A Demographic Case Study of Forced Migration: The 1947 Partition of India

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Abstract[1]

Drawing on the initial results of a study of the demographic impact of the Partition of British India, the present paper provides an overview of some of the concerns and issues related to the study of forced migration, reviews data sources available for the study of Partition migration and mortality, and examines some of the methods of demographic analysis available for estimating the components of demographic change during the Partition period. The paper focuses on the Punjab, using data published in the 1931, 1941, and 1951 Censuses of India and the 1951 Census of Pakistan. The paper presents estimates of survivorship by age and sex for the Punjab province from 1931 to 1951 (by comparing the undivided Province in 1931 with the total of the Indian and Pakistan 1951 Censuses) and comparable estimates for a number of individual districts whose boundaries did not change substantially between 1931 and 1951. Data on population change between 1931 and 1951 in these districts by religion and sex are also presented. Findings include that for the Punjab as a whole, estimated survivorship, which as used here includes the effects of mortality and to a lesser extent net migration, for both men and women below age 60 are markedly lower than model life tables with an expectation of life at birth (e(0)) of around 40 years. For individual districts of Indian Punjab, loss rates in the period 1931-41 correspond quite closely to those of model life tables with e(0) around 40, but increase substantially in all districts except one for the period 1941-51.

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I. INTRODUCTION

In terms of size and rapidity, the Partition of India in 1947 constitutes one of the greatest instances of voluntary and involuntary mass population migration in modern history. Estimates of migrants between 1947 and 1951 as a result of Partition range from 10 to 18 million, roughly the number of persons currently under the United Nations High Commissioner for Refugees' mandate of concern[2]. Estimates of deaths associated with Partition range from 200,000 to 1 million.

The problem of forced population displacement is not new and seems likely to remain one of the greatest challenges facing the international community for the foreseeable future. The US Committee for Refugees' 2002 World Refugee Survey estimated the number of refugees and asylum seekers in 2001 to be nearly 15 million, and the number of those forcibly displaced within their own borders (and therefore not strictly categorized as refugees) to be an additional 22 million (USCR, 2002). Despite the magnitude of the issue, there have been relatively few empirical studies of involuntary migration. We also have limited systematic knowledge of the impact of suffering and coping strategies arising from forced migration, such as the patterns of pain and loss, extent of population protection, attention to issues of vulnerability and human rights, the role of the state, and the roles played by international actors and voluntary agencies.

In terms of patterns of forced migration, even its most basic parameter (the number of those in situations of forced displacement at any given time), is derived from data of exceptionally poor quality, using ambiguous definitions and much ad hoc estimation (Reed, 1998). During crises, it is understandable that detailed and accurate data collection is largely impossible and probably inappropriate, given needs that require more urgent attention. Yet we need greater understanding of the process and patterns of forced migration if we are to mitigate its effects and prevent some of its worst manifestations.

Despite the passage of over 50 years, the demographic consequences of Partition have not been systematically described or assessed. The few existing studies employing modern techniques of demographic analysis make use of only Indian or Pakistani census and other data in the post-Partition period (Bhat, 1998; Preston, 1984; Retherford, 1982). The wide-ranging economic, social, and health consequences of this vast movement of peoples also remain largely unexplored and uninformed by current scholarship on forced migration, humanitarian crises, and human rights.

This paper represents a preliminary product of a study of the historical demography of Partition intended to help address the issues raised above. This study grew out of a workshop of population and regional experts, convened to evaluate census and administrative data sources and to determine the feasibility of launching an in-depth investigation into Partition as the largest instance of forced migration in recent history. The overall study has three major objectives: to develop and document methods that can be used to quantify the demographic consequences of forced migration; to develop improved estimates of Partition related migration and mortality and their correlates; and third, the broadest objective, to amplify and refine current understanding of

[2] UNHCR estimates there were about 20.5 million persons of concern as of 1 January 2003 (http://www.unhcr.ch/cgi-bin/texis/vtx/basics).

the typical patterns of massive population movement occasioned by crisis and their social, economic, and humanitarian consequences. The historical and social studies of the violence and migration associated with Partition make this a particularly rich example from which to draw. The focus of this paper, reporting on our initial research, is on the first objective, advanced by applying modern demographic techniques to an analysis of 1931, 1941, and 1951 Census data for the Punjab.

II. DATA

Censuses

Decennial censuses of British India were conducted at 10-year intervals from 1881 onwards. Tabulation was carried out manually, by sorting slips into pigeon holes, a process that limited the tabulation (and particularly cross-tabulation) detail. However, the censuses provide extensive information about population size and certain important characteristics that are invaluable for this study, such as birthplace and religion for small geographic areas. Of particular interest to this research are the Censuses of 1931 and 1941, and (for India and Pakistan separately) 1951.

The 1931 Census provides population counts at the district level by (among other characteristics) sex, age group, religion and sect, "race, tribe or caste", and district of birth. The 1941 Census collected information on much the same set of topics. However, because of the Second World War, the 1941 Census was never fully tabulated. Population totals by district and sex are available, but information by age is available only for those districts that remained part of India after Partition from sample tabulations carried out by the Indian Census Administration. In 1951, both India and Pakistan carried out population censuses, but tabulation procedures varied. Both the India and Pakistan censuses of 1951 collected information on displaced persons.

Vital Events

A civil registration system for the recording of births and deaths existed in India prior to Partition, although coverage varied widely. Studies have suggested that registration completeness was quite high in the Punjab (Dyson et al.), at least until Partition. Births and deaths by district and calendar year for the Punjab are available in the 1931 and (for India) 1951 census volumes.

Data Problems

One problem faced by any analysis by administrative entity is posed by boundary changes. Partition itself was a boundary change on a macro scale, but other less salient boundary changes of administrative units occur all the time. Of particular importance to this analysis was the treatment of the pre-1947 Princely States – areas not under direct British rule for which census data were not tabulated according to the standard Imperial Table system in 1931 and 1941, but were included in regular administrative units in the 1951 censuses of both India and Pakistan. Fortunately, the 1951 India Census carefully recreated 1931 and 1941 district populations comparable to the 1951 boundaries, thus indicating the size of the effect of boundary changes on population totals. The re-creation indicates that, for districts not directly affected by Partition (all districts on the Indian side except Amritsar and Gurdaspur), the effects were quantitatively

quite small, ranging from no change at all for one district (Kangra) to a maximum of about five percent of total district population (Gurgaon, inflated by about five percent by the inclusion of the Princely State of Pataudi).

A second problem facing this analysis is the lack of comparable age data across censuses. The 1931 Census tabulated age by single years up to five, then by five-year age groups up to 20, and then by 10-year age groups up to an open interval of 60 and over. The 1941 Census was not originally tabulated by age because of war-time economies, but was tabulated on a sample basis. In the case of the Punjab, this tabulation was carried out after Partition for the districts that remained in India (the so-called "Y" sample) for five-year age groups up to an open interval of 70 and over. The 1951 census of India was tabulated for the age group 0 to 4, then for ten-year intervals up to 65 – 74, and then for the open interval 75+. The 1951 Pakistan Census tabulated age by five-year intervals up to an open interval of 75+, but with a caveat warning about errors in age reporting.

The following section outlines the methods we apply to census data by age and sex to identify the demographic effects of Partition. In section 3, we present results of the application of these methods to data for the Punjab as a whole (both the Indian and Pakistani parts) and for individual districts not directly affected by boundary changes associated with Partition. Finally, we draw tentative conclusions about population changes in Punjab associated with Partition.

Methods

A variety of methods exist to estimate mortality levels. Mortality rates by age, sex and other characteristics can be calculated directly from registered deaths, appropriately categorized, and measures of exposure time derived from the census data. However, this direct method will not give good results for India because of errors known to be present in the data, most importantly omission of deaths from the vital records and age misreporting in both the censuses and the vital statistics (Bhat, 1990). As a result, we will have to use more robust, but less direct, methods of estimation.

The most direct of these indirect methods is the intercensal survival technique (United Nations, 1983). Data from successive censuses can be used to measure the survival of successive age cohorts from one census to the next. Thus, for example, the survivors in 1951 of the male population aged 5--14 in 1931 will be aged 25-- 34. Assuming that net migration is negligible, the ratio of the population 25--34 in 1951 to that aged 5--14 in 1931 measures the probability of survival from one age group to the next over the intercensal period, a standard life table function ($_{10}L_{25}/_{10}L_5$ in life table notation). The major problem (other than the migration assumption) with this method for application to India and Pakistan is the change in age categorization between 1931 and 1951, compounded by the lack of age information for 1941 for the districts of Punjab that became part of Pakistan. The method is also sensitive to a common form of age misreporting, namely age exaggeration. We calculate intercensal survivorship ratios only for the Punjab as a whole (to limit the potential effects of migration).

The change in age characterization between the 1931, 1941 and 1951 censuses (5-year age groups up to 20, then 10-year age groups up to an open ended age group 60+ in 1931and 1941,

the age groups 0, 1 to 4, then 10-year age groups up to an open interval of 75+ in 1951) complicates the intercensal survival application. There is only one common age group: 5--14. For other age groups, the 10-year age groups available by district for 1951 have been split into 5-year groups on the basis of the single-year age distribution available for the Indian Punjab as a whole. The 5-year age groups are then re-combined to match 1931 and 1941 age groups. It is thus assumed that the age structure of each 10-year age group in each district can be adequately approximated by the age structure of the Punjab as a whole.

For individual districts we use a method based on the demographic balancing equation, which expresses the tautology that population change over a period is equal to the balance between entries and exits over the period. This equation can be applied to age groups, as well as aggregate populations. For example, for the age group 20-24, entries are the number of persons who have 20th birthdays during the period plus persons aged 20-24 who migrate into the defined population, while exits are the number of persons who have 25th birthdays plus persons aged 20-24 who migrate out of the defined population plus the number of deaths of persons aged 20-24. Thus

$$ {}_5N_a\,(t+10) - {}_5N_a\,(t) = B_a(t,t+10) + {}_5IM_a(t,t+10) - B_{a+5}(t,t+10) - {}_5D_a(t,t+10) - {}_5OM_a\,(t,t+10) \qquad (1) $$

where ${}_5N_a\,(t)$ and ${}_5N_a\,(t+10)$ are the population aged a,a+5 at time t and time t+10 respectively, $B_a(t,t+10)$ and $B_{a+5}(t,t+10)$ are the numbers of persons having a^{th} and $(a+5)^{th}$ birthdays between t and t+10, ${}_5IM_a(t,t+10)$ and ${}_5OM_a\,(t,t+10)$ are the numbers of immigrants and outmigrants aged a,a+5 between time t and t+10, and ${}_5D_a(t,t+10)$ is the number of deaths of persons aged a, a+5 between t and t+10. Our interest in this section is to estimate net loss, so equation (1) can be re-arranged as follows:

$$ {}_5D_a(t,t+10) + {}_5IM_a(t,t+10) - {}_5OM_a\,(t,t+10) = {}_5N_a\,(t) - {}_5N_a\,(t+10) + B_a(t,t+10) - B_{a+5}(t,t+10) \qquad (2) $$

${}_5N_a\,(t)$ and ${}_5N_a\,(t+10)$ are available from the (adjusted) census data. The numbers of persons having a^{th} birthdays are estimated from the age distributions as follows:

$$ B_a(t,t+10) = 10*({}_5N_a\,(t) * {}_5N_{a+5}\,(t+10))^{1/2}/2) \qquad (3) $$

The left hand side of equation (2) is an estimate of net loss due to both mortality and net out-migration. A net loss *rate* can be obtained by dividing the net loss number by an estimate of person-years lived, approximated for this analysis as $10*({}_5N_a\,(t)* {}_5N_a\,(t+10))^{1/2}$. In the absence of net migration, the net loss rate estimates the average age-specific death rate for the interval t, t+10. Assuming that net migration at the district level was modest for the intercensal period 1931-1941, we can use loss rate estimates as approximations to baseline mortality rates by age and sex, against which loss rates for 1941-1951 can be compared. The loss rate estimates for 1941-1951 confound mortality and migration. At the present stage of our analysis, we are not able to disentangle these two effects. Future analyses using information on birthplace and

numbers of persons reported in 1951 as displaced will help to put broad indicators of magnitude on the two components.

This methodology can only be applied to districts that remained in India, because of the availability of the "Y" sample age distribution for 1941. Even then, a number of data adjustments are required before this methodology can be applied, since the method requires population numbers by 5-year age groups. The 1931 census data for 10-year age groups have been split into 5-year groups using the sex-specific structures indicated for each district by the "Y" sample. The 1951 10-year age groups have been split into 5-year groups using the structures of the all-Punjab single year of age distribution.

Once loss rates for 5-year age groups are available, summary measures of loss can be calculated from the age-specific loss rates by converting them into the equivalent of life table probabilities of surviving. A convenient summary index for the data is the probability of loss between the ages of 15 and 60, equivalent (if the only source of loss were mortality) to the life table probability of dying between 15 and 60 ${}_{45}q_{15}$.

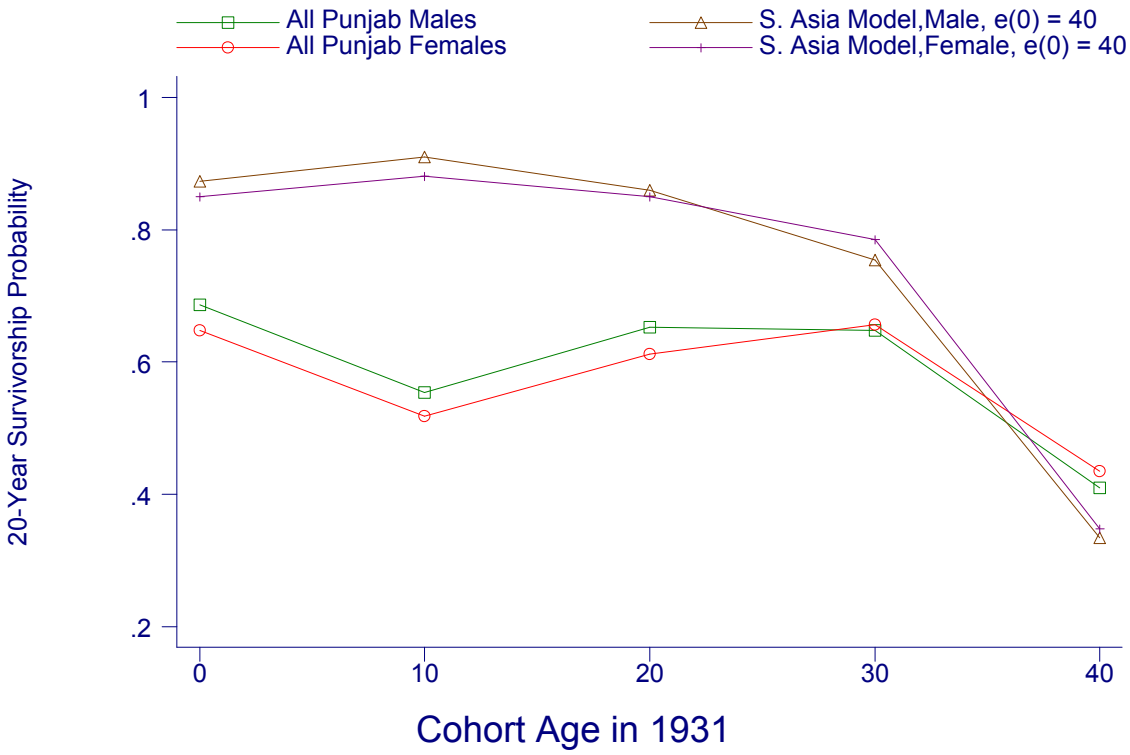
IV. RESULTS

*"**All** Punjab" Results*

Analyses of population change by district are complicated by both boundary changes and the confounding of mortality and net migration inherent in the estimation methodology we are using. One approach for dealing with census-to-census changes in district boundaries is effectively to ignore them by carrying out an analysis on the basis of virtually the entire area of the former Punjab province as it existed at the time of the 1931 Census. Such an analysis also mitigates the confounding of mortality and migration, to the extent that a substantial portion of the forced migration at the time of Partition took place within the Punjab. Subsequent analysis will attempt to quantify this extent. Analyses by groups of districts that remained in India or became part of Pakistan (while not being geographically affected by Partition) also mitigate the boundary change problems, but do not reduce the confounding of mortality and migration since the flows of migrants are unlikely to offset one another.

To take advantage of the benefits of combining district information from 1931 and 1951 into an "all-Punjab" analysis, we have calculated 20-year cohort survivorship ratios for cohorts aged 0-9, 10-19, 20-29, 30-39, and 40+ in 1931. Figure 1 presents the results, comparing the Punjab male and female survivorship ratios with those obtained from the UN South Asia model life tables with a life expectancy at birth of 40 years (UN 1982). Although these survivorship estimates include the impact of both mortality and net migration, it is anticipated that at the all-Punjab level, the impact of migration will be only moderate. The graph shows much higher net loss (assumed to be largely mortality) for both women and men under age 40 than implied by the model life tables. Survivorship is particularly low for the cohort aged 10-19 in 1931, a cohort that would have been aged 26-35 at the time of Partition. The analysis also shows slightly higher survivorship for males in cohorts initially under age 30, after which female survivorship surpasses that of the males, as in the UN models.

Figure 1. Cohort Survival, "All" Punjab: Twenty Year Survivorship Ratios to 1951 of 1931 Population aged x, x+10



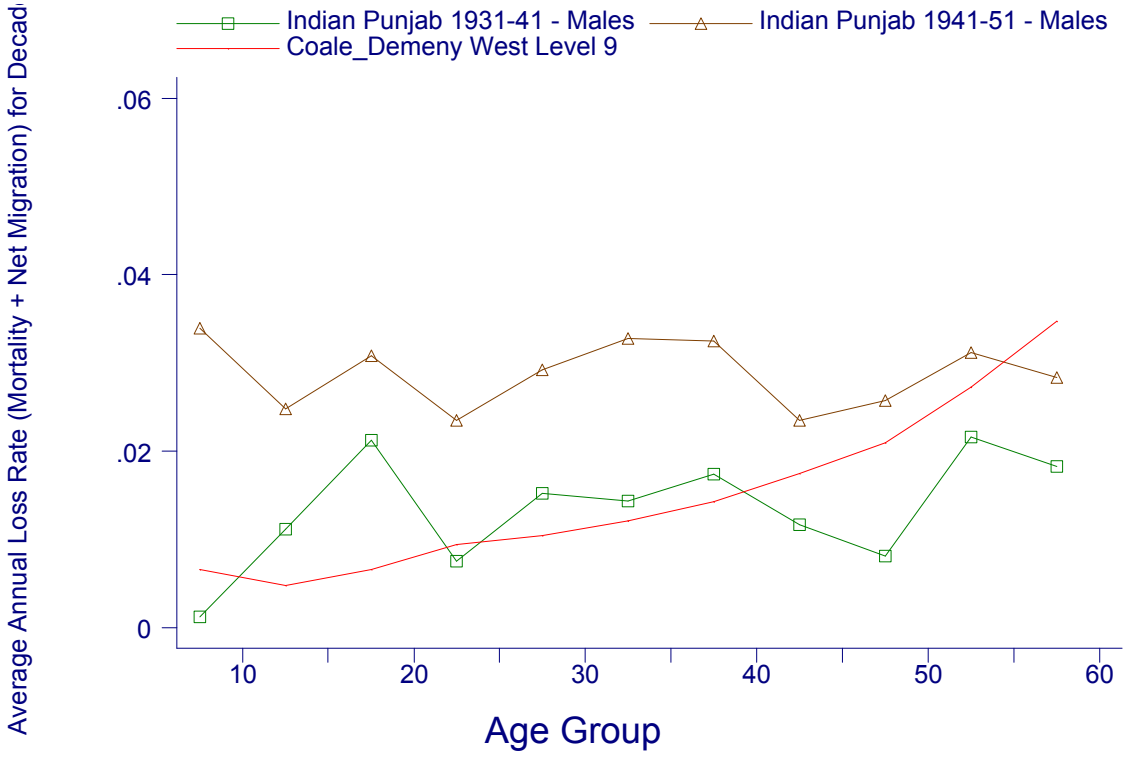
District-level Results

The first analysis pools the data for all Punjab districts that remained in India, with the exception of Amritsar and Gurdaspur (which were directly affected by territorial transfers at Partition). Original age groups have been split into 5-year groupings where necessary, using the 1941 "Y" sample to split the 10-year and open-ended age groups from 1931, and using the 1951 single year age distribution for the Punjab at large to split the 1951 10-year groupings. Adjustment for boundary changes have been made at the district level prior to pooling by multiplying the 1931 and 1941 district populations by the ratio of the constructed 1931 and 1941 totals (by sex) consistent with 1951 boundaries to the recorded census totals.[i] Figure 2 shows estimates of loss rates by age group for males (Panel A) and females (Panel B) for the two periods 1931-1941 and 1941-1951. Also shown are age-specific mortality rates from Level 9 (female e(0) of 40 years) Coale-Demeny "West" model life tables.

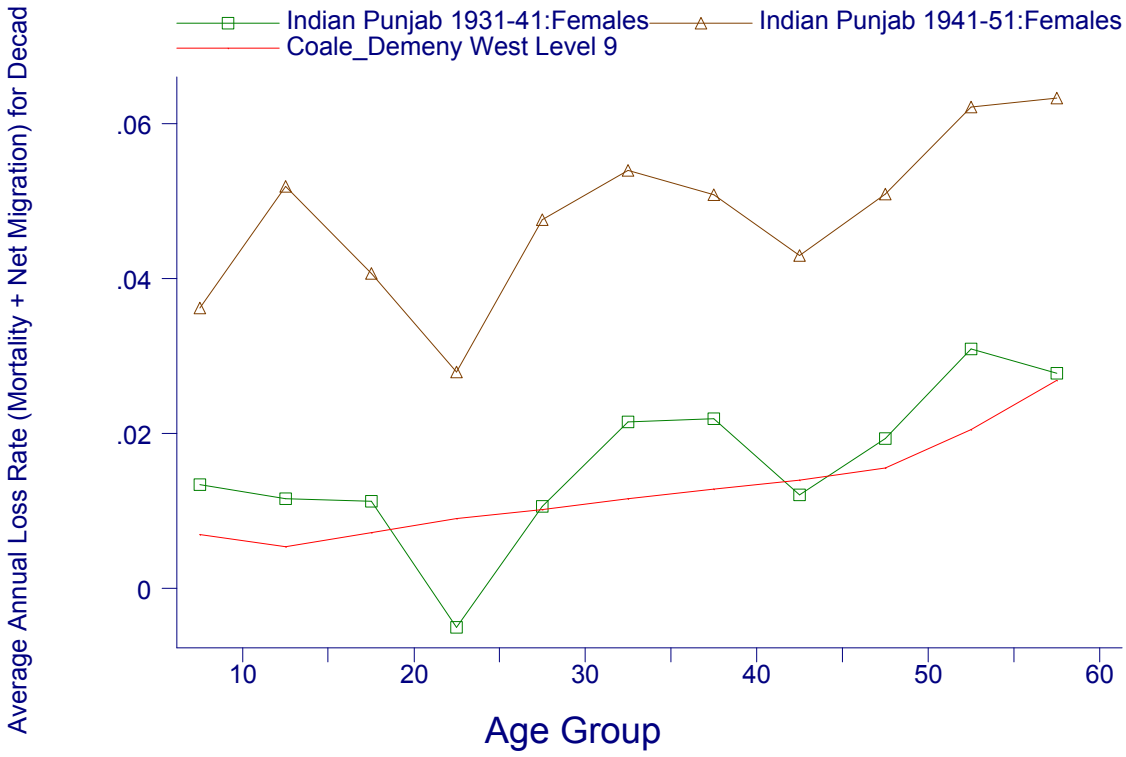
The loss rates for the period 1931-1941 approximate the Coale-Demeny "West" Level 9 mortality rates reasonably closely, especially for females. The somewhat lower loss rates for males over age 40 relative to the model may be associated with age exaggeration among the elderly. The similarity of pattern by age for each decade is also probably explained by typical patterns of age misreporting that occur in each of the three censuses. The loss rates for the period 1941-1951 are all higher than for the period 1931-41, by on average about two percent per annum. The differences are particularly large for females. It should be borne in mind, as already

Figure 2: Age-Specific Loss Rates, 1931-1941 and 1941-1951: Indian Punjab

Panel A Males



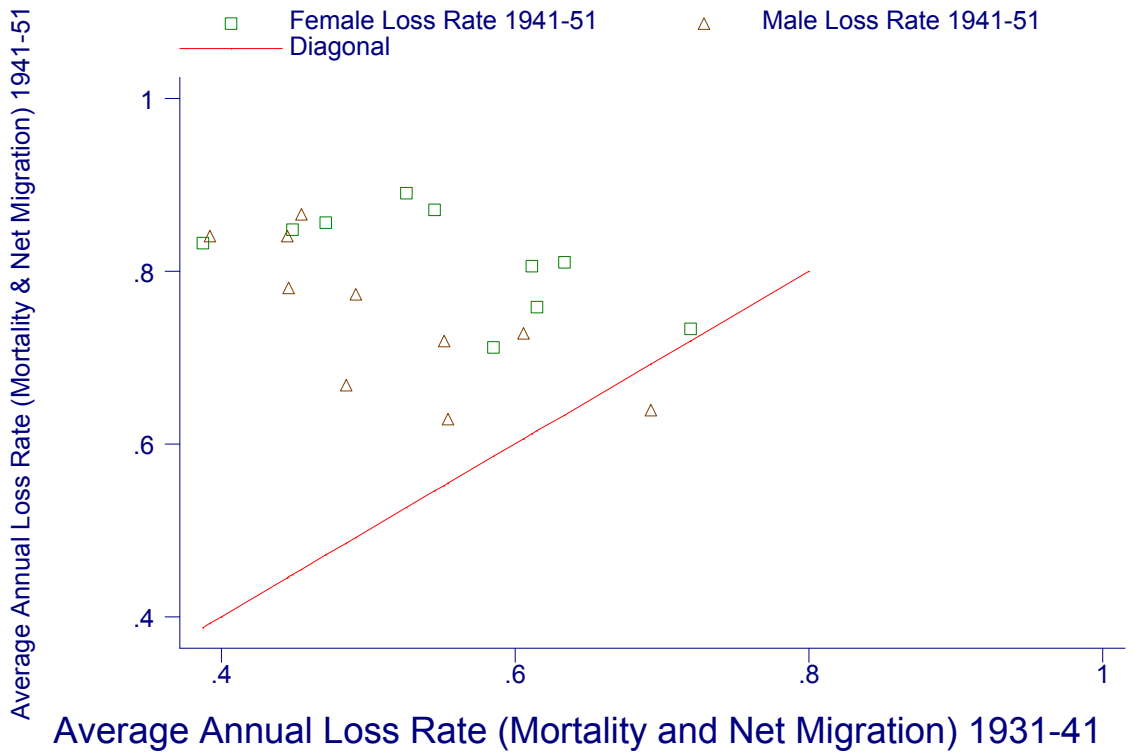
Panel B Females



noted, that the loss rates combine both mortality and migration effects, and from an analysis of the age distribution alone it is not possible to sort out the relative magnitudes of the two effects.

Summary measures of loss can be calculated from the age-specific loss rates by converting them into the equivalent of life table probabilities of dying. A convenient summary index for the Indian data is the probability of loss between the ages of 15 and 60, equivalent for mortality alone to the life table probability of dying between 15 and 60, ${}_{45}q_{15}$. For the pooled districts, the loss rates between the ages of 15 and 60 were 0.492 and 0.528 for males and females respectively for the period 1931-41. The rates for the 1941-51 period were much higher – 0.773 for males and 0.891 for females. Figure 3 plots the 1941-51 loss rates by district against the corresponding 1931-41 loss rates (the district of Karnal has been excluded from this figure because of implausibly low loss rates between 1931 and 1941). With the exception of one district (Gurgaon, which accounts for both the points close to the diagonal), loss rates are uniformly higher for the 1941-51period than for the 1931-41 period. The loss rates for the earlier period are mostly in the range 0.40 to 0.60, whereas for the later period they are mostly in the range 0.70 to 0.85. The increase in loss rate is somewhat greater in general for females than for males.

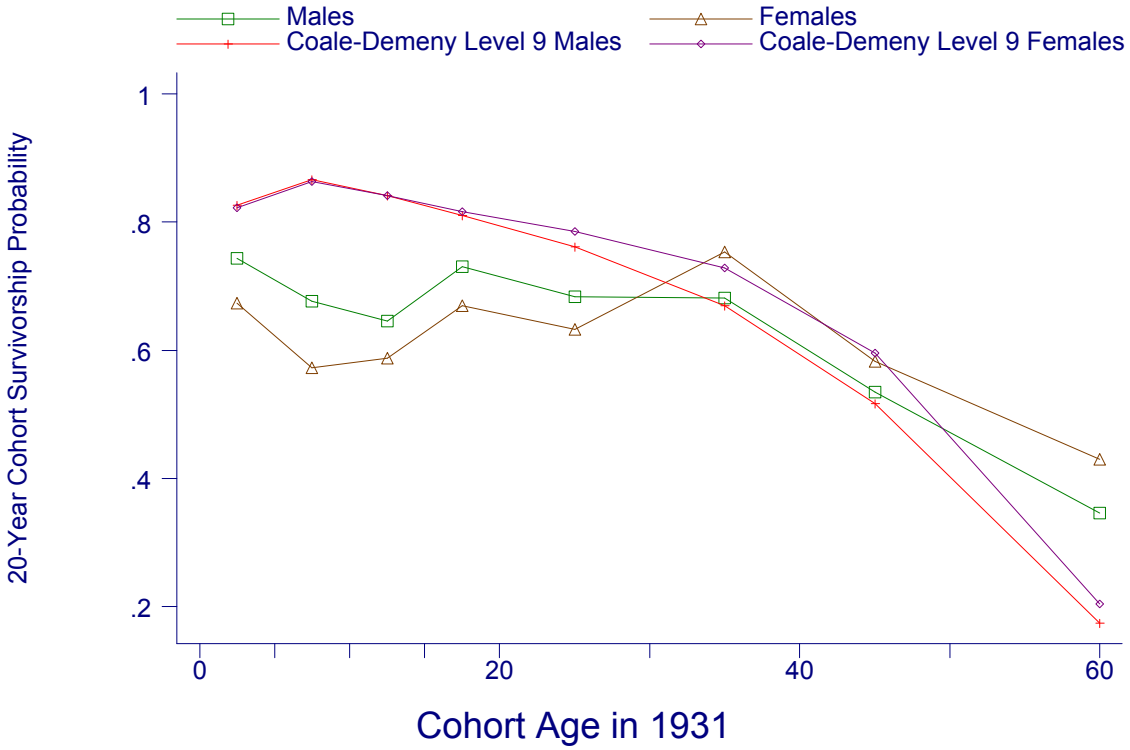
Figure 3: Summary Loss Rate Age 15 to 60 1941-51 by Loss Rate 1931-41 by Sex and District (Indian Punjab)



The analysis conducted for districts of India cannot be repeated for Pakistan because the Pakistan Census Commissioner did not create a sample age distribution from the 1941 Census after Partition. Thus there are no base line 1931-41 loss rates for comparison purposes and no loss rates for 1941-51. However, in two respects the analysis of data for districts of the Punjab that became part of Pakistan is somewhat simpler: the 1951 Census of Pakistan tabulated age by five year age groups up to 70 and over, making it possible to calculate cohort survivorship probabilities from 1931 directly; and the districts of Pakistan not directly affected by Partition were less affected by the absorption of Princely States than those that remained in India.

Figure 4 shows 20-year survivorship ratios for the pooled districts of Pakistan Punjab from 1931to 1951 for the 5-year and 10-year age groups available for 1931. These survivorship ratios are compared with corresponding survivorship ratios from the Coale-Demeny (1983) "West" model life table Level 9. For all cohorts below age 30 in 1931, the survivorship ratios for Pakistan Punjab are substantially below those of a Coale-Demeny "West" Level 9 model life table (expectation of life at birth for women of 40 years). The excess loss is particularly notable for females. For cohorts aged 30-39 and 40-49 in 1931, the survivorship probabilities correspond closely to the model life tables. The higher survivorship of the 60+ cohorts in 1931 relative to the models is probably a result of age exaggeration in both censuses.

Figure 4: Cohort Survivorship, 1931 to 1951: Pakistan Punjab and Coale-Demeny Models



Population Change by Religious Community, 1931-1941-1951

An obvious consequence of the population displacements in the Punjab around Partition is the remarkable homogenization of the district populations by religion. Table 1 shows the percentage composition of district populations by religion in 1941 and 1951. Districts whose boundaries were directly affected by Partition, for which a before-an-after comparison is misleading, are in brackets and are excluded from the discussion below. The final row shows figures for the combined Punjab, adding district figures from 1941 and 1951across all districts.

In 1941, in only four districts (Kangra, Karnal, Rohtak and Simla) was the population more than two-thirds Hindu; in 12 districts the population was more than two-thirds Moslem: no district was majority Sikh. In 1941, only three districts of the Punjab had less than 28 percent Moslem population. In 1951, eight districts were more than two-thirds Hindu; all 15 of the districts that became part of Pakistan were more than 90 percent Moslem; three districts were majority Sikh. Only one district that remained in India had more than 2.5 percent Moslem population (but that one, Gurgaon, had 17 percent, a major outlier). Only one district that became part of Pakistan (Sialkot) had more than one percent of its population Hindu in 1951, and no district that became part of Pakistan had more than a handful of Sikhs in 1951. In general, there is some indication of a pattern of flight to security, that is, moving to districts with an existing high proportion of that religious community. The districts that were two-thirds or more Hindu in 1941 all exceed 80 percent Hindu in 1951, and the districts 20 percent or more Sikh in 1941 all exceed 50 percent Sikh in 1951. Naturally, it is the majority Moslem districts in 1941 that become almost exclusively Moslem in 1951, since Partition was based upon population distribution. It is notable, however, that the proportion of Moslems in a district that remained in India did not have the effect of reducing the exodus: the Moslem populations of both Jullundur and Ferozepur, the districts remaining in India that had had the highest proportions of Moslems in 1941, declined to less than one half of one percent by 1951. Similarly, the two districts becoming part of India that had had over 20 percent Hindu population in 1941, Mianwali and Multan, had less than one hundredth of one percent Hindu in 1951.

It is interesting to note that the district in Indian Punjab that retained a substantial proportion of its Moslem population in 1951, Gurgaon, is also the district that showed no major change in loss rate for the period 1941-51 relative to its loss rate 1931-41 (Figure 3). Further exploration of the special circumstances operating in this district at the time of Partition may throw light on potential protective factors reducing forced displacement.

For the Punjab as a whole (summing the religious community numbers for each district in 1941 and 1951, and therefore minimizing effects of boundary changes) the percentages of both Hindus and Sikhs drop slightly (by about one percentage point each) while the percentage of Moslems increases somewhat (by four percentage points). Since we are unable in this analysis to distinguish the effects of migration and mortality, either factor may account for this change, as could differential changes in census coverage from 1941 in India and Pakistan respectively. A migration interpretation might be that Moslems from areas of India other than the Punjab moved into Punjabi part of Pakistan at Partition, while Hindus and Sikhs from the Punjabi part of Pakistan moved into areas of India other than the Punjab. A mortality interpretation would be greater excess mortality among Hindus and Sikhs than among Moslems.

TABLE 1: Percentage Composition of selected Punjab District Populations by Religion: 1941 and 1951

District	Hindu		Sikh		Moslem	
	1941	1951	1941	1951	1941	1951
Districts that remained part of India						
Hissar	64.8	91.3	6.0	7.7	28.3	0.3
Rohtak	81.6	98.5	0.2	0.7	17.4	0.2
Gurgaon	66.2	82.1	0.1	0.7	33.8	16.9
Karnal	67.0	90.3	2.0	8.9	30.6	0.3
Ambala	48.4	72.2	18.5	24.6	31.7	2.4
Simla	76.4	80.8	2.7	16.1	18.2	1.4
Kangra	93.2	96.0	0.5	2.0	4.8	0.7
Hoshiarpur	49.9	72.8	16.9	26.0	32.4	0.1
Jullundur	27.6	40.7	26.5	54.0	45.2	0.2
Luhiana	20.4	37.3	41.6	61.6	37.0	0.4
Ferozepur	19.6	38.1	33.7	58.8	45.1	0.4
Amritsar	(17.7)	(27.7)	(35.2)	(70.6)	(45.4)	(0.3)
Gurdaspur	(25.9)	(49.6)	(18.8)	(41.7)	(50.2)	(1.3)
Districts that became part of Pakistan						
Lahore	(16.3)	(1.0)	(18.4)	(0.0)	(61.0)	(94.7)
Sialkot	19.4	1.0	11.7	0.0	62.1	93.8
Gujranwala	11.8	0.1	10.9	0.0	70.5	94.3
Sheikupura	9.1	0.0	18.9	0.0	63.6	95.0
Gujrat	7.7	0.0	6.4	0.0	85.6	99.9
Shahpur/Sargodha	10.1	0.0	4.8	0.0	83.7	99.2
Jhelum	6.5	0.0	3.9	0.0	89.4	99.8
Rawalpindi	10.5	0.0	8.2	0.0	80.0	99.6
Attock	6.4	0.0	3.0	0.0	90.4	99.9
Mianwali	20.3	0.0	1.2	0.0	78.4	99.9
Montgomery	14.4	0.0	13.2	0.0	69.1	98.5
Lyallpur	7.2	0.0	19.8	0.0	66.0	97.0
Jhang	15.9	0.0	1.5	0.0	82.5	99.9
Multan	20.5	0.0	5.2	0.0	72.4	99.3
Muzaffargarh	12.7	0.0	0.8	0.0	86.4	100.0
Dera Gazi Khan	10.9	0.0	0.2	0.0	88.9	100.0
Total, All Punjab	27.8	26.4	13.2	12.1	55.9	59.9

Note: Bracketed values are for districts the geography of which was fundamentally changed by Partition

Discussion and Conclusions

This exploratory (and still preliminary) analysis of 1931, 1941 and 1951 census data demonstrates the magnitude of the population upheaval that occurred during and immediately

after the Partition of India in 1947. From being not strongly segregated by religion at the district level in 1931 and 1941, the population of the Punjab became highly segregated in 1951. Age-specific loss rates at the district level between 1931 and 1941 were broadly consistent with model life tables with an expectation of life at birth for females of about 40 years, but these loss rates for the districts that remained in India were substantially higher for the period 1941 to 1951. Intercensal survival ratios for the overall period 1931 to 1951 for the districts that became part of Pakistan were also lower than those of the model life tables. In general, loss rates were more elevated for females than for males. Whether these high loss rates represent migration to areas outside the Punjab, or whether they reflect excess mortality during the period 1941-1951, remains unclear. Once we have expanded the analysis to other areas of the Indian sub-continent, and reviewed additional census data on birthplace, we will be able to draw conclusions about the relative magnitudes of the migration and mortality effects.

This analysis makes extensive use of the 1941 Census of India. This Census, which was only partially tabulated because of the Second World War, has the reputation for having been adversely affected by political movements in 1941. However, the results of the 1931 to 1941 comparisons for the Punjab districts that remained in India in 1947 look in general to be plausible. Of course, the data are affected by errors, for example a tendency to exaggerate the age of the elderly. Comparisons are also affected by differences in tabulation schemes for 1931, 1941 and 1951, particularly in terms of age groups and religious communities, and by changes in administrative areas. On the whole, however, the plausibility of the 1931 to 1941 comparisons gives us increased faith in the provisional results derived from the comparison of 1941 and 1951 data.

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[i] The 1951 Census volumes for India provide population counts by district and sex for 1931 and 1941 for district boundaries as they existed in 1951 (differing primarily as a result of the incorporation of Princely States into district populations in 1951). The 1931 (1941) population age distributions have been adjusted to make them comparable with the 1951 district populations by multiplying by the ratio of the 1931 (1941) district population reported in 1951 to the 1931 (1941) district population reported in the original census report. We have therefore assumed that the populations gained or lost by boundary changes between 1931 and 1951 had the same age distribution as the original population.