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Accuracy index of census age distributions

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Summary

The accuracy test 'joint score' for census group-age distributions developed by the U.N. Population Division in U.N. Population Bulletin and adopted in U.N. Demographic Year Books is critically examined in its application to diverse population structures. The conclusion is reached that the score is liable to show up certain demographic formations at a disadvantage and the definite adjustments to the 'score' of all small populations as provided in the test is inappropriate, specially for the sample estimates.

An alternative quality indicator of group-age data, the 'grouped accuracy index' requiring no ad hoc special treatment or adjustment for demographic accidents like wars or for smallness of population, is put forward. A more sensitive 'composite accuracy index' that takes into account the intensity of integar bias in a census is also introduced: while tabulation of data in at least 15 age-groups is necessary for the accuracy test and the 'grouped accuracy index', 4 additional classifications are only required for the 'composite accuracy index'.

* General distribution of this document is limited to the introductory summary. Participants who have been invited to take part in the meeting referred to above will receive also the full text of the paper. Other participants in the Conference will receive the full text upon request.

Pour la traduction française voir au verso.

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Indices de l'exactitude des répartitions par âge obtenues dans les recensements

Ajit Das-Gupta (Inde)

Résumé : L'auteur examine, de façon critique, les applications à différentes structures démographiques de la méthode permettant d'apprécier l'exactitude de la répartition par âge grâce à un "indice combiné" mise au point par la Division de la population de l'Organisation des Nations Unies (Bulletin démographique n° 2 - Octobre 1952) et adoptée dans les Annuaires démographiques de cette Organisation. L'auteur en arrive à la conclusion que cette méthode peut montrer de manière erronée certaines structures démographiques et que les corrections précises faites d'après les résultats de l'application de cette méthode et portant sur des population de petite dimension, ne remplissent pas leur but, notamment dans le cas d'estimations par sondage.

L'auteur propose un autre "indicateur" de la qualité des données sur les groupes d'âges, l'"indice d'exactitude par groupe" qui ne demande pas de correction ou de traitement spéciaux dans le cas d'accidents démographiques, tels que les guerres, ou pour de petites populations. Il présente aussi un "indice d'exactitude composite" plus sensible qui tient compte des erreurs systématiques dans un recensement : alors que l'indice d'exactitude employé par les Nations Unies et les "indices d'exactitude par groupe" nécessitent le calcul des données portant sur 15 groupes d'âges au moins, l'"indice d'exactitude composite" ne demande que 4 classements supplémentaires.

⊠ Seule la présente analyse d'introduction fait l'objet d'une distribution générale. Les participants qui ont été invités à assister à la séance mentionnée ci-dessus recevront en outre le texte intégral du document. Les autres participants au Congrès recevront le texte intégral sur leur demande.

E/CONF.13/280
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ORIGINAL: ENGLISH

ACCURACY INDEX OF CENSUS AGE DISTRIBUTIONS

by

Ajit Das-Gupta

The problem of evolving a simple index for broad comparisons of the quality of census data on international level has been taken up only recently. In the article "Accuracy tests for census age distributions tabulated in five-year and ten-year groups" published in Population Bulletin No.2 (October 1952), a 'joint score' built up of the sum of thrice the 'sex ratio score' and the two 'age ratio scores' for the two sexes separately, was put forward by the U.N. Population Division as a rough comparative measure of the accuracy of the census group-age data. The 'sex ratio score' was the mean difference between the sex ratios for successive age groups averaged irrespective of sign, and the 'age ratio scores' the mean deviations from 100% of the age ratios (calculated as the percentage of an age group to the average of the two age groups adjoining it on either side) also irrespective of sign, for all age groups up to 65-69. Adjustments of the score were also provided, to allow for irregular demographic incidents like war-effects and for smallness of the population. The test was adopted and approvingly referred to in the U.N.Demographic Year Books. A census was classed 'accurate', 'inaccurate' or 'highly inaccurate' accordingly as the joint score was less than 20, 20-40, or over 40. As the problem is likely to gain importance, the accuracy test is critically examined, and an alternative index developed in the present paper.

2. The 'age ratio score' developed by the U.N.Population Division will show up to some disadvantage countries experiencing increasing trend of births and improv-

ing heavy mortality. The fall in numbers in such a population growth will rather approach a cubic than a linear form, that the model underlying the age ratio score apparently assumes. A deviation of a age group from the assumed normal will disturb three consecutive age ratios. The efficiency of the test could not be properly understood by its application to stationary hypothetical populations, as has been sought to be done in one part of the Population Bulletin article. The emerging populations in all the age-groups of the life table originate from a uniform number of births, and all the age cohorts are assumed to have experienced the same rates of age-specific mortality in their progress through life. Actual conditions are quite different. The population pyramids of different countries are the resultant of varying fertility and mortality bases operating over a couple of generations, and the cumulative effect of even small changes over such long periods of time, can make the population structures very much different as they are. The proportions of population in age-group 65-69 to the average population of age-groups 0-4 and 5-9 are, for males and females respectively, 31.3% and 37.3% for U.S.A. (Census 1950), 44.3% and 61.8% for U.K. (England and Wales Census 1951) as compared to 8.0% and 8.5% for India (National Sample Survey Estimate 1952). A comparatively small difference in numbers in the attenuated old age range will inflate the score unduly for countries like India with shorter span of life where the sharp lift in the mortality curve starts in the age range.

3. The 'sex ratio score' does not allow for the tendency of masculinity at birth and the relative lighter mortality experience of females in most countries, that bring about wide divergence between the sex ratios at the terminal age ranges from the operation of natural biological causes; this disparity might have contributed as much as 2 points to the sex ratio score (that is 6 points in the joint score) of countries like France, U.K. and Germany where the sex ratio in the terminal age group 60-69 goes down well below 80%. Higher mortality in one sex in a particular age range followed by compensating lower mortality in another age range, will be a

material factor disturbing the score; the heavy female mortality at the early child-bearing range of life as in India and other under-developed countries, is a case to the point. Such selective mortality features disturb the run of the ratios, in a similar manner though to a reduced extent as demographic accidents like wars (for which exclusion of the particularly affected age groups is permitted in computation of the scores). For proper comparability a test should provide for organic peculiarities of diverse demographic patterns. The reason why the sex ratio is given multiple weightage in the joint score is not very convincing. Any misreporting in ages in either sex will show up in the two age ratio scores and the additional weightage allotted to the sex ratio score loads the scales unduly against some demographic growths.

4. In the Population Bulletin article it has been assumed that an error inversely proportional to the square root of the population strength is superimposed in the joint-score from the smallness of the population itself. The constant for the proportion is then determined by the method of least squares from the population data of eleven islands of the British West Indies, eleven districts of Barbodos, and twelve selected countries of Ontario Province. The constant and the adjustment arrived at would be appropriate only for populations similarly circumstances, primarily in regard to sex-age selective movements ; Parts of the same State and separate governments could hardly be expected to have similar characteristics in this regard. The adjustment for smallness could not, in any case, be applied to small samples of population, as has been sought to be done in the Population Bulletin article and in the Demographic Year Book, if representativeness was at all an object of sampling. An adjustment is called for only when the development of a small population has been lop-sided or irregular owing to the impact of selective migration or chance oscillations in the vital rates. While it is understandable that smaller populations will be liable to an inflated range of errors, a definite deduction from the joint score of all small populations based on the size of the population is

clearly unwarranted.

5. It may be mentioned here that while the accuracy test and the scores are applicable only to original data, the 1931 Indian census age-group population figures used in the Population Bulletin article, were partially graduated data. The five-year groups were framed as indicated in Census of India 1931 Report by taking two halves (with small adjustments for varying mortality) from the two parent ternary and septenary groups, into alternate sets of which the primary sorting was made. This deflated the scores for the particular census artificially by perhaps half their correct value. The general shape of the published census data for individual ages available on sample basis for the few individual States (Madras and Punjab 100,000 samples 1931, and the 2% Y-samples of Part "A" States 1941) goes to suggest that there has not been any greater improvement in age reporting standards in India; it is hoped that the test is not being applied by the Population Division to the partially graduated data of other countries too and specific caution is necessary that only raw original data in groups is dealt with. The 1951 census complete age distribution figures are not yet published, but the joint score for the National Sample Survey Estimate 1952 for the Indian population is 47.8: The total number of persons in the relevant sub-sample used for the estimate is 19005, and it is incidentally of interest to note that on application of the standard correction for small populations prescribed in the Population Bulletin article the adjusted joint score for accuracy in age reporting in the National Sample Survey medium would come down to 25.4, not far removed from the accurate class.

6. A modified index for accuracy test is suggested below. The index developed is also rough, but it is less disturbed by organic deformities of population patterns, and the composite index at least is designed to be sufficiently broad based to absorb ordinary demographic accidents without serious distortion. The assumptions underlying the suggested index are basically the same: that is the model is a population falling gradually with age and maintaining a more or less steady sex propor-

tion. The possible distortions in various population formations are however taken into account in formulating the index. For the suggested index, the age and sex ratios are calculated in quinary age groups, the sex ratio as in the accuracy test but the age ratio as the percentage of an age group to the average of the particular age groups and the age group immediately preceding. The overall gap, if any, between the sex ratio at the terminal age ranges 0-9 and 60-69, is then deducted from the aggregate of the sex ratio differences before taking the mean, which is now called the 'sex ratio index'. The male (and the female) 'age ratio index' is calculated by summing up the deviations of the respective age ratios from 100% as before but dividing the aggregate now by the percentage-ratio, to half the number in the initial age range 0-9, of the sum of the numbers by which the maximum population in any age group exceeds (1) half the population in the initial age range 0-9, and (2) the population in terminal age group 65-69. The product of the male and the female age ratio indices with the sex ratio index gives the 'grouped accuracy index' for the census age distribution.

7. The accuracy index however will lack sensitiveness and balance until some measure of the error in age reporting by individual ages is incorporated. A simple index reflecting the accuracy standard in individual age reporting and suitable for application to the 'grouped accuracy index' could be evolved on the lines of the indices of concentration in general use. Bearing in mind the overriding necessity of requiring the minimum amount of additional information, the 'integer bias index' is defined as the ratio that the numbers enumerated at ages 30,40,50 and 60 bear to one tenth of the population in the age range 25-64. The 'grouped accuracy index' multiplied by the 'integer bias index' gives the 'composite accuracy index' for a census. The 'integer bias index' works out as 2.58 for the Indian National Sample Survey Estimate 1952. As a practical point it can be mentioned here that a very small representative sample should yield a workable approximation of the integer bias index for the big populations. Only numbers enumerated in the sample in the

age range 25-64, and the numbers at the individual ages 30, 40, 50 and 60 (or the number enumerated in the age range at ages with end digit zero) are required. In the alternative, and for small populations, subsorting of the quinary age-groups 30-34, 40-44, 50-54 and 60-64 into four more classifications for the individual ages 30, 40, 50 and 60 will do. Sorting for the five-year age-groups used in the joint score accuracy test involved at least 15 classifications, and the addition of 4 more necessary to get a better balanced measure may not be too onerous.

8. The sex and age ratio indices of a few countries, along with the grouped accuracy index outlined above, and some other relevant factors, are given in the table below: Detailed calculations of the various indices for four countries are also given in the appendix, to illustrate the method of working. Monaco is a case of extreme disturbance in the population structure from selective migration on a small base and Germany from war devastation: South West Africa (Europeans) supply an instance of sharp deflection of sex proportions from selective migration. The age-group population data are taken from the U.N.Demographic Year Books 1951 and 1952, and it is presumed that the data are not graduated. It is seen that adopting below 5, 5-15 and over 15 as the bands for accurate, inaccurate and highly inaccurate grades of census age reporting, the grading of the various countries, in order of accuracy, is not very much different from that obtained by the accuracy test method with adjustment. The comparisons will really be valid only in broad ranges and no significance should be placed on small differences between the individual indices. No ad hoc omission of age-groups suspected to be disturbed or other subsequent adjustments for demographic accidents or smallness would be necessary for the composite accuracy index for which accuracy grade bands below 10, 10-40 and over 40 are considered to be appropriate.

Table : Accuracy index of census age distributions

sl. no.	country and date of census (or estimate)		aggre-gate sex ratio de-via-tions	ini-tial ter-minal sex ratio differ-ence	sex-ratio index	dggregate age ratio deviations from 100%		percentage ratio of the heaviest age group to the average of the initial age groups		percentage ratio of the terminal age group to the average of initial age groups		age ratio index		'group-ed accu-racy index'
						male	female	male	female	male	female	male	female	
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.	Switzerland,	1951	29.7	22.3	.57	73.7	68.1	103.9	103.3	38.4	49.1	1.06	1.19	.72
2.	Iceland,	1950	31.4	17.0	1.10	93.6	81.3	112.9	110.9	19.6	24.5	.88	.83	.80
3.	Sweden,	1949	24.5	14.3	.78	80.7	72.7	108.7	108.1	41.5	48.4	1.06	1.07	.88
4.	France,	1950	40.9	32.8	.62	116.3	108.3	123.9	123.5	45.1	67.5	1.13	1.36	.95
5.	Monaco,	1951	77.3	24.4	4.07	99.9	109.6	176.9	192.6	100.0	133.6	.65	.44	1.16
6.	England & Wales,	1951	43.7	27.5	1.25	75.7	54.2	107.8	108.1	44.3	61.8	1.06	1.00	1.33
7.	Australia,	1951	36.5	10.7	1.98	88.9	80.1	111.3	111.2	30.4	34.9	.96	.92	1.75
8.	Norway,	1950	49.1	19.5	2.28	84.7	73.4	109.0	107.6	33.2	43.1	1.00	1.02	2.33
9.	United States,	1950	58.8	8.8	3.85	73.7	67.1	109.8	111.1	31.3	37.3	.84	.79	2.55
10.	Japan,	1950	62.0	15.3	3.59	98.5	86.4	108.4	107.7	15.2	19.1	.97	.90	3.13
11.	Yugoslavia,	1948	59.7	28.5	2.40	135.0	110.1	110.4	110.8	19.8	27.2	1.34	1.17	3.76
12.	Germany (F.R.),	1950	72.8	25.3	3.63	114.6	108.1	124.1	125.2	44.7	57.5	1.11	1.16	4.70
13.	Br. Honduras,	1946	60.4	9.8	3.86	108.1	110.9	102.2	102.0	12.1	11.0	1.17	1.19	5.37
14.	Israel,	1951	85.1	15.5	5.35	133.8	128.8	119.4	119.2	13.9	16.6	1.07	1.06	6.07
15.	S.W. Africa Europeans,	1946	149.6	57.3	7.10	82.9	104.0	101.0	100.1	24.5	12.6	1.07	1.19	9.04
16.	India-NSS +	1952	99.4	6.3	7.16	138.6	125.8	102.5	103.4	8.0	8.5	1.43	1.28	13.10
17.	Philippines,	1948	86.4	0.1	6.63	137.2	135.9	100.0	100.8	6.8	6.5	1.45	1.43	13.75
18.	Cook Islands,	1951	183.7	15.2	12.96	123.3	142.0	105.9	105.4	8.9	6.9	1.17	1.37	20.77
19.	Egypt,	1947	92.5	11.5	6.23	174.0	199.5	102.8	104.6	6.7	6.6	1.76	1.95	21.38
20.	Zanzibar & Pembs,	1948	425.1	50.1	28.84	292.8	384.4	104.2	105.1	9.4	5.1	2.79	3.66	294.50

+ the 'integar bias index' for the sub-sample used in the estimate is 2.58 and the 'composite accuracy index' for the NSS age distribution is therefore 13.10 x 2.58 or 34.

sp.

Appendix

Computational notes and illustrative detail working tables.

The symbols used in the working of the accuracy index are explained below (dashed symbols denote the female counterparts generally):

$n_0, n_1, \ldots\ldots n_{13}$ denote the male population in age groups 0-4, 5-9, ... 65-69 respectively.

$m_1, m_2, \ldots\ldots m_{13}$ denote the moving totals of the successive pairs of age groups, so that $m_1 = n_0 + n_1$, $m_2 = n_1 + n_2$, ... $m_{13} = n_{12} + n_{13}$

$r_0, r_1, \ldots\ldots r_{13}$ denote the sex-ratios percentages $\frac{n_0}{n'_0} \times 100$, $\frac{n_1}{n'_1} \times 100$, ... $\frac{n_{13}}{n'_{13}} \times 100$; r_i and r_t denote the sex-ratio in the initial and terminal age ranges, $\frac{m_0}{m'_0} \times 100$ and $\frac{m_{13}}{m'_{13}} \times 100$ respectively.

$R_1, R_2, \ldots\ldots R_{13}$ denote the age-ratios percentages $\frac{n_1}{m_1} \times 200$, $\frac{n_2}{m_2} \times 200$, ... $\frac{n_{13}}{m_{13}} \times 200$: R_h and R_t denote the percentage ratios of the heaviest age-group and the terminal age group to the average of the initial age-groups 0-4 and 5-9, that is $\frac{n_h}{m_1} \times 200$ and $\frac{n_{13}}{m_1} \times 200$ respectively where n_h is the heaviest among the series $n_0, n_1, \ldots\ldots n_{13}$:

d, the aggregate sex-ratio deviation, is the summation irrespective of sign of the deviations between the successive sex-ratios, that is $/r_o - r_1/ + /r_1 - r_2/ + \ldots\ldots + /r_{12} - r_{13}/$:

i the sex-ratio index is therefore $\frac{1}{13}(d - /r_i - r_t/)$:

D, the aggregate age ratio deviation from 100%, is the summation irrespective of sign of the deviations from 100% of the age ratios, that is $/100 - R_1/ + /100 - R_2/ + \ldots\ldots + /100 - R_{13}/$:

I, the male age-ratio index, is $D \div (R_h - 100 + R_h - R_t)$:

I', the female age-ratio index, similarly is $D' \div (R'_h - 100 + R'_h - R'_t)$:

G.I., the grouped accuracy index, is i x I x I'.

age groups	numbers enumerated: males n	numbers enumerated: females n'	sex ratio percentages, r	sex ratio deviations	moving totals of paired age groups: males m	moving totals of paired age groups: females m'	male age ratio percentages, R	male age ratio deviations	female age ratio percentages, R'	female age ratio deviations
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
country : MONACO 1951										
0- 4	474	501	94.61							
5- 9	496	526	94.30	- 0.31	970	1027	102.27	- 2.27	102.43	- 2.43
10-14	404	411	98.30	4.00	900	937	89.78	10.22	87.73	12.27
15-19	404	483	83.64	-14.66	808	894	100.00	-	108.05	- 8.05
20-24	508	624	81.41	- 2.23	912	1107	111.40	-11.40	112.74	-12.74
25-29	575	781	73.62	- 7.79	1083	1405	106.19	- 6.19	111.17	-11.17
30-34	463	567	81.66	8.04	1038	1348	89.21	10.79	84.12	15.88
35-39	670	853	78.55	- 3.11	1133	1420	118.27	-18.27	120.14	-20.14
40-44	815	989	82.41	3.86	1485	1842	109.76	- 9.76	107.38	- 7.38
45-49	858	942	91.08	8.67	1673	1931	102.57	- 2.57	97.57	2.43
50-54	776	954	81.34	- 9.74	1634	1896	94.98	5.02	100.63	- 0.63
55-59	607	885	68.59	-12.75	1383	1839	87.78	12.22	96.25	3.75
60-64	594	853	69.64	1.05	1201	1738	98.92	1.08	98.16	1.84
65-69	485	686	70.70	1.06	1079	1539	89.90	10.10	89.15	10.85
total				d = 77.27				D = 99.89		D' = 109.56
ratios and indices: r_i = 94.5, r_t = 70.1, i = 4.07, R_h = 176.9, R_t = 100.0, I = 0.65, R_h' = 192.6, R_t' = 133.6, I' = 0.44, G.I. = 1.16										
country : GERMANY (F.P.) 1950										
0- 4	1717	1632	105.21	- 0.98	3541	3382	103.02	- 3.02	96.51	3.49
5- 9	1824	1750	104.23	- 0.45	4021	3867	109.28	- 9.28	109.49	- 9.49
10-14	2197	2117	103.78	0.03	3966	3821	89.21	10.79	110.81	-10.81
15-19	1769	1704	103.81	- 5.47	3543	3508	100.14	- 0.14	102.85	- 2.85
20-24	1774	1804	98.34	-23.27	3295	3830	92.32	7.68	105.80	- 5.80
25-29	1521	2026	75.07	- 1.25	2573	3451	81.77	18.23	82.58	17.42
30-34	1052	1425	73.82	2.46	2612	3470	119.45	-19.45	117.87	-17.87
35-39	1560	2045	76.28	6.12	3302	4159	105.51	- 5.51	101.66	- 1.66
40-44	1742	2114	82.40	9.04	3505	4042	100.60	- 0.60	95.40	4.60
45-49	1763	1928	91.44	- 8.39	3184	3639	89.26	10.74	94.04	5.96
50-54	1421	1711	83.05	- 8.48	2500	3158	86.32	13.68	91.64	8.36
55-59	1079	1447	74.57	3.20	2020	2657	93.17	6.83	91.08	8.92
60-64	941	1210	77.77	3.61	1732	2182	91.34	8.64	89.09	10.91
65-69	791	972	81.38							
total				d = 72.75				D = 114.59		D' = 108.14
ratios and indices: r_i = 104.7, r_t = 79.4, i = 3.65, R_h = 124.1, R_t = 44.7, I = 1.11, R_h' = 125.2, R_t' = 57.5, I' = 1.16, G.I. = 4.70.										

age groups	numbers enumerated: males n	numbers enumerated: females n'	sex-ratio per-centages, r	sex ratio deviations	moving totals of paired age groups: males m	moving totals of paired age groups: females m'	male age ratio per-centages, R	male age ratio deviations	female age ratio per-centages, R'	female age ratio deviations
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
country : SOUTH WEST AFRICA (EUROPEANS) 1946										
0- 4	2365	2244	105.39							
5- 9	2320	2248	103.20	- 2.19	4685	4492	99.04	0.96	100.09	- 0.09
10-14	1859	1773	104.85	1.65	4179	4021	88.97	11.03	88.19	11.81
15-19	1554	1594	97.49	- 7.36	3413	3367	91.06	8.94	94.68	5.32
20-24	1758	1616	108.79	11.30	3312	3210	106.16	- 6.16	100.69	- 0.69
25-29	1534	1510	101.59	- 7.20	3292	3126	93.20	6.80	96.61	3.39
30-34	1404	1478	94.99	- 6.60	2938	2988	95.58	4.42	98.93	1.07
35-39	1324	1320	100.30	5.31	2728	2798	97.07	2.93	94.35	5.65
40-44	1118	1085	103.04	2.74	2442	2405	91.56	8.44	90.23	9.77
45-49	872	858	101.63	- 1.41	1990	1943	87.64	12.36	88.32	11.68
50-54	795	768	103.52	1.89	1667	1626	95.38	4.62	94.46	5.54
55-59	745	725	102.75	- 0.77	1540	1493	96.75	3.25	97.12	2.88
60-64	743	533	139.40	37.06	1488	1258	99.87	0.13	84.74	15.26
65-69	574	282	203.55	64.15	1317	815	87.17	12.83	69.20	30.80
total				d = 149.63				D = 82.87		D' = 103.95
ratios and indices: r_i = 104.3, r_t = 161.6, i = 7.10, R_h = 101.0, R_t = 24.5, I = 1.07, R'_h = 100.1, R'_t = 12.6, I' = 1.19, G.I. = 9.04.										
country : EGYPT 1952										
0- 4	1280	1305	98.03	3.45	2489	2496	97.16	2.84	95.43	4.57
5- 9	1209	1191	101.48	5.17	2351	2262	97.17	2.83	94.69	5.31
10-14	1142	1071	106.65	0.60	2126	1989	92.55	7.45	92.27	7.73
15-19	984	917	107.25	-11.26	1662	1623	81.57	18.43	86.98	13.02
20-24	678	706	95.99	- 8.81	1364	1493	100.58	- 0.58	105.39	- 5.39
25-29	686	787	87.18	2.74	1306	1476	94.97	5.03	93.43	6.57
30-34	620	690	89.92	10.95	1279	1343	103.07	- 3.07	97.33	2.67
35-39	659	654	100.87	- 0.38	1228	1220	92.65	7.35	92.84	7.16
40-44	569	566	100.49	2.71	998	982	85.91	14.09	84.60	15.40
45-49	429	415	103.20	- 9.29	850	864	99.14	0.86	103.86	- 3.86
50-54	421	449	93.91	4.96	592	622	57.77	42.23	55.69	44.31
55-59	171	173	98.87	-14.53	423	472	119.12	-19.12	126.65	-26.65
60-64	252	299	84.34	17.67	336	381	49.90	50.10	43.12	56.88
65-69	84	82	102.01							
total				d = 92.52				D = 173.98		D' = 199.52
ratios and indices: r_i = 99.7, r_t = 88.2, i = 6.23, R_h = 102.8, R_t = 6.7, I = 1.76, R'_h = 104.6, R'_t = 6.6, I' = 1.95, G.I. = 21.38.										

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