. For the censuses conducted from 1871 to 1931, the population shares were 6.79, 7.31, 7.14, 7.19, 6.71, 6.58, and 6.34 percent.

Thus before 1931 the Brahmin share was declining despite the elite status of Brahmins. This trend is consistent with the finding of Kingsley Davis that in 1931 the Brahmins had a ratio of children 0–6 to women 14–43 that was only 88 percent of other Hindu groups on average. This was mainly a consequence of the social taboo on Brahmin widows' remarrying (Davis 1946, table 3, 248). Presuming that Brahmins, a group with higher incomes than other Hindus, had better child survival rates would explain the only modestly lower net fertility of Brahmins. Brahmins in Bengal represented the same share among Hindus as for all of India in 1921–31. We

Table A.1: Share Muslim and Hindu, Bengal and West Bengal

Year	Share Muslim	Share Hindu	Share Muslim 20-9	Share Hindu 20-9
Bengal				
1871	0.490	0.500	0.480	0.500
1881	0.498	0.490	0.490	0.490
1891	0.508	0.487	0.498	0.487
1901	0.512	0.476	0.508	0.476
1911	0.526	0.470	0.512	0.470
1921	0.540	0.454	0.526	0.454
1931	0.549	0.433	0.540	0.433
1941	0.558	0.430	0.549	0.430
West Bengal				
1951	0.199	0.199	0.785	0.785
1961	0.200	0.206	0.780	0.774
1971	0.205	0.211	0.775	0.769
1981	0.215	0.228	0.765	0.752
1991	0.236	0.250	0.744	0.730
2001	0.253	0.268	0.725	0.710
2011	0.278	0.295	0.702	0.685

Sources: Census of India, various years.

Notes: Based on the Kolkata electoral register of 2009 we estimate the Muslim population share 20-9 was 6% greater than the overall Muslim population share. In line with the steady growth of the Muslim population share 1981-2011 we apply this correction throughout these years. For 1961-1971 we assume the share aged 20-9 was 3% greater than the overall population share, based on a slower rate of population growth.

thus assume this same population trend for Bengali Brahmins relative to other Hindus in Bengal for the period 1871–1931.

Since Independence there has been no formal count of Brahmins. However, electoral surveys for 2004–07 estimated Brahmins as 5 percent of the entire Indian population, or 6.2 percent of the Hindu population (Center for the Study of Developing Societies 2009). This implies a modest decline in the Hindu share of Brahmins between 1931 and 2004. However, the Kolkata electoral register suggests that Brahmins had much greater life expectancy than the Hindu population as a whole (Chief Electoral Office, West Bengal 2010). Whereas the seven Kulin Brahmin surnames constituted 4.1 percent of the Hindu electorate in the 20–29 age group, they constituted 9.9 percent of the Hindu electorate in the 70–79 age group. If this distribution is representative of national population, it would imply that Brahmins accounted for only 5 percent of the Hindu population age 20–29 in 2004. We assume the same to be true for Brahmins in West Bengal in the period 2000–2009.

Not all Kulin Brahmins had one of the seven surnames we track. But a list of prominent Bengali Brahmins consists almost entirely of people with these surnames, so we take the seven Kulin surnames as comprising 5 percent of the Hindu West Bengal population age 20–29 in 2001, acknowledging that this method modestly overestimates their population share.

Other high-status Hindu groups are assumed to follow the same population trends as Brahmins. The three other Hindu surname groups—poor, scheduled caste, and mixed—are assumed to follow the population trend of the remainder of the Hindu population in Bengal. The estimated population shares of each of these surname groups in each census year for ages 20-9 is shown in table A.2.

Table A.2: Share of Hindu Surname Groups, Bengal and West Bengal, 20-9

Year	Kulin Brahmin	Other High Status	Mixed	Poor	Scheduled Caste Elite
Bengal					
1871	0.034	0.048	0.082	0.045	0.027
1881	0.033	0.047	0.081	0.045	0.026
1891	0.036	0.050	0.079	0.044	0.025
1901	0.034	0.048	0.078	0.043	0.025
1911	0.034	0.048	0.076	0.042	0.025
1921	0.030	0.043	0.075	0.041	0.024
1931	0.028	0.040	0.072	0.040	0.023
1941	0.027	0.038	0.072	0.040	0.023
West Bengal					
1951	0.047	0.066	0.132	0.073	0.043
1961	0.045	0.063	0.131	0.073	0.042
1971	0.043	0.060	0.131	0.072	0.042
1981	0.040	0.057	0.129	0.071	0.042
1991	0.039	0.053	0.126	0.069	0.041
2001	0.037	0.052	0.122	0.067	0.039
2011	0.034	0.046	0.119	0.066	0.038

Sources: Census of India, various years.

Notes: Based on the Kolkata electoral register of 2009 we estimate the Muslim

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