Population Size and Growth in Pakistan Based on Early Reports of 1972 Census

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Introduction

Census reports are the primary source of information on population characteristics. Fundamental among these characteristics are population size and growth, but census reports are often used to evaluate other features of a population such as reliability of age reporting, extent of literacy, adequacy of occupational reporting, and level and pattern of unemployment. In this paper, we take a preliminary look at the 1972 Census of Pakistan in order to determine its overall suitability as a source of information on population of the country.

The quality of census data depends not only on the technical capacity of the statistical arm of the government, but on the characteristics of the society as well. For example, even the advanced statistical and survey technology available in the United States is inadequate to deal with the more volatile nature of society. Near completeness of coverage is achieved only in a few countries such as Holland, Denmark and Switzerland, with high degrees of social cohesion[1] and where population censuses are kept in close administrative check.

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[1]Low social cohesion need not be an inherent and constant characteristic of a society. It can be imported, as the alleged 2 or 4 or 8 million illegal immigrants in the United States, who prefer to be fugitives from justice there, than safe and legal citizens in their own countries. It can also arise in response to developments, such as the tendency for linguistic, or tribal or national groups to overrepresent themselves in order to increase their clout at the federal level, as was apparently the case in Nigeria, first in 1962 (insufficiently corrected in 1963), and then to a greater extent in 1973.

Pakistan has had three censuses of population in 1951, 1961 and 1972. The 1951 census data were, however, not evaluated in sufficient detail. Following the 1961 census of population and the 1960 census of housing, a series of evaluation studies [2, 19, 21, 25, 26, 31, 56, and 60] had clearly established that there was a substantial underenumeration of population in 1961. The implications of this underenumeration on the estimates of population growth during the previous decade, on population projections and on other demographic variables of interest were pointed out by both official and non-official analysts [9, 11, 18, 20, 44, 51 and 57]. For the 1972 census the evaluative process is well under way [3, 4, 7, 8, and 29]. In an earlier article [29] the 1972 population totals and associated growth were discussed in the light of the 1972 Census Evaluation Survey. In this article, these totals and associated growth are discussed in the light of age and sex distributions available in several District Census Reports (DCR) that are now available for 23 districts out of the total of 61 districts. When results in related and relevant characteristics are available for the country as a whole a more definitive analysis can be undertaken.[2]

Planning Implications of the Variations in Estimated Population Size and Growth

In a way, population size is an unimportant variable, because whatever is the size not much can be done about it. Other indicators which are important nationally and are tied to the population size partly or entirely (such as various contributions to the national income estimates based on, say, numbers in a given occupation) would probably respond to any estimate of underenumeration or overenumeration proportionately, and would leave various averages largely unchanged. Certain estimates of Pakistan's wealth and products are likely to move in sympathy with the changing estimates of the population and leave, at least, on paper the planner as happy or unhappy as he was before.

But one population factor of crucial importance is natural increase. It shows how soon, if ever, certain national programmes will catch up with the population size. Programmes that increase annually by less than the natural increase will "never" catch up unless accelerated. For finite resources, the rate of natural increase is an indicator of how soon the limit will be reached (space, irrigation water, drinking water). It may even be used in place of the dependency ratio as an indicator of the current burden on the productive forces of the society.[3]

Analytical Approaches Available

These can be meaningfully grouped under three headings: models, internal consistency and external evidence. Models cover a variety of possibilities. One can begin with simple propositions[4] such as: sexes are about evenly divided in a population and large departures in totals or in any particular age group require an articulation of causes; a large proportion of children means

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[2]If the conclusions of this article are even approximately valid, then the likelihood that any definitive results from such a "final" analysis will become possible, is somewhat limited.

[3]The current burden on the productive resources of the society are sometimes confused by economists with the long term burden of "wasteful" demographic investment [24]. Since the work by Durand [15], Demeny [14], and others, this confusion is no longer justifiable.

[4]For these proportions, note that the reported age distribution will be covering only the population of the country whose ages were collected. It will not be applicable for the millions in the CATA (Centrally Administered Tribal Areas), and possibly some other areas where no age data were collected. These were 2,679,000 in 1951 and 3,438,000 in 1961.

high birth rates, at least for a few previous years.   More generally, if the same age group (e.g., 15-19 in 1961 and 15-19 in "1971")[5] shows similar idiosyncrasies then we are probably confronted with the enumeration artificat.   If the same age cohort (e.g. 15-19 in 1961 and 25-29 in "1971") shows similar idiosyncrasies, then we are more likely to have a real demographic phenomenon.

There are also more rigorous approaches, steeped in advanced demographic theory, the best known of which are the stable and quasi-stable population theory.   They rest on the not unreasonable supposition that the age distribution of a population reflects its past fertility and mortality experience. Mortality is an important determinant of natural growth of a population: the lower the mortality the faster the population growth.   Mortality is unimportant in determining the proportionate age disribution.   Generally, all age groups in a population are subject to a similar mortality level.   Of course, the age specific mortality curve is heavily U-shaped, that is age selective, but relative to the importance of fertility, which all happens at age zero, proportions at each age group remain about the same whatever, within reason, the level of mortality.   Like an onion with peeled off layers of its skin, the age pyramid retains basically a similar shape whatever the thickness of the peeling.   It is fertility that decides whether an age pyramid is wide bottomed (high fertility) or narrow bottomed (low fertility).   The life table, celebrated inside and outside demography, is another model used to summarize human mortality experience.   The life table is seldom an exact reflection of reality in any one year, but is always close enough to represent reality for almost all situations.

The trouble with models is twofold.   First, one is never sure whether a given model applies to our population.   And second, models encourage the use of "plausibility" when computed with uncertain data.   In final analysis plausibility becomes a dirty word.   It justifies a choice between large differences, say, a crude birth rate of 50 estimated from one approach and a crude birth rate of 35 estimated from another approach, but it is powerless when a choice has to be made between a birth rate of 50 and 45.   Particularly when the latter rate is suggested after some years of the existence of family planning programme, the temptation to choose the plausible 45 is almost irresistible.

Internal consistency relies on such simple propositions that boys aged 10-14 in 1961 should be enumerated as men aged 20-24 in 1971.   If in 1971 there are markedly fewer of them than in 1961, i.e. markedly fewer than can be explained by mortality, and if there is no evidence of outmigration and no evidence of emigration,[6] then either the boys in 1961 were overreported or the men in 1971 were underreported.   We then look for further internal evidence to make the choice.   If the men reappear aged 30-34 in 1981 then we think that they were underreported in 1971. If the boys 10-14 in 1961 are consistent with children aged 0-4 in 1951 or consistent with other neighbouring age groups in 1961, that again provides us with some additional evidence that boys 10-14 in 1961 were counted correctly.   This evidence weighed against all other evidence might help in expressing an objective preference.   The trouble with this type of deductive reasoning is that with really inquisitive minds there is no end to the doubts that may arise.   An extreme example of such inquisitiveness

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[5]There are, of course, no reported data for 1971.   As explained latter we interpolated Jan. 1971 between Jan. 1961 and Sept. 1972.

[6]We follow the convention that outmigration (and immigration) refer to internal movements, while emigration (and immigration) refer to external movements.

is the explanation of a hole at ages 25-29 with a swelling at ages 60+. One could argue that the reported ages 60+ are really persons aged 55-59; persons reported 55-59 are really 50-54 and so on until we find that we miss those aged 25-29 because they were reported aged 30-34. Thus, in the very face of determined believers of such a domino theory, much of the analytic power of this approach breaks down.

External evidence from sources other than the census data which contain demographic characteristics is based on registrations of vital events for various purposes, registers of population under different circumstances, and results from social and health surveys. The data from these sources is usually more suited to determine the patterns rather than the levels for demographic variables. The difficulty with external evidence is the danger of one's own subjectivity and that of others. One tends to choose results that support one's tentative conclusions. To use all available sources of data might make the conclusions too cumbersome for presentation. Assessing the reliability of available external data might be impossible if the reporting agency does not disclose all the relevant facts, or invidious in certain socio-psychological circumstances.[7]

This article relies mostly on internal evidence and to a limited extent on models, in which respect it is somewhat different from our other work in this area.[8] External evidence is used sparingly, partly because of its uncertain reliability and partly to limit our argument to the length of an article.[9]

Current and Historical Estimates of Population Size

It is generally agreed that the subcontinent has quite a tradition of manipulating the census results. In 1931 the census enumeration suffered from the civil disobedience campaign and the totals were low. In 1941, the agitation in favour of communal rolls made them high. Thus the intercensal increase between 1931 and 1941 was double of what it was in the previous decade or in the following decade [45]. Be that as it may, the subsequently reported 1951

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[7]This might be especially so in the prevailing circumstances where international agencies, learned journals, national governments reward elegant presentation more than dirtying one's fingers and elbows in back breaking daily work in the field. Continuously arising new ideas are another disadvantage in this connection. One can spend one's whole professional life butterflying from single round surveys to multi-round surveys, to followup surveys, to sample registration, to dual record systems, to playing around with the Som curve, to varying the recall period and the frequency of interviews and the matching frequency to applying the randomized technique, to refining the capture-tag-recapture technique, to developing new matching principles and record linkages, to asking the orphanage questions, to using the own children technique—all the time making the best of impressions, not once delivering the goods.

[8]The analytic power of age pyramids coming from successive censuses does not depend entirely on their conforming to requirements of the stable and quasi-stable population theories as some writers imply [54] or even say explicitly. Much of the potential under enumeration and/or over enumeration, and much of the confusing noise introduced by erroneous age reportings can be brought to light through detective work, stable theory or no stable theory. Even the number of children reported, apart from the two sources of errors (incompleteness and age mis-statements), must have been substantially the outcome of recent fertility, irrespective of whether the fertility rate was steady as required by the two theories or not.

[9]The sometimes bewildering variability and the sizeable quantity of analytic endeavours concerning population parameters for the population of Pakistan deserves a critical assessment of their stability, reliability, and validity. An opening is being made with regard to life tables [35], but other parameters are also becoming numerous enough, such as projections (more than twenty), estimates of age at marriage (almost ten), various other aspects of nuptiality and the like, to justify critical amendments.

total[10] of 33,740 [31, p. 284] looked plausible in comparison with 1931. Furthermore, the vision of the 1941-51 change must have been blurred considerably by the partition of the subcontinent and the associated large scale displacement of population, increased mortality partly due to violence, and fertility apparently averted during these disturbances. The 1961 total of 42,880 [31, p. 284] occasioned some surprsise, because it was on the high side in comparison with the 1951 total. Also in the light of the then prevailing beliefs regarding the rate of natural increase, a small total was expected. Subsequent demographic analysis has shown that there was actually an underenumeration of the population during the 1961 census. While the exact estimate of underenumeration varied among researchers from a low 2.8 million [9] to a high 5.4 million [57], seven out of eight analytic attempts maintain that there was considerable underenumeration [9, 11, 18, 20, 31, 51 and 53].[11] The sole exception is one of the several government population projections [44][12]. However, the estimates of considerable underenumeration were accepted and used by the government [1, 8, 48, 51 and 53].

These estimates of 1961 underenumeration were all based on an age-and-sex analysis. In other words they were based on perceived age and sex selective errors after suitable allowances were made for compensatory age reporting errors between age groups. That type of analysis is inappropriate when areal omissions take place. In 1961 there was no evidence of such an occurrence, except some slight possibility of missing the nomads from the population count [34]. The areal omissions are, however, more likely to have happened in 1972.

The 1972 census reported a total population of 64.9 million which was a surprise to almost everybody. It was a surprise in view of several indicators to the contrary. These are: the reportedly increasing effectiveness of family planning programmes [58]; the delayed effectiveness of health programmes; the effects of the two wars with India; only minor net gains in population from Bangladesh and the fact that other countries on the subcontinent reported totals that implied some breaks in the population surge. Overenumeration was suggested [7] immediately and somewhat impressionistically, but this was countered with hypothesized underenumeration [3 and 4].[13] It is this unexpectedly large population size that is one of the two main concerns of this article.

Current and Historical Estimate of Population Growth

By the time Pakistan entered seriously into the field of economic planning, the rate of population growth of 1.4 percent per annum was assumed to

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[10]These totals quoted are exclusive of non-Pakistanis. We obtained verbal assurances that all substantive 1972 tabulations for Pakistan will be produced without non-Pakistanis. This is confirmed by footnotes on the cover page of the statistical part of such district census reports as became available, where the statement is consistently repeated that "These tables exclude foreigners" [for example, 43]. However, the footnote in 1972 bulletin No. 1 [42] seems to contradict this belief in as much only the 1961 totals seem to be exclusive of non-Pakistanis.

[11]A first summary of these views is given in Table 1 of [30]. An amended and enlarged summary will be available in [28, Table 8.1].

[12]To "prove" its case census Bulletin No. 7 even suggested that 53,000 females reported themselves as males, with no evidence cited, just to smooth the age pyramid and to avoid the possibility that these women were underreported: instead they allegedly paraded as men.

[13]For a brief summary of these two views on the 1972 population total See [29, pp. 182 and 185].

prevail [50, p. 331 and 59, p. 305]. It is likely that the greater ease with which books of the national economy can be balanced with a lower rate of population growth in comparison with a higher rate of population growth, provided some inducement for the stubborn persistence of the belief (or hope, to be precise) in the low rate of 1.4 percent per annum. Bits of evidence here and there suggested an early increase to 1.8 per cent. Based on the reported size of poplation in 1951 and 1961 censuses, the rate of growth was 2.2 percent [46]. One of the authors of this paper had estimated the rate to range between 2.6 percent to 2.8 percent around 1961 and had argued that the rate of 2.2 percent per year was an average rate over ten years [33, p. 304 and 51, p. 301]. Some argued that the actual rate was 3.2 percent. The Family Planning Programme accepted 3 percent rate of growth for planning purposes [1, p. 569]. Finally, the 1972 total has shown an average rate of change between the 1961 and the 1972 census of 3.6 percent.

This latter rate was found to be consistent with at least some analytic evidence that resulted in a preliminary estimate of 3.4 percent [29, p. 192, and 54, Table viii]. Is this the end of the continuing increase in growth estimates over the last twenty years of demographic history of Pakistan? It better be, for biological reasons, although two economists talked of the possibility of 4 per cent, "the spectre that haunts the nation" [17, p. 38]. A rate of natural increase of 35 per thousand requires, for example, a crude birth rate of 50 and a crude death rate of 15 or a similar, mutually consistent combination adding up to a net of 35. Any birth rate more than 53 or death rate less than 12 would stress credulity. These critical values for the birth and the death rates would imply a rate of 4.1 percent per annum for Pakistan. Such a rate is unheard of in the demographic annals for any sizeable population. So 3.6 is probably the upper limit for the rate of population growth in Pakistan. The second question that we will be asking ourselves in the remaining parts of this article is whether 3.6 is an artifact of reporting or a true phenomenon.

Peculiarities of the Reported Age Distributions

We have at our disposal the age distributions for the whole of the country in 1951 and in 1961. For 1972, the avaliable age distributions from the census cover only 23 districts out of 61 districts and is, therefore, referred to as "1972".[14] Two types of comparison are possible between 1961 and 1971: with the same 23 districts in 1961, when the year is called "1961" and the less justified comparison with the proportionate age distribution for the whole country when the year is called 1961 (without quotation marks). Necessary and helpful comparisons are made between the absolute numbers (as distinct from proportions) at given age groups between 1961 and "1971". The latter refers to the 23 districts brought back from 1972 through a deduction of 6 percent to allow for the passage of time between the enumeration of September 1972 and January 1971, exactly ten years after the 1961 enumeration.[15] The proportionate age distributions of

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[14]The proportions stated: 23 districts out of 61 is somewhat misleading. Out of the 61 districts age distribution data for only 51 districts will ever be available. For the others age data were never collected. Thus, we had almost half the population by size, even if it came from non representative parts of the country.

[15]The 23 districts available to us were all outside the Punjab province, the core province of Pakistan, and consisted of: in North West Frontier Province, all ten, except Hazara; in Sind province: Jaccobabad, Larkana, Khairpur, Sanghar, Thatta; in Baluchistan province all ten, except Kachhi. During our work the District Census Report for Hazara [47] district became available but it is not included in our analysis. A few tests suggest that it behaves like other districts in NWFP. We are grateful to the census authorities for making available to us the early data in advance of publication.

"1972" and "1971" are, of course, identical.

Another two age distributions are available from the Census Evaluation Survey (CES) of 1972: the raw, unadjusted proportions of the census population also enumerated in the CES, and called here as CES (un), and the age distributions corrected through adjustments found necessary during the CES called here as CES(a). Assuming that the CES was a representative sample of the whole country, the CES (un) age distribution is that of the reported 1972 population. This, however, cannot be checked until the age distributions for the whole country become available. All these proportionate age distributions have been summarized in Table 1.

The peculiarities of Pakistan's age distributions vary in importance depending on whether they appear in all three censuses, in some of them, or for the first time in the "1971" or "1972" data.

Age group 0 and age group 1-4

Infants aged less than 1 comprise a smaller proportion of the total population than an average single year in the age group 5-9. Observed in any one census, a decline in fertility during the last five years could be implied. Repeating itself census after census, with an accompanying population increase, we have an enumeration and reporting phenomenon and not a demographic reality.

However, a couple of straws in the wind blow from the direction of family planning. Proportions at age zero obtained from the 1972 CES (un), as well as in the 1972 CES(a), and according to the 23 districts, are lower than in 1961. Was the traditional underenumeration at this age and the age reporting even poorer in 1972 or more pronounced than in 1961? One is inclined to say "yes". There are several reasons for this inclination to distrust the CES age distribution whether (un) or (a): the masculinity ratio at the youngest ages increased "unnaturally", most of our 23 districts were rather outside the influence of the family planning programme, the CES(a) tried to improve on CES (un), but, as can be expected from such surveys, was not quite equal to the task, and arrived at 1972 proportions that, despite adjustment, are less plausible than the 1961 unadjusted proportions.

Age group 5-9

In the 1961 analysis this age group had quite a critical and pivotal role. Unless there is evidence to the contrary, one expects for a population such as in Pakistan, that each age group is slightly bigger than the preceding older age group, so that all the age groups together taper off smoothly, first quite raidly, and at middle or older ages more gently. In fact, age group 5-9 in 1961 was sticking out like a rib that required to be padded up with most of omitted younger and older age groups on both sides. Everyone of the eight analysts we know about thought it to be overreported and deleted from the male age group 5-9 varying numbers for distribution among neighbouring age groups [28, Table 3, row f].[16] Yet in four of the six proportions available in table 1 in respect of

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[16]For a summary of the eight analysis see [30, table 1]. Two of the eight analysts [9 and 44], even deleted respectively 642 (as usual in thousands) and 266 girls from age group 5-9 for distribution among neighbouring age groups. Pakistan Census Organisation [44] assumed further that 84 of the girls with reported ages 5-9 were actually 15-19 years old and a further 26 were actually in the 20-24 age group. This requires a very peculiar anthropological standpoint, but then the same analyst assumed that 53 reported men were actually women.

"1971" and 1972, the percentage is even higher than in 1961, and in the other two only marginally lower.   Either the rib is still sticking out, because the under-enumeration at other age groups was even greater than in 1961 or there was an increase in fertility in the years 1963-1969, when these children were born just when family planning evaluators were reporting a decline in marital age-specific fertility rates. [58]

Age group 10-14

All six indicators in Table 1 (cols. 5, 8/9, 10/11; rows h and y) claim marked increases. We will be able to check against the census survival ratio later on whether these children were there in the census of 1961 aged 0-4 or whether they were missed by the census of 1961, but reappeared in "1971".

Other age groups are discussed more conveniently in connection with the age ratios, sex ratios (in the form of masculinity ratios), and census survival ratios. It will suffice to point out at this stage that reported proportions aged 60 and over, seem to have declined (in arithmetical sympathy with the increase at younger ages) and that the heaping at ages 40-44 and 50-54 does not seem to have lessened. Thus, we might expect similar conclusions in our analysis to those arrived at after 1961. The available data for "1971" limit us to a consideration of changes in the 23 districts described earlier as reported in 1961 and "1971". The CES (un) and CES (a) series serve well enough as temporary background information, but CES(un) will be superseded by the so-called full count data when these become available, while CES(a), was able to do only a small part of the job of adjusting and correcting.

The age ratio is an index of a given age group in comparison with its two neighbouring age groups. In a population that has not been subject, in past, to violent demographic experiences and with perfect age reporting, the line connecting these indices should be horizontal. The 1961 and "1971"[17] age ratios for our 23 districts are shown in figure 1. The typical influence in both years is the heaping at age groups ending with zeros and the troughs at age groups ending with fives. . Above ages 20 the misreporting of ages is almost identical in the two years; in fact, more violent departures at some ages from 100 in "1971" than in 1961, are evidence that some worsening took place. As already observed the overreporting at ages 5-9 (atypical for an age group with five) or the underreporting at neighbouring ages is almost the same. There is a smaller trough (atypical for an age group with ten) at ages 10-14, but a worsening at ages 15-19 between 1961 and "1971". The significance of these last two groups will become apparent in the light of the masculinity ratio. When the available districts are grouped by province, it can be seen (not reproduced here) that they behave almost identically. A notable observation is that NWFP is mainly responsible for the sharper age heaping in "Pakistan", there being some slight improvements in Sind and in Baluchistan.

The masculinity ratio is the number of males per 100 females and is shown in figure 2. Without demographic violence in the past and wih perfect age

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[17]It will be recalled from an earlier part of the text that we arrived at the January "1971" estimate by decreasing all September 1972 total by 6 percent (equal to the reported growth in the intervening 1 year and 8 months on the assumption of even change throughout the intercensal period). Thus, all ratios, rates, proportions, and percentages for 1972 are the same as for "1971". For simplicity of exposition we use "1971" even when we could use either "1971" or 1972, and limit 1972 to situations where it is 1972 only, that is for absolute numbers.

Table 1

Reported Proportionate Age Distributions of Pakistan and Selected Districts, 1951, 1961, 1971, "1971", "1972", and CES 1972

Population Group	1951 Census	1961 Census	"1971" Estimate	1972 Census	1972 CES(un)	23 Districts 1961	23 Districts "1971"	23 Districts 1972	1972 CES(a)	1972 CES (estimate)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
a. Total population in thousand³	33,740	42,880	61,219	64,892	57,407⁵	6,752	11,548	12,273	61,241⁴	69,368
b. Both Sexes	100	100		100		100	100			100
c. All males	53.85	53.66		52.34		53.80	52.59			52.23
d. 0		1.49		1.06		1.33	1.00			1.14
e. 1—4		6.88		6.87		7.31	6.37			6.92
f. (0—4)	(7.03)	(8.37)		(7.93)		(8.64)	(7.37)			(8.06)
g. 5—9	6.95	8.76		8.78		9.31	9.07			8.83
h. 10—14	8.67	5.32		7.07		5.24	6.98			6.97
i. 15—19	6.16	4.86		4.81		4.50	4.49			4.85
j. 20—24	4.36	4.14		7.33		4.07	3.58			7.42
k. 25—29	3.75	4.02				4.16	3.88			
l. 30—34	3.29	3.37		6.07		3.53	3.35			5.98
m. 35—39	2.66	2.85				2.82	2.75			
n. 40—44	2.62	2.64		4.73		2.73	2.66			4.65
o. 45—49	2.02	2.13				2.11	1.93			
p. 50—54	2.09	2.10		5.61¹		2.12	2.06			5.47¹
q. 55—59	1.17	1.14				1.16	0.95			
r. 60+	3.06	3.96				3.42²	3.53²			
s. All females	46.15	46.34		47.66		46.20	47.41			47.77
t. 0		1.45		1.08		1.38	1.11			1.14
u. 1—4		6.56		6.72		7.23	7.20			6.83
v. (0—4)	(6.72)	(8.01)		(7.87)		(8.61)	(8.31)			(7.97)
x. 5—9	6.19	7.65		8.23		7.87	8.32			8.23
y. 10—14	7.57	4.34		5.68		3.95	5.27			5.76
z. 15—19	5.79	4.10		4.01		3.64	3.59			4.07

Table 1—*Contd.*

1	2	3	4	5	6	7	8	9	10	11
al. 20—24	3.75	3.67	{	7.04	}	3.54	3.46	{	6.97	}
bl. 25—29	2.79	3.69				3.70	3.59			
cl. 30—34	2.48	3.05	{	5.75	}	3.18	3.24	{	5.62	}
dl. 35—39	1.98	2.43				2.41	2.44			
el. 40—44	2.01	2.21	{	4.17	}	2.32	2.41	{	4.07	}
fl. 45—49	1.57	1.70				1.69	1.59			
gl. 50—54	1.60	1.62	{	4.92¹	}	1.66	1.68	{	5.08¹	}
hl. 55—59	1.08	0.90				0.80	0.80			
il. 60+	2.62	2.97				2.73²	2.75²			

Foot notes:

¹Includes all ages 50 and above.
²Includes all ages 60 and above.
³Excludes non-Pakistanis, but includes all areas of Pakistan; for populations for which no age distribution as in the rest of the country.
⁴The CES estimate of the CES universe was 58,046,000. The balance is an allowance for CATA (Centrally Administered Tribal Areas) and population in institutions, added on the assumption that their age distributions are the same as those of the rest of the country [29, table 2]. lines c through f].
⁵The census population found by CES is estimated at 54,400,000 (own calculations derived from CES); and allowance of 2,507,000 for CATA (Centrally Administered Tribal Areas) and 500,000 for population in institutions gives 57,407,000; the two allowances were made on the assumption that the two additional populations have the same age distributions as the rest of the country.

Sources by Table column Number:

(for parts of the population for which no age distributions were collected the same distribution was assumed as for the rest of the population).

(2) 1951 Census Bulletin No. 5 (restricted), table 4, all Pakistan minus East Bengal.
(3) 1961 Census Bulletin No. 3
(4) The September 1972 total reported in 1972 Census Bulletin No. 1 minus 6 percent
(5) Total from 1972 Census Bulletin No. 1 proportionate age distribution from col (6).
(6) See footnote 5 for total; for proportionate age distribution see [29 and 30].
(7) Own derivations from 1961 Census Bulletin No. 3 for the 23 districts listed in the text.
(8) Total from col (9) minus 6 percent.
(8&9) Own derivations from 1972 Census Bulletin No. 1 for the 23 districts listed in the text.
(8&9) Own derivation from District Census Reports for ten districts and preliminary computer printed for thirteen districts.
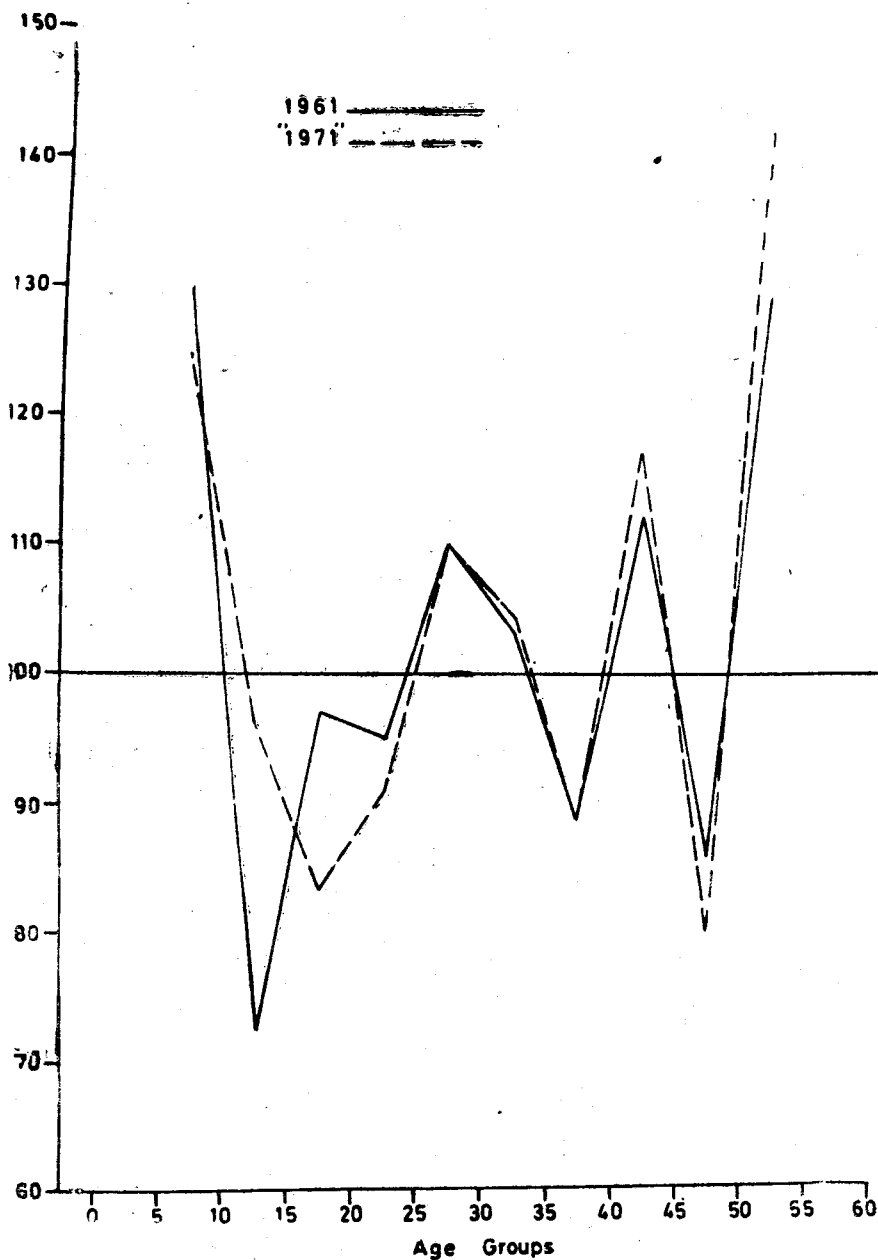(10) See footnote 4.
(11) See [30].
(10 & 11) See [30].

FIGURE 1

Age Ratios For 23 Districts of Pakistan 1961 and 1971
Both Sexes

reporting, the line connecting these ratios should start at about 105 at age zero and then continue declining. At first the decline is slow, cutting the horizontal line at about age 15. At older ages the decline is more rapid. In countries, like Pakistan, with persistent evidence of female selective mortality, the decline in the ideal curve could be slower or may reverse itself by some rises in the youngest ages and early adult years. There is seldom enough evidence of female selectivity to expect rises at middle or older ages. In Figure 2 there is no change at the crucial age groups 10-14 and 15-19 between 1961 and "1971". Table 1 further confirms that we were unnecessarily alerted by the age ratios at 10-14 and 15-19; they are phenomena of the 23 districts, not repeated in CES, whether (un) or (a). Above age 20, there has been an increase in the reporting of female age groups. Hidden in 1961, they, or at least some of them, came forth in "1971". Above ages 35 the evidence of underreporting of women in "1971" (or less likely continuing female selectivity in mortality) is still there. When the available districts have been grouped by province (not shown here) there are no interprovince variations in the pattern observed for "Pakistan", but it is clear that NWFP made no contribution to the increasing inclusion of females in the 1972 census (or less likely to the lessening of the female selectivity in mortality), but merely upsets the age ratios.[18] It is Sind and Baluchistan that increased their inclusion of women and lowered in this way the reported masculinity ratio.

The census survival ratio gives the proportion of people in a given age group who survived since the previous census when they were in an age-group ten years younger. In Figure 3 we show for each sex the number of survivals at a given age group from hundred persons in the age group ten years younger. In the absence of demographic violence, with no external migration, and with perfect reporting the curves should start some distance below 100 in the youngest age group (depending on the severity of infant and child mortality) rise slightly to just below 100 at ages 10-14 and then continue a slowly accelerating decline, the male curve typically declining faster than that for females. Pakistan departs markedly from this behaviour of a typical population.[19] The zig-zags above ages 29 with high "survival" at ages ending in zeros and low "survivals" at ages ending in fives had been expected from earlier discussion of age ratios and masculinity ratios, women behaving somewhat more extremely than males. The extreme trough at "1971" ages of 15-19 and the survival of 150 out of 100 males and 170 females at ages 25-29 are respectively the arithmetical reflections of the ribs sticking out in 1961 at ages 5-9 and of the shortage at ages 15-19 in 1961. If we had only one of these phenomena the argument could continue in terms of enumeration freaks. That is to say, if we had only a trough at ages 15-19 in "1971" we could say that the rib at 5-9 was an artifact. The mortality was high enough for all these children of 1961 to die before they reached age 15-19 in "1971". They were simply not there in 1961. Conversely, if we had only the extreme swellings at ages 25-29, we could say that the young people aged

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[18]It cannot be said until more data become available, whether the age ratios in NWFP were spoiled by the inclusion in the standard questionnaire of areas hitherto treated otherwise, or whether the very brief "big count" questionnaire used in 1972 prevented the enumerator from gaining the familiarity with the household he must have gained during the longer interview in 1962, when by the mere length of the interview the chance of encountering more household members and obtaining answers directly from them must have been greater.

[19]A parallel investigation into Indian and Bangladesh data could possibly help in determining whether these are subcontinental reporting idiosyncrasies pure and simple, or whether there is an element of demographic reality in them. Such an investigation might also help in evaluating whether the low reported total for 1971 in India is real or an artifact of the enumeration process with downward biases in comparison with the 1961 procedures.
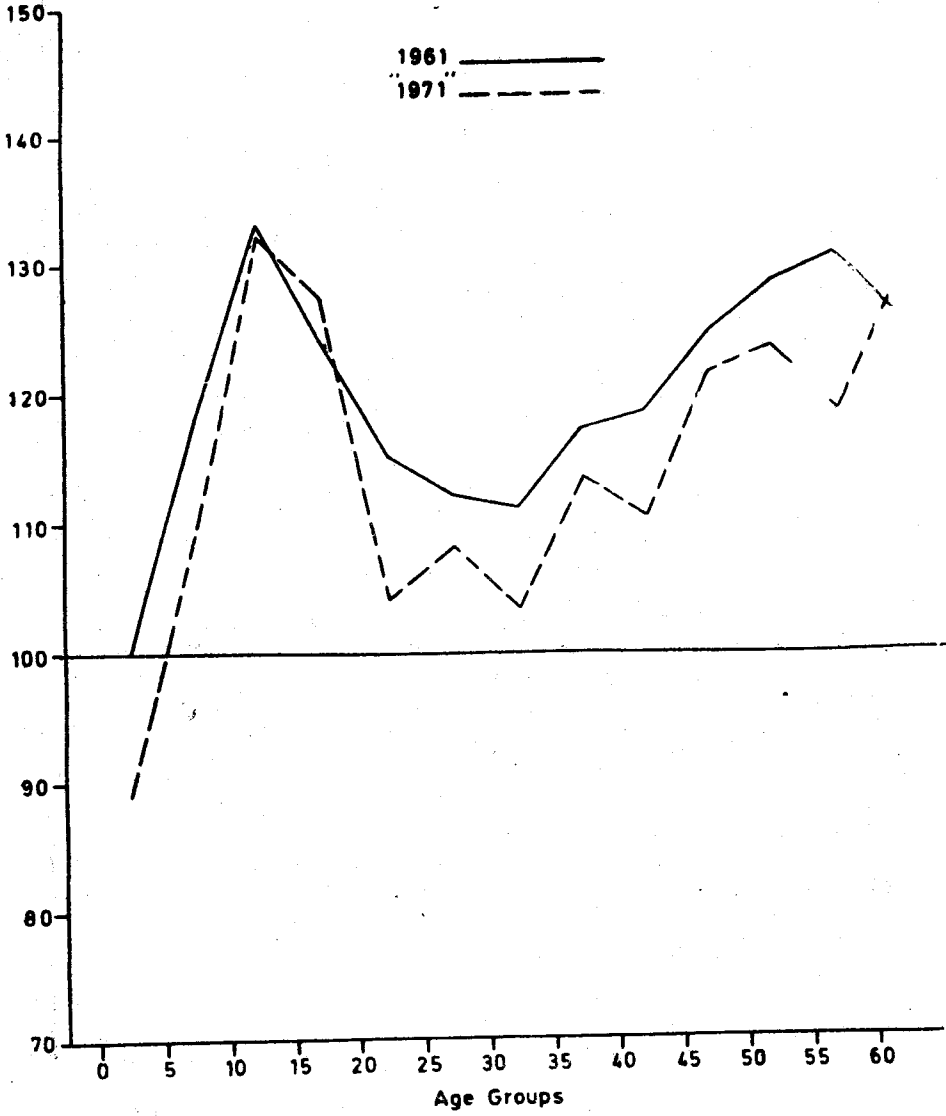
FIGURE 2

Masculinity Ratios   For 23 Districts of Pakistan
1961 and "1971"

C S R

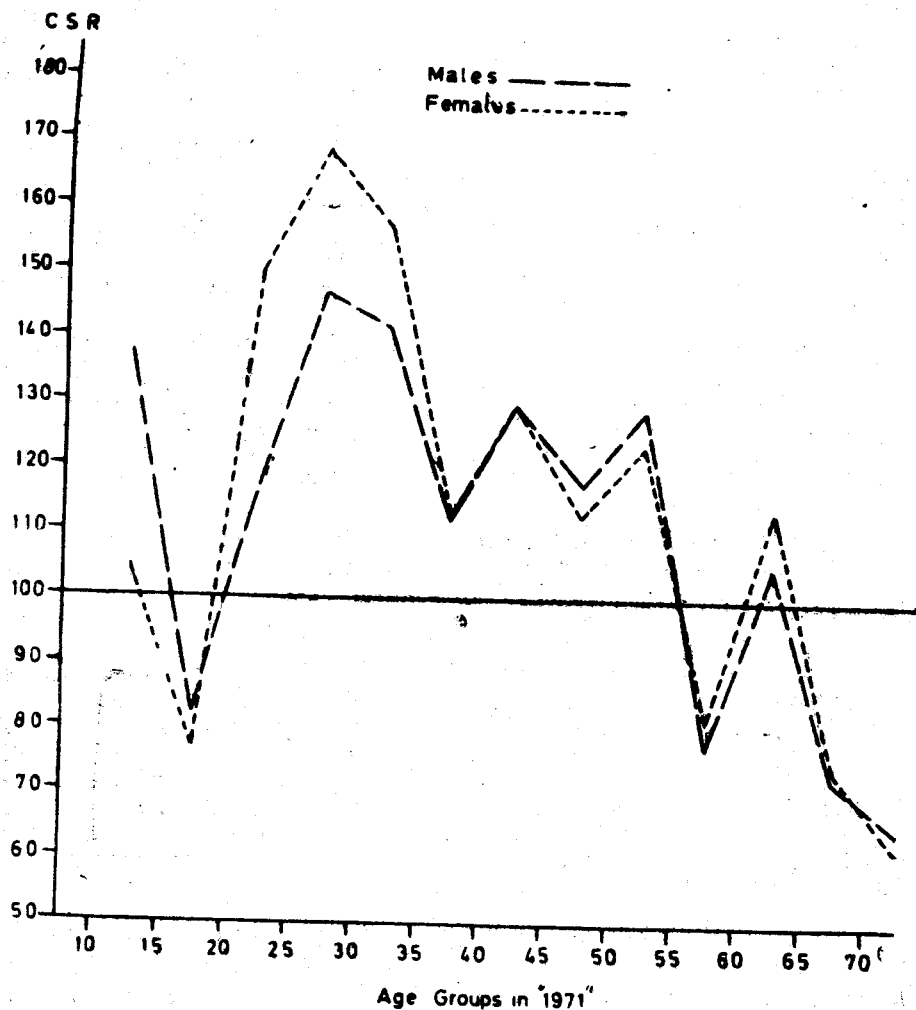Males ——————
Females............

Age Groups in "1971"

FIGURE 3

Five Year Age Group Census Survival Ratios For 23 Districts of Pakistan
Between 1961 — 1971

15-19 in 1961 were underenumerated in 1961 (young mobile males looking for work, education, and adventure; young mobile women ignored or concealed by their fathers and/or husbands) and then properly recorded in "1971". Confronted with both phenomena at the same time, the more likely scenario is that aged 5-9 were enumerated (by and large) correctly, then they were missed in "1971" while aged 15-19 (as was the previous cohort aged 15-19 in 1961) and then will reappear again as age group 25-29 in 1981 (as did the missing 1961 cohort aged 15-19 when it reappeared aged 25-29 in "1971"). Both censuses were apparently subject to the same influence. The partial analysis based on sex and age ratios gave, it will be remembered,. consistent conclusions. An alternative explanation based on age misreporting rather than age selective under-enumeration would demand less plausibility. It would require that some persons aged 15-19 were enumerated as aged 5-9, and some as aged 25-29. We would have to postulate for both censuses an anthropological tendency displaying two opposite directions with regard to the same age group.

When the available districts were grouped by provinces, there was little to learn additionally, except that once more the NWFP was more different than the other two. Moreover, NWFP kept its curve consistently above 100 (in normal circumstances an impossibility) until age group 55-59, with two small aberrations at age groups 15-19 and 55-59, when declines between 1961 and "1971" to 94 and 97 respectively were observed.

The last observation confronts the two alternatives: underenumeration in 1961 or overenumeration in "1971", and brings us conveniently to figure 4 where we show for the 23 available districts all the age groups in "1971" and the corresponding age groups ten years younger in 1961. There is the amazing fact that, except for age group 15-19 in "1971" (5-9 in 1961) and ages 55-59 in "1971" as well as those above, all other age groups are more numerous in "1971" than they were in 1961. In the absence of sizeable immigration this is an impossibility: even under the healthiest conditions an age group will lose some of its members in the intercensal period. Students of Pakistan demography will recall that there was a similar phenomenon observed and reported with regard to the then West Pakistan between the 1951 and 1961 censuses [31, p. 296], but not in the then East Pakistan [31, p. 293]. After 1961, a question mark was attached to eight age-and-sex groups for present Pakistan as compared to sixteen after "1971" for the 23 districts.

This finding requires two qualifications. On the one hand areas of the age pyramids question-marked are not a complete indicator of the underenumeration in the previous census or the overenumeration in the subsequent census. For a correct comparison some members of the age groups from the previous census would have to be killed off "survived" somewhat illogically. in demographic jargon in accordance with a relevant time table. This would increase the size of the areas question-marked in figure 4 and also probably their number. More important, the 23 districts that are available for this analysis, come from three provinces, two of which (Sind and Baluchistan) experienced a rate of growth between the censuses of 1961 and "1971" higher than the country average, and certainly higher than the core province of Punjab in spite of the fact that at least Baluchistan is traditionally a province of outmigration and of the ten districts of Sind, only Hyderabad and Sanghar had in 1961 more than 10 percent of their residents born outside the province [46, p. 44]. The intercensal growth of
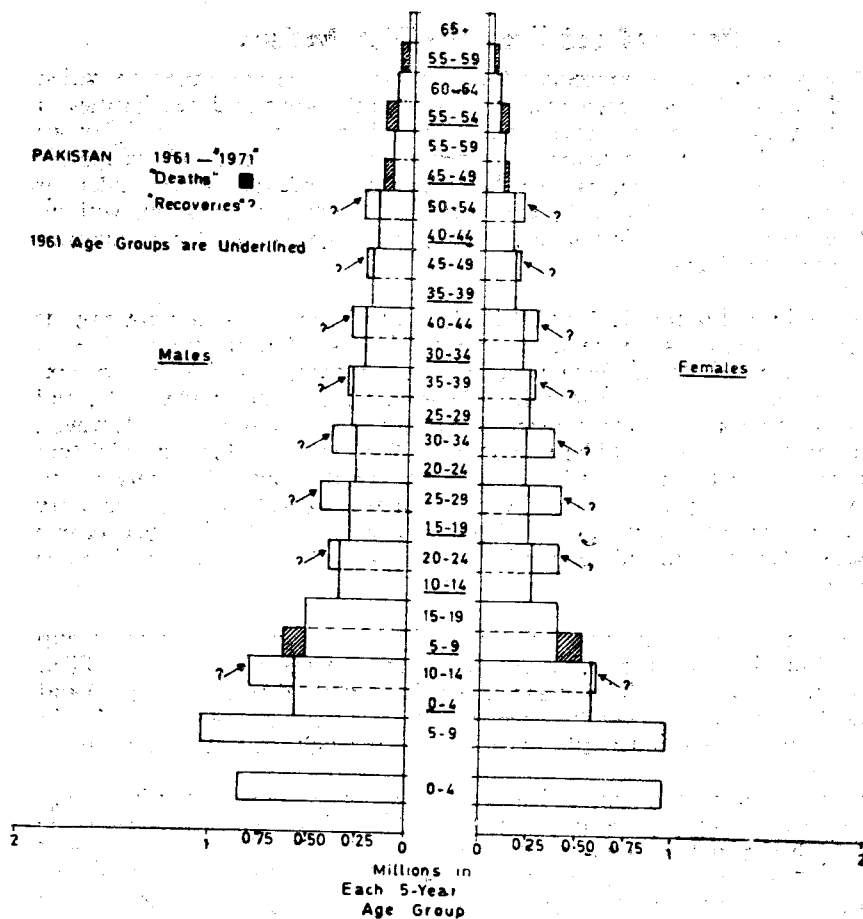
FIGURE 4

Five Year Age Groups of "1971" Compared With Age Groups Ten Years Younger of 1961
For 23 Districts of Pakistan

NWFP was 46.6 percent, the same as that of Punjab. We expect for a country as a whole, when the data become available, that the areas question-marked will be somewhat smaller and fewer than for the 23 districts. Nevertheless, the tendency noted already in 1961 is there.

Reported and True Age Distributions

The purpose of the preceding discussion was to see the extent to which the consideration of the idiosyncrasies of census field work and peculiarities of age reporting during census throw light on the demographic reality. Can we separate age and sex specific under or overenumeration from age and sex specific misreporting? Furthermore, can we distinguish age and sex specific under- or overenumeration from under- or overenumeration of whole populations without age and sex selectivity (whole regions, or at least villages, whole socio-economic groups, and the like).

A study of Figures 1, 2 and 3 leads us to believe that the zig-zags at older ages just about cancel each other out. But we feel uncomfortable to accept the apparently high female mortality, contrary to the known experiences of elsewhere in the world. We would find it more plausible, and more realistic to assume some underenumeration of older women. However, such estimated numbers would be unimportant for the reproduction of future generations and we leave this task to those who need a smoother base population for population projections.[20] As a minimal observation, it is necessary to underline once more that by "1971" either the mortality at older ages became less female selective or the alleged tendency to forget older women has become less marked.

. For the younger age groups much of the discussion turns on age group 5-9 as it did in 1961. If it is real, then the neighbouring age groups must be filled up. If, on the other hand, children aged 5-9 are misreported as infants aged 0 and babies aged 1-4 or as older children aged 10-14, then the sticking out rib should become less protruding and needs fewer fill-ups at neighbouring age groups.

Figure 5 gives the reported age distributions in single months of age below one year and in single years of age under 12. If age group 5-9 lives at the expense of others then this should show in the form of heaping at age 5 (borrowed from 4 and 3) and also by heaping at age 9 and 8 borrowed from 10. It will be seen that, at least in the 23 districts that were available, the heaping of the kind noted above is not worth mentioning. But for the shortage of children aged zero and aged one, slightly more pronounced in the case of boys than girls, figure 5 leaves no doubt on the veracity of age groups 5-9.[21]

The main features of figure 5 were with us already in 1961 [31, p. 299], except that once more the 23 districts available for '1971" behave somewhat more

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[20]It will be recalled that demographic analysts whose confidence in their trade is greater than ours, have suggested quite minute corrections and shifts between age-and-sex groups [28, Table 3], the extreme case being probably the transformation of 57,000 males into 57,000 females.

[21]The shortage at age zero and at age one could be interpreted as a genuine decline in the births over the last year prior to the census enumeration. However, it is doubtful whether on inspection it would lend support to the alleged declines in age specific rates of marital fertility so widely publicised [58] and that reportedly took place at all age groups since about 1966. Firstly, if true, all ages up to six and seven should be affected. Secondly, an identical phenomenon has been with us in 1961 and no decline has been observed in the ages up to 12 (between 1961 and 1972).
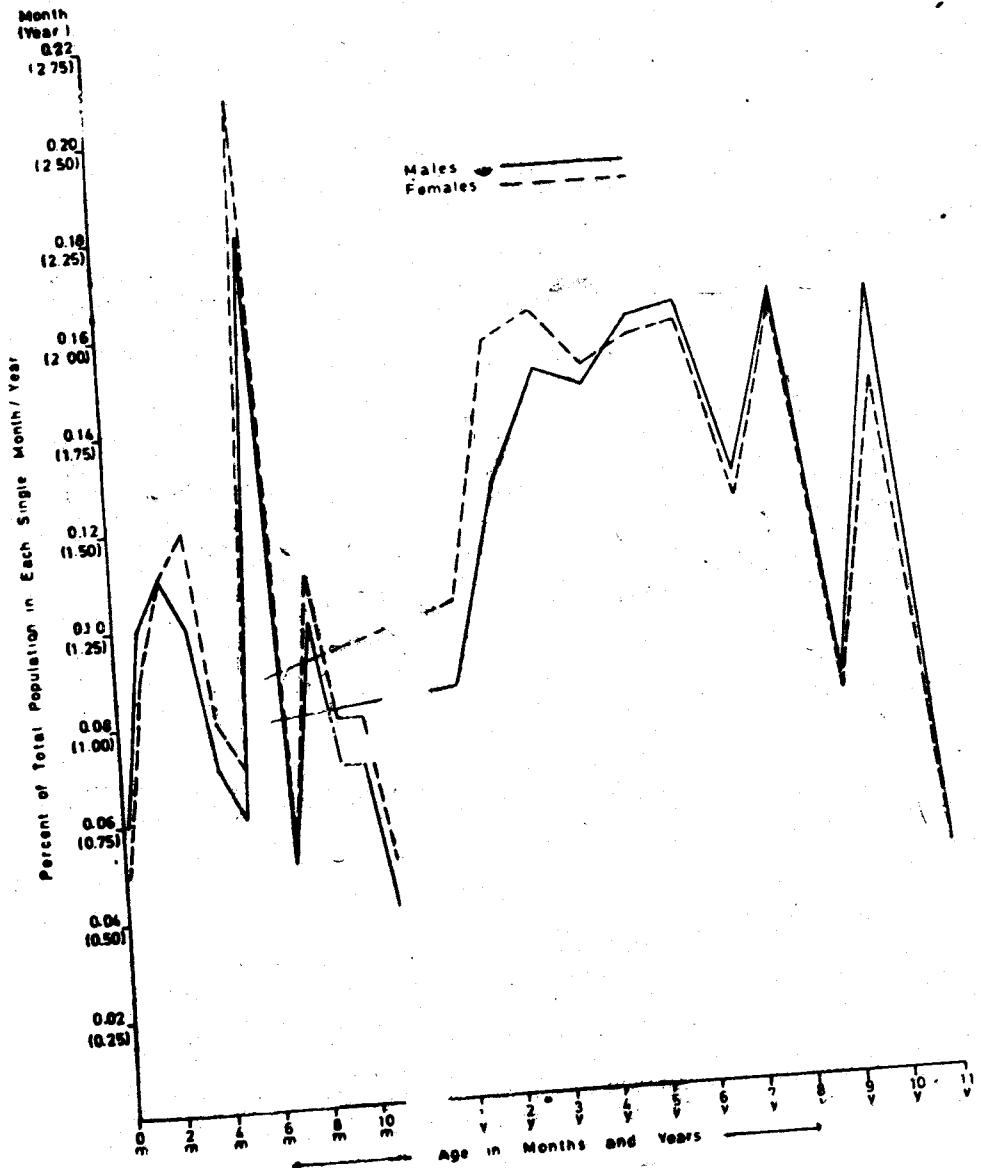
FIGURE 5

Ages Below 12 in Years and Below One in Months For 23 Districts of Pakistan 1971

violently than did the whole country in 1961. We had in 1961 the same shortage of babies aged 0 and 1. There are two new features: infants aged 0 month are not as underreported in 1961 as they are apparently in "1971" (although they were in the then East Pakistan). Secondly, in 1961 the underreporting of females begins early, while they are still at the tender age of three and increases afterwards. There is no such tendency in "1971". Embarrassing to the analyst, it is in fact the opposite overreporting of girls which is noticeable at the early ages.[22]

In conclusion, we are generally on familiar grounds to note that the main features of the field work results relating to respondents' reporting and enumerators recording are the same in both censuses. There are some exceptions: (i) the total seems to be too large (the question marked areas in Figure 4); (ii) NWFP has shown poorer age estimation (the sharper heaping in Figures 1, 2 and 3), particularly in the case of females (more zig-zags in figure 2 for "1971" than for 1961 and more violent female zig-zags in figure 3 for 1961 than for "1971"); (iii) increased coverage of females in Sind and Baluchistan (lower level of masculinity ratio curve in figure 2).

Granting the exceptions, the corrections suggested by the eight analysts and reported elsewhere for 1961 will also be similar for "1971" [28, Table 3]. It is too early to suggest similar numbers for each "1971" age group on the basis of the rather volatile 23 districts that were available for this analysis though it will be remembered that in table 1 we also had the age distributions from CES (un) and from CES(a), which have shown that the 23 districts were not completely unlike the rest of Pakistan in 1961 and in "1971'. It is sufficient to say, that the real proportionate age distribution for "1971" is not likely to be very different from the real 1961 age distribution. The mere illustrative suggestions made in table 2 allow for the fact that the reporting of females, having been better in "1971" than in 1961, the "1971" correction for them is absolutely and proportionately smaller than in 1961.

It is not useful at this stage to suggest what would be the corrected "1971" total (or even less the 1972 total), because that depends on corrections due to non-age and sex specific under or overenumeration (the whole villages, whole regions, etc.). Before we embark on that guestimation we will try to obtain a measure of consistency from an estimate of growth rate.

Reported and True Population Size and Rate of Growth

The census total reported in September 1972 is 64,892 (all numbers are in thousands and exclude non-Pakistanis). The similar figure in January 1961 was 42,880. These figures imply a reported rate of annual growth of 3.6 per cent or 36 per thousand. Such a rate of growth for a country that had no emigration of any significance can be combined with a number of consistent birth and death rates. However, it appears that even if there was no significant migration, this

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[22]Could it be that the practice of bride price reported from some of the areas covered by our 23 districts [6] affected by 1972 the survival of little girls. One need not do much to raise the masculinity ratio by a couple of points; two girls per 100 will do.

Table 2

Hypothetical Components of the Difference between Reported and Estimated Population Size in Pakistan, 1961, "1971", 1972
(in thousand)

Components of Difference	1961	"1971"	1972
(1)	(2)	(3)	(4)
Census Reported Population			
Both Sexes	42,880[5]	61,219[1]	64,892[4]
Male	22,960	32,469	34,417
Female	19,921	28,750	30,475
Age and Sex Selective Underenumeration			
Both Sexes	3,950	3,600	—
Male	1,300	1,600	—
Female	2,650	2,000	—
Areal Completeness improved in "1971"[2]			
Both Sexes	1,300	—	—
Male	650	—	—
Female	650	—	—
Straightforward Overenumeration[3]			
Both Sexes	—	1300	—
Male	—	650	—
Female	—	650	—
Adjusted Total			
Both Sexes	48,130	63,519	67,332[6]
Male	24,910	33,419	35,424
Female	23,220	30,110	31,908

[1]The total of September 1972 minus 6 per cent gave the January "1971" total.
[2]An arbitrary allowance to separate the genuine part of those district increases that appeared extravagant in comparison with the country average increases, from "phoney" increases provided for in footnote 3.
[3]Based on Krotki [29, p. 128] following Krotki [28, Table 8.5].
[4]Source [4'].
[5]Source [46, p. II-58, Table 1].
[6]The total of January "1971" plus 4.7 per cent gave the September 1972 total.

rate was subject to many influences other than pure natural growth. At least three such other contributions can be distinguished:

  (i) decline in age-and-sex selective underenumeration, particularly for females (confounded most likely by mortality imporvements);

  (ii) improvement in areal completeness;

  (iii) straightforward overenumeration.

The evidence for (i) rests in Figures 2 and 3. It is also reflected in the decline, proportionate for males and absolute for females, in the correction for age and sex selective underenumeration suggested in Table 2 for "1971" $(1,600+2,000=3,600)^{23}$ in comparison with 1961 $(1,300+2,650=3,950)$. The evidence for (ii) is in Figure 4 and in the unplausible large increases in some districts as reported in Census Bulletin No. 1 [42]. The bulletin provides some evidence for (iii); otherwise we have to rely on impressionistic opinions [3, 4 and 7]. For the purposes of another study, not reported here, the census survival ratios were calculated between 1961 and "1971", for the whole country, but not for the 23 districts as was done for the purposes of Figure 3. Two proportionate age distributions have been assumed for the "1971" population total: one equal to the 1961 distribution and one equal to the 1972 CES(a) distribution. Most of these survival ratios turned out to be higher than 1.0, which is, of course, impossible. Provided we have done the exercise correctly, this outcome would be another indicator in support of all three considerations mentioned above [35].

In Table 2 the census reported totals for 1961, "1971", and 1972 are assembled with illustrative corrections for the three counts listed above. The new "1971" total of 63,519 leaves a rate of growth from the new 1961 total of 48,130 equal to 2.8 per cent or 28 per thousand per annum. Thus, with three innocuous assumptions summarized in table 2, the extraordinary growth between 1961 and 1972 could be shown to be an artifact of circumstances and the explosive 3.6 is adjusted downwards to 2.8, almost traditional in the mid sixties.

The separate threads of evidence on the total need to be pulled together. Census reported 64,892 in September 1972. CES suggested an underenumeration of 4,300 which would give for September 1972 a CES corrected total of 69,280.[24] By its nature, the CES was capable of discovering omissions within census enumerated households in the selected clusters. The CES was less capable of discovering omissions for households within the chosen clusters but not enumerated for the evaluation purposes. The survey was not at all capable of discovering omissions for households outside the small clusters. It is, therefore, more than coincidence that the CES suggested ommisions of 4,300 are only slightly larger than the net "1971" correction for age-and-sex specific,

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[23]Until more data become available and further analysis is possible, these quantities should be thought of as no more than algebric expressions of an intention. .

[24]It will be recalled that CES itself omitted some eight million persons if their estimates are to be taken seriously [29, p. 186], their estimate of the total population of Pakistan being even lower than that of the census enumeration.

underenumeration in table 2 equalling 3,600.[25] The difference could be due to, or at least is consistent with, the inability of the demographic analysis to estimate accurately omissions arising from factors other than age and sex selective errors in enumeration.

Proceeding from the January "1971" new total by extrapolating the 1962-"1971" change we arrive in September 1972 with a figure of 67,330 which comes close enough to the 68,000 suggested more impressionistically in an earlier discussion [29, p. 192].[26]

A Maximum and Minimum Scenario for Pakistan's Age Distributions and the Associated Population Size and Growth

In the previous section we have been riding the villianeous horse of plausibility very hard and we did arrive at a solution of our problem. Let us now see what solutions emerge if different assumptions relating to the correctness of the available data are made.

Under the maximum approach we tend to lean towards assumptions that give us upper limits for the size and growth of population. The questions raised are: how much larger could the birth rate be, how much lower the death rate and how much larger the population size can be if the preferred estimates suggested in the previous section are valid estimates for Pakistan?

Between 1961 and "1971" the proportion under 15 increased from 42 percent to 48 percent when CES(a) is considered, but to only 46 percent with CES(un). Our correction for the underenumeration of youngest ages would also increase the 46 percent to about 48 percent. Forty eight percent is close to the biological maximum (a higher proportion would not leave enough mothers under the curve of 100 percent to give births to all these children). Still one could probably think up some particularly favourable combination of infant mortality rate and census underenumeration corrected partly by the CES and partly by us for the age groups under 15, which could conceivably increase further the estimated proportions suggested by us under age 15. In any case the resulting maximum could not go much above the maximium suggested for any large population and our preferred guestimate is quite close to it.

The growth rate through natural increase even under the maximum alternative must be less than the reported 36 per thousand because there is no doubt that there were substantial additions to the 1972 population which were not there in 1961. Whether these "recoveries" as they are called on figure 4 are overenumerations or additions through increased completeness (see the

Solomon's choice in Table 2), need not concern us in the discussion of the growth rate (they are relevant to the discussion of population size). The plausibility of a death rate less than 12 per thousand is also limited: with a CBR as low as 44, and not even family planners suggest less, we have a growth of 32. Should the growth rate of 28 be taken seriously, we require a birth rate of 40, which is obviously too low. Something must give (and it will be the weakest link), the death rate of at least 16 to give a minimum birth rate of 44 with a growth of 28, but with a more realistic CBR of 48 the death rate climbs to 20.

A similar argument as in the case of growth is applicable to population size. We have in 1972 a total reported population of 64,982. We assumed that no straightforward overenumeration took place in the 1972 census. Allowing for age-and-sex specific underenumeration suggested in Table 2 of 3,600 (plus because of the elapsed 20 months since "1971") and adding a symbolic one million for unrecovered recoveries we arrive at a total of over 69,492 for 1972.

There seems to be more room for manoeuvring in the case of the minimum alternative. May be the domino argument described earlier reflects the Pakistani reality adequately. If so, a much narrower age pyramid, consistent with more optimistic reports from family planners, is possible. The immediate question that arises in that case is from where did the high 1972 total come from? If nobody was unreported in 1961 and if there was a continuous decline in marital fertility since 1964 [58, p. 124] then from where did all the people enumerated during the census come from? From areal recoveries since 1961 or from straightforward overenumeration? If we admit the domino possibility, we have no firm limit on which to hang our age distribution, except for the population size.

The deductive reasoning suggested above leads us to expect a greater role to be performed by the possibility of overenumeration in 1972 or underenumeration in 1961. In other words, the population changes reported between 1961 and "1971" were working themselves out in the realm of enumeration artifacts and were not a part of the demographic reality. Such a scenario cannot be ruled out entirely, but the more one relies on it the greater is the strain on credulity and plausibility. Take the reported growth rate of Punjab as the lower limit to population growth for the two provinces that grew faster than Punjab, namely Sind and Baluchistan. If both grew only at the lower Punjab rate then their totals in 1972 would be respectively 12,269 (instead 13,965) and 1,984 (instead 2,409). Thus the reported total of Pakistan in 1972 would decline by 2,121 to 62,771 and the growth rate through natural increase would become 3.2. With an upper limit to birth and a lower limit to growth we have an upper limit to death of 17 per thousand. It will be noted that while in the case of size, the outcome was close to the earlier analysis [29], for growth the results are much more uncertain.

Summary and Suggestions

In the previous two sections we speculated about Pakistan's population and growth in the light of such evidence as has become available from the 1972 census, from the CES, and from the comparison with the 1961 census.

There was a general agreement on the existence and the size of age and sex selective underenumeration in the 1961 census. This general agreement

provided anchors for the computation of vital rates and the growth rate. PGE results were consistent with these rates and had provided comfort to the analysts and policy-makers. After 1972, we still do not know what the reported age distributions are. The evidence presented by us, introduces a new uncertainty in the form of unnatural features which makes it difficult to foresee consequences for final analytic estimates. There is the strong suggestion of areal recoveries in 1972, but of uncertain size and location. True, this areal underenumeration in 1961 is the "fault" of 1961, not for 1972, but after 1961 we did not know about it, so we did not worry, being presumably similar to 19 1 it did not matter. The areal recoveries are compounded with the strong suggestion of overenumeration, but again of uncertain size and location. External evidence from PGS [52] and the National Impact Survey [58] is inconsistent with all this and adds to our discomfort.

The remedial measures that suggest themselves fall into two categories: immediate that can be taken now without extensive and extraneous efforts, and long term that may require considerable funds, reorientation and the agreement and cooperation of several agencies.

For immediate measures, the current study and that of 1961 can be duplicated with data for all districts and not only for the 23 that were available to us to see whether current conclusions need to be changed. Tabulations by household size for each district need to be studied for signs of clumsy household duplication. The original "big count" questionnaries can be randomly inspected in a structured manner to assess the likelihood that households were duplicated. The 1972 CES matching rules can be assessed to see whether the sizeable underenumeration alleged by CES may have been due to overrigorous matching rules.[27] Lists of villages in districts that experienced a particularly extravagent population increase for 1972 can be compared with lists that were published for 1961 and 1951 to assess whether chunks of territory omitted in 1961 (and in 1951) were included[28] in 1972. Lists of households enumerated in one survey should be traced after a passage of time (comparable to the passage of time between 1972 census enumeration and the 1973 CES) by another survey organization to see whether the proportion of households that cannot be identified will be different from the proportion of census households that could not be identified by 1973 CES. The "own children technique" need to be applied on a gradual basis—to begin with for a few districts—on a trial basis, as it is far from cèrtain that this technique can be used successfully with the Pakistani 1972 data in view of the complex coding required [38]. HED tabulations need to be scrutinzed for the demographic content, province by province, that could possibly throw light on the question raised in this article. Action programmes, self-evaluating their performance and creating demographic data that are inconsistent with other demographic data available for Pakistan, should feel obliged to issue impact statement concerning result. An early experimentation through a reputable survey organization and a tightly supervised contract for the application of the PGE/ERAD techniques on the estimation of base populations and the denominator of vital rates is called for [22]. The complete technical

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[27]It is understood that when the 1972 CES matching rules were being designed, only the old Pakistan PGE rules were available as examples [49], the more recent developments in this area were not yet available for consideration [e.g., 37 and 39].

[28]One of us has considerable experiences with the matching of these lists with each other and with the reality in the field: no definitive results must be expected from this endeavour, but in the current situation no effort should be spared.

details of the sample design and survey design of PGS II, particularly the procedures leading to quarterly interviews, six monthly recall periods, three monthly overlaps and matching between them, can be studied with a view to assess the future dependability of these data together with the matching rules adopted and their departures, if any, from the currently prevailing principles [37 and 39]. Before the elegance of the WFS [for first details of PFS see 40] is dismissed as unhelpful to provide the crude data required by Pakistan, a concerted effort should be mobilised to determine whether anything of value could be rescued from this endeavour, probably on the lines of correlation between the sophisticated measures obtained by PFS and the crude measures required by Pakistan [10]. An analytic investigation could be set up to determine how far the elegance of the sophisticated results of the PFS can be translated into the simplicity required by the crude birth and death rates. This is a difficult assignment in view of the following features of PFS: (i) no Sydney questions [14] (ii) no orphanage questions [27]; (iii) coding suitability of selected (5000) households doubtful for "own children technique"; (iv) no base population from sampling persons and listings of household; (v) eligible respondents selected in the field by interviewers.

As for long term measures, preparations for the articulation of demographic needs from the 1981 census should be considered early. The likelihood of obtaining useable demographic data from the National Registration Scheme in our life times should be determined. A sample scheme for the permanent provision of a long term source of demographic data should be created. As part of the intellectual contributions to the preparations for the 1981 census experimentation with the application of the PGE/ERAD techniques to the PFS type of survey evaluation of large scale surveys and censuses could be started [36]. As a further development consideration should be given to a wide ranging evaluation programme for the 1981 census with a view of selecting for action only one or two additional features, for example, such as the orphanage questions, the Sydney que tions, and the like (perhaps photogrammetry). Informed opinion could be alerted and made sensitive to the need to scrutinize decisions of individuals that affect the data availability, their quality, and involve large budgetary and personnel support. One contribution to this end would be periodic, professional, even technocratic, forums to consider and scrutinize the attempts to obtain national and subnational data. It is highly unlikely that in the sharp light of such a forum, the PGS I, the demographic dimension of the Registration Scheme, the omissions on the PFS questionnaire and possibly even the PGS II and the sample design of HED would stand the test of rationality; the five fundamental weaknesses of PFS would in all probability, been avoided.

When this programme, or some such programme has been logically put together and carried out with determination and the application of the best professional techniques, considerable certainty will emerge with regard to demographic data. Actually, as we tried to show in this article the uncertainty surrounding the demographic data is much less than it would appear at first sight. The alternative explanations are narrowed down after suitable analysis to a manageable realm of possibilities. Nevertheless, the task of obtaining more independent and objective data still remains. The Census and Registration Organisation seems to be aware of their responsibilities and there are indications that they mean to carry them out [28]. Hopefully the uncertainty factor will

eventually give way to greater certainty as more data become available for intensive analysis.

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