Social Security Technique and Demography

by

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Demographic data are essential for the establishment of social security technique on a firm foundation. The close connection between social security studies and demographic studies was discussed in a recent article in the Review [1], *and it was suggested that the article should be followed up by further studies by social security and demographic experts. In reply to this invitation the author of the following article has treated the subject from the point of view of social security in France. Mr. Netter is a well-known actuary and author of studies showing the essential principles of social security in general and the reasons for certain of its features.*[2]

The subject is not treated exhaustively here; the author shows rather how the combined study of demographic statistics and statistics taken from the application of the social security system have proved helpful in the solution of a number of problems in France.

SOCIAL security effects a redistribution of income to the benefit of the non-active population (children, the sick, invalids and old people). An analysis of the structure of the group comprising all the persons covered enables the technical details of this redistribution to be ascertained. Conversely, the administration of a social security system provides information on struc-

[1] " Social Security Financing and Demography ", *International Labour Review*, Vol. LXVI, Nos. 5-6, November-December 1952.

[2] Notably in Francis NETTER : *Notions essentielles de sécurité sociale* (Librairie du Recueil Sirey, Paris, 1951).

tural trends within the group. A combined study of demographic statistics and statistics drawn from the application of social security legislation should therefore be particularly instructive.

In France the social security system has been gradually built up through a number of stages, and the result is a complex organisation strongly influenced by its historical development. Attempts to unify and co-ordinate the various schemes have succeeded in bringing sickness insurance, industrial accident insurance and family allowance benefits into line, in spite of the diversity of agencies concerned, but old-age insurance benefits and methods of financing still vary greatly from scheme to scheme.

The information provided by social security statistics is in consequence incomplete and relates to only a part of the population, and is thus unsuitable as a basis for general conclusions. It would appear preferable, therefore, to compare the results of studies made at different times in order to attempt to define the habits of the group of individuals covered.

Sickness expenditure statistics, for instance, show that the medical consumption of employees increases with their income, and that the increase is much more marked among insured persons with a dependent family. Medical and pharmaceutical consumption remained closely linked over a long period. Since 1949, however, pharmaceutical expenses have risen steeply as new kinds of therapy have been developed.

The way in which benefits in kind are provided has a strong influence on the level of sickness expenditure, to the extent that expenditure is seen to vary in accordance with the facilities afforded for the satisfaction of needs. There has been, for instance, an appreciable decrease in the number of confinements at home and a corresponding increase in the number of confinements in nursing homes or hospitals.

The comparison of sickness insurance statistics with demographic statistics enables changes in population structure to be traced in expenditure trends. French birth-rate trends since 1945, for example, have brought about an increase in the number of beneficiaries' dependent children, which is reflected in expenditure. Of total sickness benefits paid out in kind for insured persons, spouses and dependent children, the proportion represented by children was 17 per cent. in 1946, and rose to 22 per cent. in 1952.

Furthermore, the fact that the expansion of sickness insurance expenditure has coincided with an appreciable improvement in the country's general state of health and a considerable fall in the death rate leads to the supposition that sickness insurance expenditure

represents a maintenance cost on human capital which grows as maintenance improves and makes its results felt. Whereas there was one doctor per 1,600, one dentist per 4,900, one midwife per 3,700 and one pharmacist per 3,500 inhabitants in France in 1936, there was one doctor per 1,200, one dentist per 3,900, one midwife per 4,300 and one pharmacist per 3,000 inhabitants in 1951.

Before carrying this study further, we must briefly describe the population of France with particular reference to distribution by age and sex, which was strongly affected by the abnormally high male death rate and decrease in births consequent on the first and second world wars.

The distribution of the sexes is the result of a combination of opposing factors. Male births exceed female births; the wars upset the normal balance of the sexes in favour of the female element; foreign immigration is predominantly male, and finally, the adult male mortality rate is higher than that of adult females. Taking the population as a whole, the number of women per thousand men has varied continuously. In 1911 it was 1,035, in 1921 1,103, in 1931 1,070, in 1946 1,111 and may be put at 1,069 for 1953. The 1953 population has more men than women in the under-35 age group, and more women than men in the over-35 group. The number of females per thousand males ranges from 961 in the 0-4 age group, through 976 in the 15-19 age group, 998 in the 35-39 age group and 1,048 in the 50-54 age group, to 1,526 in the 70-74 age group.

The wars separated couples and resulted in an appreciable decrease of marriages during the period of hostilities, causing a considerable fall in births. The end of hostilities brought a sharp rise in the number of marriages, which had often been delayed by the war; this, and the general return home, raised births correspondingly. At the same time the age structure of the female population, which is an essential factor in the number of births, has become very favourable since 1946 (see table I).

TABLE I. FEMALE POPULATION BY AGE GROUPS IN FRANCE

(in thousands)

Year	Age group				
	15-19	20-24	25-29	30-34	35-39
1936	1,121	1,471	1,639	1,655	1,602
1946	1,612	1,639	1,060	1,409	1,561
1953	1,455	1,607	1,612	1,401	1,119

The groups drained by the first world war have passed into the higher age groups, and the number of women of child-bearing age has become especially high since 1946. The effects of a favourable demographic situation were reinforced by the large number of marriages that followed on the end of hostilities. Furthermore, the average age at marriage, raised by delayed post-war marriages, has fallen and is tending to stabilise at a lower level than before the war. Finally, the female fertility rate has remained high. All these phenomena are reflected in a high number of births at the present time. The number of children per family, which had fallen with the decrease in births during the pre-war period, has risen perceptibly, as is seen in table II.

TABLE II. REGISTERED LIVE BIRTHS IN FRANCE
(in thousands)

Year	Registered live births	Year	Registered live births
1930	750	1941	520
1931	734	1942	573
1932	722	1943	613
1933	679	1944	627
1934	678	1945	643
1935	640	1946	840
1936	631	1947	867
1937	618	1948	867
1938	612	1949	869
1939	612	1950	858
1940	559	1951	823
		1952	820

In the field of sickness benefits, demographic statistics are of assistance only in explaining expenditure trends. In other branches of social security a knowledge of demographic statistics not only contributes to an understanding of present trends but enables future ones to be forecast by extrapolating present data.

A rough indication of the trend of family allowance costs, for instance, can be obtained by comparing the number of children under 15 years with the total French population of working age (15 to 64).

TABLE III. CHILDREN UNDER 15 YEARS AND POPULATION OF WORKING AGE
(thousands)

Year	Children under 15	Population aged 15-64
1936	10,167	26,909
1946	8,696	26,766
1951	9,504	27,832
1953 [1]	9,919	27,929

1 Estimate on 1 January 1953.

The under-15 age group will increase by about 200,000 per year until 1961. In spite of a diminished fertility rate, the number of annual births is likely to exceed 750,000. Furthermore, a perceptible gain will accrue from a drop in the infant mortality rate (cf. table IV).

TABLE IV. DEATHS UNDER AGE 1 PER 1,000 LIVE BIRTHS IN FRANCE

Year	No. of deaths	Year	No. of deaths
1930	78	1945	109
1935	69	1946	73
1939	64	1947	67
1940	92	1948	52
1941	73	1949	56
1942	71	1950	47
1943	76	1951	46
1944	77	1952	41

A smaller but nonetheless appreciable gain will accrue from a fall in the child death rate. This latter, which was 67 per 10,000 for the 1-4 age group in 1930 and 1932, fell to 31 per 10,000 for 1947-50. On the other hand, leaving immigration out of account, the size of the 15-64 age group will not alter perceptibly before 1961, owing to the small number of births during the years between 1936 and 1945. In other words, the ratio

$$\frac{\text{children under 15 years of age}}{\text{population aged 15-64}}$$

which fell to a low of 32.3 per cent. in 1946, is likely to reach 40 per cent. in 1961.

The amount to be paid out in family allowances, which vary per child with the size of the family, will increase much more rapidly than the number of children. An increase in the cost of family benefits involves an increase in contribution rates. In the general scheme for employees in commerce and industry, contributions have risen from 12 per cent. of wages in 1946 to 16.75 per cent. since the end of 1951. This contribution rate, which was slightly higher than the family allowance funds required to meet their needs, enabled a considerable surplus to be accumulated in 1952. The demographic upthrust, however, which will involve an increase in costs up to 1961, will make it necessary to reconsider the financing of family allowances if the amount of family benefits is to be maintained at its present level or increased.

Forecasting old-age benefits is less complicated than forecasting family allowances. The size of the population above a given age may be calculated, assuming an estimated death rate and ignoring emigration and immigration (see table V).

TABLE V. EXPECTATION OF LIFE AT VARIOUS AGES IN FRANCE

Age	Men			Women		
	1920-1922	1935-1937	1947-1950	1920-1922	1935-1937	1947-1950
0	50.7	55.7	61.8	54.4	61.3	67.5
20	42.6	43.3	48.0	45.5	48.3	52.6
40	27.4	27.3	30.3	30.1	31.5	34.7
60	13.7	13.8	15.2	15.3	16.2	17.9
80	5.8	5.7	6.2	6.1	6.3	6.9

Except for the lowest ages, the death rate altered little between 1920 and 1930. During the last decade it fell considerably for all ages. Without this fall the size of the over-65 group in France would remain practically unchanged up to 1961, owing to the losses during the first world war, which were particularly heavy in the generations born between 1880 and 1900. As an absolute figure, the number of old people will continue to grow during the years to come. As a proportion of the total population of all ages, the percentage of old people over 60, which was 16.1 per cent. of the total population during each of the years between 1947 and 1950, is likely to increase and reach 18 per cent. by about 1971 if the death rate continues to drop.

If old-age insurance covered the whole population under a single scheme demographic studies would provide sufficient information for the probable size of the older population to be calculated for various periods, thus enabling the future cost of old-age insurance to be deduced. This is not the case, however, and the existence of different schemes for major occupational groups creates a number of problems.

Theoretically, the financial equilibrium of an assessment pension scheme may be expressed by the equation—

contributions × number of active members = pensions × number of pensioners.

The equation is quite simple if contributions and benefits are uniform, as they are in the French schemes for independent workers (tradesmen, craftsmen and professional people). In the case of the professions, each has its separate fund. For those listed in table VI a comparison is made between—

(a) the number of independent professional workers under 65; and

(b) the total of professional people over 65 (whether retired or still active), non-active spouses and widows [1] (in the case of those unable to work, the age of 60 is taken instead of 65).

[1] Under this head a couple consisting of an independent professional worker and spouse is reckoned as two.

TABLE VI. NUMBER OF PERSONS UNDER 65 YEARS OF AGE AND NUMBER OVER 65 IN CERTAIN PROFESSIONS IN FRANCE

Profession	Persons under 65 in practice	Persons over 65
Doctors	25,960	13,151
Notaries	5,808	4,284
Legal officers	7,080	4,832
Pharmacists	11,991	5,839
Veterinaries	2,471	1,200
Dentists	9,208	1,374
Chartered accountants	7,906	1,515

The demographic differences are due to trends within the profession; for instance, the office of notary is gradually being abolished, some professions have only recently received legal recognition (chartered accountants) and others include only a small elderly element or are in the stage of development (dentists).

The effect of such differences is traceable in the contribution rates of the various occupational funds. In order to keep contribution rates down some professional old-age insurance funds have been compelled to demand contributions from those who continue their professional activity after the age of 65 and to make the payment of pensions dependent on a means test or the cessation of gainful activity.

In an old-established old-age insurance scheme, or a recently established scheme in which pensions are calculated according to past employment although contributions were not paid on such employment, the present pensioners' group corresponds to the gainfully-occupied group of some 30 years ago. Comparing the pensioners' group and the active workers' group is therefore, within limits, the same as comparing the number of active workers at periods 30 years apart. Such a comparison reflects population trends or, in the case of an occupational scheme, trends in the industry. In an assessment system recently developed industries have lower pension expenses than older industries in which numbers may have decreased owing to rationalisation or technical advances.

For example, a collective agreement of 14 March 1947 established a pension scheme for technicians and managerial and supervisory staff, which covered on 31 December 1951 about 337,000 persons earning over 408,000 francs a year at that date.

This is an assessment scheme which takes into account periods of employment worked before it was set up. On 31 December 1951 it numbered only 55,000 pensioners or widows ; the lowness of the

figure is partly due to the large numbers who continue in employment after the age of 65, but mostly to the fact that undertakings now number more technicians and managerial and supervisory staff than formerly. Industrial concentration and the fact that heads of industry tend to become company employees instead of remaining independent, with a consequent change of legal status, is responsible for the latter trend.

Such examples show that occupational social security schemes cannot be set up without taking into account the economic conditions governing the activity of occupational groups.

In a system without any outside financial assistance, the equation

$$\text{benefits} = \text{contributions} \times \frac{\text{active members}}{\text{beneficiaries}}$$

comprises two factors. The first is the ratio

$$\frac{\text{active members}}{\text{beneficiaries}}$$

which is given by a demographic analysis of the occupational group. It can be altered by measures designed to lessen the number of beneficiaries—in the field of old-age insurance, for instance, by raising the retirement age, making pensions dependent on the cessation of activity, or a means test. The second factor, contributions, must be kept within limits which are financially possible for the group of workers concerned.

In many systems it has been necessary to make provision for adjusting contributions to contributors' means, either by fixing contributions according to earned income or by providing for partial exemption for members of insufficient means.

A group's contribution limit will be high if it participates in the production of a relatively large fraction of the country's output or if its share of national revenue is large, so that certain occupational groups are able to make a wide social security scheme work in spite of unfavourable demographic characteristics.

A group's contribution limit is low on the other hand if the method of payment and the incidence of contributions make them bear relatively heavily on active workers, and certain schemes may find it difficult to balance receipts and expenditure owing to the unfavourable demographic characteristics of their members and beneficiaries.

In this case external aid becomes essential. It may be effected either by government subsidy or equalisation from another occupational fund. Such equalisation may be acceptable and fairly

simple to carry out for sickness insurance or family allowances because benefits are similar from one scheme to another, but it becomes very difficult in the field of long-term benefits owing to the great variety of pension rates. In this case, therefore, it is usually replaced by financial assistance from the community.

French experience provides an example. The social security scheme for industrial and commercial employees was reorganised by the 1945 Ordinances which provided social security institutions with very flexible rules and considerably widened the scope of benefits.

At the present time expenditure in the social security scheme for industrial and commercial employees has been pushed very close to the contribution limit compatible with the financing machinery set up under the 1945 Ordinances, owing to the higher cost of workers' health and the demographic tendency increasing the number of beneficiaries per family.

The social security scheme for agricultural occupations, which split off from the commercial and industrial scheme in 1941, has tended towards a different system of financing based on individual contributions, taxes on produce and levies graduated according to the size of farms.

This machinery reflects the distribution of income as between industry and agriculture, the economic operating conditions of farming, technical exigencies as regards the levying of contributions and farmers' demographic circumstances.

The population of France, which was predominantly rural during the nineteenth century, is now predominantly urban. The following table illustrates this development. (Communes with a central population of over 2,000 are classed as urban.)

TABLE VII. EVOLUTION OF URBAN AND RURAL POPULATION
(thousands)

Census	Population		Active population	
	Urban	Rural	Non agricultural occupations	Agricultural occupations
1906 [1]	16,537	22,715	11,811	8,910
1926 [1]	19,985	20,759	13,194	8,200
1946 [2]	21,551	18,952	13,230	7,291

1 87 departments.
2 90 departments.

Population distribution trends as between town and country and distribution trends among the active population as between

industry and farming would have the effect of making active agricultural workers responsible both for children going to work in towns and old people left in the country. Agricultural social security financing machinery effects a transfer of responsibilities from agriculture to the rest of the population, so offsetting the excess demographic burden on the former.

The foregoing demonstrates that a knowledge of population structure enables probable trends in the number of beneficiaries and hence in the expenditure of social security schemes to be predicted. The schemes' receipts are nevertheless seen to be mainly determined by economic factors. Leaving migration out of account, it may be predicted that the number of children and old people will considerably increase in France during the next 10 years, whereas the number of persons of working age will remain relatively stable.

More than 90 per cent. of men between 15 and 64 are active workers (*i.e.*, practically the total male population, after deducting students, invalids and the sick). Fifty per cent. of women between 15 and 64 years of age are at present active workers. If these percentages are maintained, the burden on every active worker to provide for the needs of the non-active population will increase with the number of children and old people.

The increase in the number of beneficiaries under social security schemes will make it necessary to put a larger share of national revenue at the disposal of the social security agencies. The increase in expenditure nevertheless seems relatively slight in comparison with the increase in national income which may be provided by technical progress.

(Translated from the French.)