

AN INSTANCE OF REVERSE HEAPING OF AGES

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Abstract—This note reports on an interesting example of reverse heaping of ages for data from the Saudi Arabian social insurance system. Peaks occur for the number of workers at ages corresponding to years of birth ending in zeroes and fives, while there are troughs at such ages for the average monthly wages. Such troughs almost certainly are the result of workers with less education using a rounded year of birth, and, correspondingly, such workers would tend to have lower earnings.

It is well known that the reporting of ages in censuses often contains heaping at certain digits, especially in populations which are not too accustomed to keeping records. Thus, for example, if age at last birthday is inquired about, heaping will often occur at the ages ending in zeroes and fives. On the other hand, if year of birth is inquired about, the heaping will be at years ending in zeroes and fives, so that the ages will be heaped at other digits if the census year itself does not end in a zero or five. Furthermore, in certain Asian cultures that use a repeated animal-cycle of years, certain years considered less propitious might be avoided in reporting (or registration), and the heaping that results might then be quite different than that at the zeroes and fives.

The author recently obtained data for private-sector workers covered under the Saudi Arabian social insurance system that are an interesting illustration of reverse heaping. The number of covered workers and their average current monthly wage were reported by single years of age as of July 1974. Interestingly, although most workers were reported on a year-of-birth basis that followed the hegira (or Moslem) year basis, a few employees of foreign employers were reported on a Gregorian calendar-year-of-

birth basis. For the former group, the age was obtained by subtracting the year of birth from the current year, which was 1394 on the hegira basis, the census being taken in the middle of that year. Similarly, for the latter group, the age was based on 1974 minus the year of birth.

Figure 1 plots these data for number of workers and average monthly salaries in terms of riyals (one riyal then equaled approximately 28 U.S. cents). A visual examination of Figure 1 clearly shows significant peaks in the numbers of workers at the ages ending in fours and nines, which is, of course, due to subtracting years of birth ending in zeroes and fives from 1394.

Correspondingly, significant troughs in the average salaries appear at ages ending in fours and nines. This almost certainly can be explained by the fact that there is a tendency for less-educated workers to fail to know their exact year of birth, so that they select a year ending in zero or five. At the same time, such individuals would tend to have lower earnings.

The data shown in Figure 1 are summarized in Table 1 by selecting age groups which are centered at the fours and nines. The ratio of the number of workers at the central age in the age group to the average

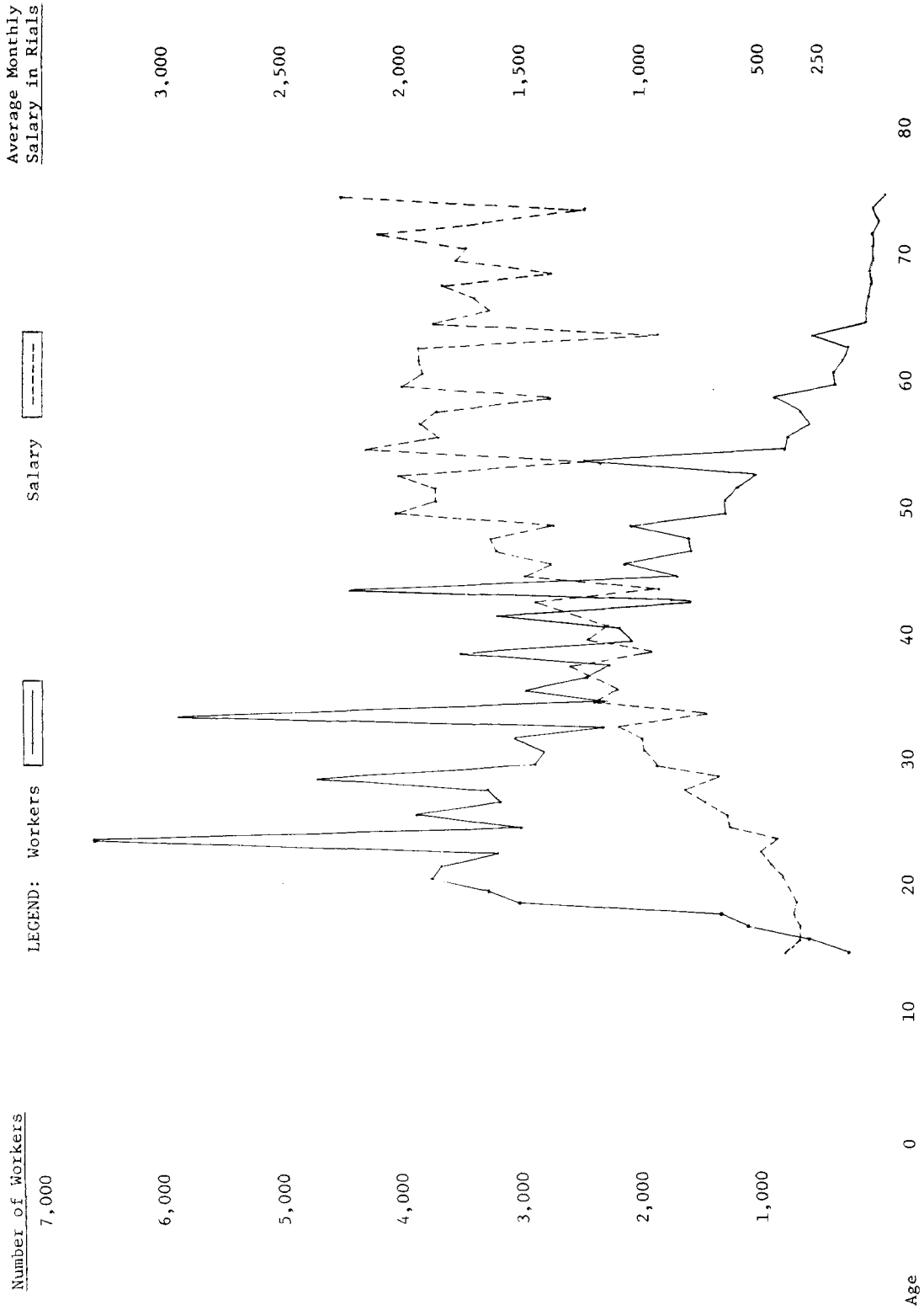


FIGURE 1.—Number of Workers and Average Monthly Salary of Workers in the Private Sector by Age Based on Information from the Saudi Arabian Social Insurance System.

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TABLE 1.—Data Showing Heaping of Number of Workers and Average Monthly Salaries of Workers in the Private Sector, Saudi Arabian Social Insurance System: Mid-1394 (Moslem Year)

Age Group	Number of Workers			Average Monthly Salary		
	Average for Group	Central Age	Ratio, Central Age to Average	Average for Group	Central Age	Ratio, Central Age to Average
17-21	2,575	3,097	1.20	R.414	R.385	.93
22-26	4,133	6,630	1.60	556	478	.86
27-31	3,446	4,781	1.39	849	715	.84
32-36	3,373	5,921	1.76	1,002	770	.77
37-41	2,567	3,592	1.40	1,179	997	.85
42-46	2,689	4,511	1.68	1,268	966	.76
47-51	1,641	2,165	1.32	1,692	1,397	.83
52-56	1,329	2,545	1.91	1,693	1,206	.71
57-61	649	962	1.48	1,789	1,418	.79
62-66	347	634	1.83	1,562	965	.62
67-71	148	163	1.10	1,707	1,414	.83
72-76	80	111	1.39	1,804	1,266	.70

number of workers per single year of age in the age group clearly shows the bias present, since this ratio is generally about 1.50. Similarly, when average monthly salaries are considered, the much lower average salary for the central age of each age group is clearly evident, since it is usually about 20 percent lower.