V. GHEȚĂU
Central Office of Statistics
VL. TREBICI
Department of Economic Cybernetics
Academy of Economic Studies

Longitudinal Analysis, Potential Demography* and Demographic Accounts (II)

"Researching the causes of phenomena is the fundamental aim of all sciences, and the social sciences-demography in particular — may not omit this imperative."

Roland Pressat

1. ACTUAL AND POTENTIAL DEMOGRAPHY

1. The appearance of the methods of potential demography is part of the continuous process of improving the methods used by demographic science in the quantitative and qualitative study of the number and structure of the population, of its movement. The techniques of potential demography come to deepen the demographic analysis conferring new aspects on it and, at the same time, to remove certain shortcomings of traditional demography (also called actual demography). These shortcomings are known and they derive especially from the impossibility for the traditional indices of grasping the demographic phenomena in their dynamics. Thus, the birth-rate (the proportion of live borns for 1000 inhabitants) is not the most faithful reflection of the intensity of the process of reproduction of the population. The inclusion of the total number of the population in the calculus of this rate thus, of the children and of old people — has a perturbative effect, distorting the real content of the rate. This shortcoming is not characteristic of the general death-rate. But, the influence of the structure on age of the population intervenes. Owing to this fact, the comparison of the death-rate of two populations only on the basis of the general death-rate may lead to erroneous conclusions. There are many situations in which two populations have equal general death- rates and specific rates of mortality (on age and

* "Démographie potentielle".

even groups of age) entirely different. The real intensity of mortality in the two populations is given by the specific and not by the general death-rate. The above paradox originates in the particularities of the structure on age of the two populations and which cannot be grasped with the general mortality rate. The solution adopted in such cases is the standardization of rates by using a structure on age common for the two populations. However, we should not forget that this standardization has a relative character, the selection of the standard population being, in the last analysis, an arbitrary selection, a fiction. The standardized death-rate is, of course, a valuable help in the compared analysis of the death-rate of two populations, but, it does not entirely clarify the phenomenon of mortality with the two populations.

However, we should not underestimate the cognitive value of the traditional demographic indices. But, their correct interpretation, the knowing of possibilities and equally of their limits are necesary.

The population has a historical character, it can be imagined only in time. The number and structure of the population on age, however, refers to a certain moment, thus eliminating the time factor. What potential demography brings new is the very dynamization of the statical character of some indices with the aid of the *life potential*, namely, of the average number of years a person aged x has to live. Some of the shortcomings of the indices of traditional demography are thus diminished and, on the other hand, new aspects of the demographic phenomena are being outlined.

The founder of potential demography is the Swiss demographer Liebmann Hersch. Being the author of many studies of potential demography, L. Hersch presented the theory of life potential especially in his work "De la démographie actuelle à la démographie potentielle" (Geneva, 1944). More or less important contributions or new applications of potential demography were also made by J. Bourgeois-Pichat, W. Winkler, E. Vielrose, Z. Pavlik and others.

2. THE LIFE POTENTIAL. NOTIONS. DETERMINATION METHODS

The *life potential* represents the average number of years a person, a group of persons or a population has to live between certain ages or until the and of life. The determination of the *life potential* is based on the index e_x — the expectation of life-in the life tables. This index shows the average number of years a person aged x has to live until the end of life, in the hypothesis that he will live in the conditions of specific mortality in the reference period. The *individual life potential* of a person aged x is thus $v(x) = \frac{e_x + e_{x+1}}{2}$.

If $v(x)$ is the individual life potential, the *total life* potential of a population will be $V = \sum P_x \cdot v(x)$, being influenced both by the size of the individual life potential and by the number and age structure of the population. Representing the total sum of the years of life of a population, the total life potential corresponds, as regards significance, to the number of the po-

pulation in the traditional demography[1]). But, in contradistinction to it, the life potential of a population changes even if the number of the respective population remains unchanged, thus no birth and no death is registered.

If $P_x^A \cdot v(x)$ is the life potential of a population aged x, in the year A, the life potential of the same population in the next year $(A + 1)$ will be $P_{x+1}^{A+1} \cdot v(x + 1)$. In this situation, $P_x^A \cdot v(x) > P_{x+1}^{A+1} \cdot v(x + 1)$, since $v(x + 1) < v(x)$ even if $P_x^A = P_{x+1}^{A+1}$. In other words, the life potential at the age $x + 1$ years is smaller than the life potential at the age x, which makes the life potential of a population of a given number to diminish with the ageing of this population.

The *individual life potential.* The life potential of a person aged x is $v(x) = \frac{e_x + e_{x+1}}{2}$ representing the average number of years a person aged x has to live.

Calculated only for the period of life comprised between n and N years $(x < n < N)$, this potential is:

$$v(x;\ n,\ N) = \frac{l_n e_n - l_N e_N}{1/2(l_x + l_{x+1})}$$

where l_n and l_N represent the number of survivors at the age n and respectively N and, e_n and e_N represent the expectation of life at the same ages.

For the period of life from n years to the end of life (ω), the life potential represents:

$$v(x;\ n,\ \omega) = \frac{l_n e_n}{1/2(l_x + l_{x+1})}$$

As the life potential of a person aged x may be decomposed on periods of life, we have the relation:

$$v(x) = v(x;\ x,\ n_1) + v(x;\ n_1,\ n_2) + \ldots + v(x;\ n_k\ \omega)$$

The *life potential of the population x years of age* is obtained by starting from the individual life potential and the number of the population:

$$V(x) = P_x \frac{e_x + e_{x+1}}{2}$$

For the period of life from n to N years, we shall have:

$$V(x,\ n,\ N) = P_x \cdot v(x;\ n,\ N) = P_x \frac{e_n e_n - l_N l_N}{1/2(1_x + 1_{x+1})}$$

and for the period of life from n years to the end of life:

$$V(x;\ n,\ \omega) = P_x \frac{l_n e_n}{1/2(l_x + l_{x+1})}$$

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[1]) The differences of these measure units are illustrated by the differences between the indices" passagers-transported" and "passengers-kilometers-transported" or between the indices of the number of workers at a certain date and the total number of person-days in a period.

Consequently:

$$V(x;\ x,\ \omega) = V(x;\ x,\ n) + V(x;\ n,\ N) + V(x,\ N,\ \omega)$$

The life potential of the population on age groups.
The population in the age group $m - M$ has a life potential equal to:

$$V(m,\ M;\ 0,\ \omega) = \sum_{x=m}^{x=M-1} P_x \frac{l_x + l_{x+1}}{2}$$

If from this potential we subtract that corresponding to the period of life from M years to the and of life, we obtain the life potential of the population in the age group $m - M$ in the period of life from m to M years:

$$V(m,\ M;\ m,\ M) = V(m,\ M;\ 0,\ \omega) - V(m,\ M;\ M,\ \omega) =$$

$$= \sum_{x=m}^{x=M-1} P_x = \frac{e_x + e_{x+1}}{2} - l_M e_M \sum_{x=m}^{x=M-1} \frac{P_x}{1/2(1_x + 1_{x+1})}.$$

Similarly, the life potential of the population aged $0 - M$ will be:
— for the entire life (from 0 to ω years):

$$V(0,\ M;\ 0,\ \omega) = \sum_{x=0}^{x=M-1} P_x \frac{e_x + e_{x+1}}{2}$$

— for the period of life 0 to M years:

$$V(0;\ M;\ 0,\ M) = \sum_{x=0}^{x=M-1} P_x \frac{e_x + e_{x+1}}{2} - l_M e_M \sum_{x=0}^{x=M-1} \frac{P_x}{1/2(l_x + l_{x+1})}$$

— for the period of life from n to N years ($n \geqslant M$)

$$V(0,\ M,\ n,\ N) = (l_n e_n - l_N e_N) \sum_{x=0}^{x=M-1} \frac{P_x}{1/2(l_x + l_{x+1})}$$

The *total life potential of a population* represents the sum of the individual life potentials:

$$V(O,\ \omega;\ O,\ \omega) = \sum_{x=0}^{x=\omega-1} P_x \frac{e_x + e_{x+1}}{2}$$

It indicates the number of years a population has to live (of course, under the conditions of specific mortality in the reference period).

Relating the total life potential to the number of the population, we obtain the *average life potential*, a synthetic index expressing the average number of years a person of a certain population has to live. It comprises not only the influence of the structure on age of the population but also that of the expectation of life. Thus, the average life potential has a complex significance, unparalleled in traditional demography.

This index may be calculated not only for the entire population but also for groups of population. Thus, the average life potential of the population aged m — M ($M > m$) is:

$$\bar{v}(m,\ M;\ O,\ \omega) = \frac{\sum_{x=m}^{x=M-1} P_x \frac{e_x + e_{x+1}}{2}}{\sum_{x=m}^{x=M-1} P_x}$$

for the entire period of life;

$$\bar{v}(m,\ M;\ M,\ \omega) = l_M e_M \frac{\sum_{x=m}^{x=M-1} \frac{P_x}{1/2(l_x + l_{x+1})}}{\sum_{n=m}^{x=M-1} P_{(x)}}$$

for the period of life from M years to the end of life;

$$\bar{v}(m,\ M;\ n,\ N) = (l_n e_n - l_N e_N) \frac{\sum_{x=m}^{x=M-1} \frac{P_x}{1/2(l_x + l_{x+1})}}{\sum_{x=m}^{x=M-1} P_x}$$

for the period of life from n to N years ($N > n$ and $n > M < N$).

The possibility of a general appreciation of the demographic ageing of two or several populations is given by the "vital centre" (x_c). It shows the age at which the cumulated life potential of the population is equal to half the total life potential, thus, the age at which $V(0,\ x_c) = 1/2\ V(0,\ \omega)$; or, in other words, the age at which the life potential calculated for the population aged 0 — x_c is equal to the life potential of the population aged x_c — ω:

$$\mathrm{V}(0,\ x_c) = V(x_c,\ \omega)$$

The life potential after a certain number of years. The methods of potential demography allow the determination of the life potential of a population in a period of time in the future.

For a person aged x, the life potential after r years but before R years ($R > r$) is:

$$v(x/r,\ R) = v(x;\ x + r,\ x + R) = \frac{l_{x+r}e_{x+r} - l_{x+R}e_{x+R}}{1/2(l_x + l_{x+1})}$$

The fact is noticed that this potential represents, in fact, the life potential of a person aged x between $x + r$ and $x + R$ years of age ($x < r < R$) The difference from the numerator is the number of years lived between $x + r$ and $x + R$ years.

For the population aged $m - M$ the life potential after r years and be re R years becomes:

$$V(m,\ M/r,\ R) = \sum_{x=m}^{x=M-1} P_x \cdot v(x;\ x + r,\ x + R)$$

Assuming that $R = \omega$, we obtain the life potential of the populat aged $m - M$ after r years and, if $R = \omega$, $m = 0$ and $M = \omega$, we obtain the potential of the entire population after r years.

The difference between the total life potential of a population and t potential of the same population after r years represents the part of t initial potential consumed in this period of time. Compared in an absolu value, for two or several populations, this index does not provide signi cant information. But, reporting this difference to the total life potenti we obtain a relative index — the proportion of the consumed life potenti

$$K = \frac{V(O,\ \omega;\ O,\ W) - V(O,\ \omega/r,\ R)}{V(O,\ \omega;\ O,\ \omega)}$$

The growth of the life potential of a population is achieved through t live borns. Noting by N their number and by e_0 the expectation of life birth, the product Ne_0 represents the life potential of the new borns. Sinc as we shall see, the losses of life potential of the entire population are appr ximatively equal to the number of the population, the growth of the life p tential is equal to $Ne_0 - \sum_{x=0}^{x=\omega-1} P_x$ and the index of the natural increa of the potential is given by relation:

$$d_p = \frac{Ne_0 - \sum_{x=0}^{x=M-1} P_x}{V(O,\ \omega)} = \frac{Ne_0 - \sum_{x=0}^{x=M-1} P_x}{\bar{v}(0,\ \omega) \cdot \sum_{x=0}^{x=M-1} P_x}$$

$\bar{v}(0,\ \omega)$ — being the average life potential.

The natural growth of the life potential represents the main compone of its increase, the other component being the growth of the life expectatio

The decrease of the life potential of a population is taking place at t expense of deceases and the ageing of the population. Obviously, the small the age is at the date of death — the bigger will be the loss of life potenti

The decrease of the life potential in a year is given by relation ($l_x e_x$ $- l_{x+1}e_{x+1}$). The relation comprises both the influence of death-rate (l_x $> l_{x+1}$ with d_x) and that of ageing ($e_x > e_{x+1}$).

The loss of the life potential by death is established on the basis the number of deceases and of the corresponding individual life potenti

$$\Delta v(x)_d = 1/2(l_x - l_{x+1})(e_x + e_{x+1})$$

As, always $l_x > l_{x+1}$, the losses of life potential by death are positiv

The change in the life potential by ageing, for a single person, is $e_x - e_{x+1}$ and the average number of survivors is $1/2(l_x + l_{x+1})$. It results that the decrease of the life potential by ageing is:

$$\Delta v(x)_b = 1/2(l_x + l_{x+1})(e_x - e_{x+1}).$$

The total decrease of the life potential in the course of a year is equal to the sum total of the losses of life potential by death and ageing:

$$\Delta v(x) = \Delta v(x)_d + \Delta v(x)_b$$

The Polish demographer E. Vielrose shows that the total loss of life potential in a population aged x is approximately equal to the number of the population at the begining of the year minus half the number of death registered in the course of the year:

$$\Delta v(x) = P_x - 1/2\ D_x$$

and when the mortality is low, to determine the total losses of life potential, the following relation may be used quite exactly:

$$\Delta v(x) = P_x$$

It is easily demonstrated that the relation between the losses of life potential by decease and ageing is:

$$\frac{\Delta v(x)_d}{\Delta v(x)_b} = \frac{1}{e_x - e_{x+1}} - 1$$

Considering the total losses of life potential $\Delta v(x) = Px - 1/2D_x$ — and the relation between the losses of life potential by death and ageing, the following formulas are obtained for the losses of life potential by death:

$$\Delta v(x)_d = (P_x - 1/2D_x)(1 - e_x + e_{x+1})$$

and, by ageing, for the population of a certain year of age:

$$\Delta v(x)_b = (P_x - 1/2D_x)(e_x - e_{x+1}).$$

3. THE EVOLUTION OF THE LIFE POTENTIAL IN ROMANIA

In this part of the study, we propose to present some *results of the estimations made for our country*. At the basis of these estimates are the data on the number of the population on sex and age, as well as, the coresponding life tables.

As the international data at our disposal mostly refer to the 1950—1960 decade, for our country too, we shall use — with some exceptions- corresponding data, thus offering the possibility of adequate comparisons.

The evolution of the individual life potential in our country shows the great achievements obtained in the post-war period in the reduction of mortality

and materialized in the increase of the expectation of life. The effects of the general increase in the living standard of the population, of the raising of the cultural level and the improvement of sanitation must be seen in this process.

Table 1

The evolution of the individual life potential at the age 0,5, 20, 50 and 65 in 1932, 1956, 1961, and 1963

Years	Age — years				
	0	5	20	50	65
1932	46.19	53.71	43.09	20.77	11.46
1956	65.40	64.58	50.53	23.61	12.42
1961	69.08	66,75	52.36	24.72	13.44
1963	69.76	67.46	53.15	25.69	14.28

The growth of the individual life potential is general though according to age important particularities are noticed. At a younger age, the growth is extremely big in 1956 as compared to 1932. The spectacular reduction of infant mortality in this period is at the basis of this growth of life potential. At an old age, where the reserves were smaller, the increase of the life potential is more reduced.

Also significant are the changes in the *individual life potential in various periods of life.*

Table 2

The individual life potential at 0, 15 and 60 years of age in various periods of life in 1956 and 1963

Age (x)	the life potential of a person aged x between							
	0 — 14 years		15 — 59 years		60 years and over		total	
	1956	1963	1956	1963	1956	1963	1956	1963
0 years	14.10	14.45	39.46	41.12	12.24	14.64	65.80	70.21
15 years	—	—	42.52	43.04	13.17	15.32	55.69	58.36
60 years	—	—	—	—	16.31	18.24	16.31	18.24

The 70. 21 years a person aged 0 lives, on an average, in the conditions of mortality in 1963 is distributed as follows: 14.15 years between O and 15 years of age (as a result of the death rate, thus 15.00—14.55 = 0. 55 years "are lost"), 41.12 years between 15 and 60 years of age (thus 45.00 — 41.12 = = 3.88 years "are lost") and 14.64 years after the age of 60. The life potential between the age of 15 and 60 estimated for a person of 15 years of age, also in 1963, is of 43—04—by almost 2 years bigger than that corresponding

to a person aged 0 — as a result of the fact that mortality between 0 and 15 years of age is excluded. All values are higher in 1963 than in 1956, an expression of the reduction of death-rate in the 1956—1963 period.

The evolution of the life potential of the population aged 0 in 1956 and 1963 reflects the combined influence of the decrease of birth-rate and the increase of the expectation of life.

Table 3

The life potential of the population aged 0 for periods of life in 1956 and 1963

million of years

years	the life potential between			
	0 — 14 years	15 — 59 years	60 years and over	total
1956	5.5	15.3	4.8	25.6
1963	4.2	11.9	4.1	20.2
1963/1956 (%)	76.3	77.8	85.4	78.9

The increase of the individual life potential in the 1956—1963 period could not compensate the effects of the decrease in the number of live borns in the same period of time. Proportionally, the decrease of the life potential is smaller in the period of life after 60, a result of a more rapid increase of the individual life potential at these ages.

If we take into account the fact that in the 1966—1970 period, the average span of life has registered no sensible changes (between 1968 and 1970, the index is little below the level registered in the 1964—1967 period), we can affirm that the variations of the life potential of the population aged O are almost exclusively, due to the annual variation of the number of live borns. After the considerable growth of the life potential of the population aged 0 in 1967 — with the increase in the number of live borns — a considerable decrease has been registered in the last few years.

Analysed in the light of the life potential, the increase of birth-rate in 1967 reveals genuine aspects: the increase of the life potential of the population is bigger than the growth of the number of the population.

Table 4

million of years

Age group	0 — 19 years		20 — 59 years		60 years and over		total	
	1961	1963	1961	1963	1961	1963	1961	1963
Total	71.9	70.5	463.9	462.5	262.1	290.9	797.9	82.9
0 — 19 years	71.9	70.5	246.9	246.9	91.2	96.8	410.0	414.2
20 — 59 years	—	—	217.0	215.6	145.6	156.2	362.6	371.8
60 years and over	—	—	—	—	25.3	37.9	25.3	37.9

Interesting observations are offered by the dynamics of the life potential of our country's population in the 1961—1963 period, on age groups and periods of life.

The period being smaller, the increase of the total life potential in 1963 in comparison with 1961 is also small: 3,3%. However, this average growth conceals different dynamics for the three age groups. If at the population aged 0—19, the life potential has increased by 1%, a 2.5% increase was registered at the population of 20—59 years of age and a 45.9% increase for that of 60 years of age and over. This last increase reflects the combined influence of the more marked growth of the number of the old-age population and of the life expectation.

The evolution of the total life potential, of the average life potential and of "the centre of life" in our country and the situation compared to that in other countries show the particularities of the demographic situation in our country.

Table 5

Country	the total life potential (millions years)	the average life potential (years)	the "life centre" (years)
Finland (1952)	164.1	40.0	17.4
France (1953)	1639.0	37.5	20.8
India (1951	10489.0	29.1	15.1
Israel (1953)	67.2	45.3	17.2
Yugoslavia (1953)	715.4	42.1	17.5
Norway (1952)	140.7	42.8	21.2
Poland (1954)	1155.0	42.8	17.6
Great Britain	1750.0	39.0	22.0
(1952) Romania			
1956	736.2	42.1	17.7
1961	797.9	43.1	18.1
1963	823.9	44.1	18.6

In the countries with a reduced mortality and a bigger share of the younger population (Israel) the average life potential registers the highest values. Our country has an increased average life potential, in 1963 the younger population still held a rather important share, the average life expectation being of a high value. The values of "the life centre" show, on the one hand, a population much older demographically in some countries, such as France, Norway and Great Britain and, on the other hand, a rather marked evolution of this process in our country, in the 1956—1963 period.

The estimations according to the territory, on regions, for 1956 and 1964 show important particularities. [1]) The direct influence of the structure on age of the population, on the life potential is reflected in the fact that although Argeș and Cluj regions had in 1956 a smaller population than the Banat region, the life potential is bigger in the two regions. The decrease of the birth-rate in the Banat region and the increase in the number and share of the old-aged population is at the origin of this situation. Added

[1]) The abbreviated life tables published by dr. P. Pruteanu în "Revista de Statistică", no. 7, 1966 were used.

to the two regions in 1964 was Jassy region which has a greater life potential than the Banat region, though the number of the population is smaller.

The average life potential had both in 1956 and in 1964 the lowest value in the Banat region (37.9 and 39.4 years) and the highest value in Jassy region (45.8 and 47.3 years).

The life potential consumed by the population after a certain number of years is varying directly proportional to the number of these years.

Table 6

The proportion of the life potential to be consumed by our country's population for the next 20, 40 and 60 years in 1961 and 1963

in percentage

Years	The life potential consumed in the next		
	20 years	40 years	60 years
1961	42.4	74.4	93.3
1963	42.8	74.2	92.9

At the level of the entire population these proportions do not provide but global information. These proportions acquire a richer significance at the level of the population of certain age groups. A younger population has a much greater life potential than an adult or old-aged population. The proportion of the potential consumed in the same period of time is smaller for a younger population.

As regards the *rate of the natural growth of the life potential* (d_p), between 1956 and 1963, it has marked a continuous decrease: 12.8‰ în 1956, 4.39‰ in 1961 and 1.63‰ in 1963.

The increase of the number of the population and of the individual life potential could not compensate the effects of the decrease of birth-rate.

The evolution of the losses of life potential was the following:

1956 — 17.4 million years
1961 — 18.4 million years
1963 — 18.7 million years

The growth of the individual life potential and of the number of the population has determined the increase, in an absolute figure of the total losses of life potential. But, relating these losses to the total life potential, we notice a decrease of this proportion. The coeficient of the loss of life potential was of 23.6% in 1956, 23.0% in 1961 and 22.7% in 1963. In comparison with other European countries, the values of the coefficient in our country are lower (in France — 26.1%, Finland — 24.8%, Great Britain — 26.0%).

The decrease of the death-rate in the 1956—1963 period has brought about the reduction of the losses of life potential by death, whereas the losses of life potential by ageing are growing.

Table 7

The share of losses of life potential by death and ageing, on sex, in 1956, 1961 and 1963

in percentage

Years Sex	Total losses	By death	By ageing
1656			
male	100.0	28.7	71.3
female	100.0	25.2	74.8
1961			
male	100.0	23.6	76.4
female	100.0	20.4	79.6
1963			
male	100.0	18.8	82.1
female	100.0	17.5	82.4

The estimations made also include other aspects of the evolution of the life potential in our country. We consider that those presented in this study provide sufficient elements for characterizing Romania's population in the light of the life potential and for offering some indications as to the rank held by Romania in comparison with other countries.

4. APPLICATIONS OF THE THEORY OF LIFE POTENTIAL

The methods of potential demography were applied in analysing the causes of death (G. Mentha) and, generally, of the death-rate (R. Sailer), in the study of the active population (E. Vielrose), the study of professional life (A. Czarnota), the study of infant mortality (W. Winkler) and of that caused by tuberculosis (M. Dempsey) and in other problems.

Two more recent applications come to outline the possibilities offered by the methods of potential demography in tackling some problems usually studied with the methods of traditional demography.

One of these applications refers to the rates of reproduction of the population. It is known that the net rate of reproduction shows the number of female live borns given birth to by a generation of women subjected, in the course of their life, to the conditions of fertility and mortality noticed in a certain period of time. It is determined as follows:

$$R_0 = k \sum_{15}^{50} f_x \cdot s_x$$

where:

k = the proportion of female live borns;
f_x — specific fertility rates;
s_x = the probability of survival from birth to the age of x $\left(s_x = \frac{l_x}{l_0}\right)$.

Making thorough studies on the reproduction of the population, the French demographer L. Henry points out that a special part in this process is played by the period in which a person is alive, thus in the last analysis, by the average span of life. Therefore, he elaborates a rate of reproduction of the years lived by comparing the number of years lived by a female generation to the number of years lived by the female live-borns deriving from this generation.

The rate of reproduction of the years lived may be correlated with the net reproduction rate NRR after the formula [1]):

$$R_{A(t)} = R_{0(t)} \frac{e_0(t + \bar{x})}{e_0(t)}$$

where $e_0(t)$ is the average span of life in the generation of motherwomen born in the year t, and $e_0(t + \bar{x})$ is the average span of life in the generation born in the year $t + \bar{x}$, that is the average span of life over $\bar{x}$ years ($\bar{x}$ being the effective average age of women when giving birth to children — or the interval between two successive generations). The rate of reproduction of the years lived is thus equal to the product between the net reproduction rate and "the index of replacing the expectation of life" $\frac{e_0(t + \bar{x})}{e_0(t)}$. There are cases when $R_{0(t)}$ is smaller than 1, but, since the gain obtained in the growth of the average span of life is considerable, the rate of reproduction of the years lived — $R_{A(t)}$ -is superunitary and the number of the population is maintained or is growing. L. Henry's estimations for the generation 1900 [2]) show a net rate of reproduction of 0.720, a net rate of 0.805 at 15 years of age and a net rate reproduction rate of the years lived of 0.865.

The demographer J. Bourgois-Pichat, commenting on L. Henry's study, underlines the particular importance of the tackling of the problem of the reproduction of the population from the point of view of the reproduction of the years lived. [3])

Another direction in which the theory of life potential may find an application of special importance is that of the period of optimization of the correlation between the accumulation and consumption funds. [4]) Generally, the problem is posed in the following terms: if the average life potential is of x years, the hypothesis is admissible that the maximization of the total consumption fund must be made on an interval of x years. The index defines only the demographic and not the social limit of the period of optimization of the accumulation rate, because the interests of the society are much more complex and they cannot be confined to an average of the life potential of the population.

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[1]) L. Henry, Réflexions sur les taux de reproduction. In Population, no. 1, 1965, p. 54—69

[2]) L. Henry, the mentioned Study, p. 64.

[3]) Population no. 1, 1965, p. 70—76.

[4]) E. Dobrescu: Corelația dintre acumulare și consum (Correlation between Accumulation and Consumption.) Editura politică, 1971, p. 76—79.

Trying to formulate a conclusion on the utility and efficiency of the methods of potential demography we consider that their blending with the traditional methods and techniques deepens the demographic analysis and offers researchers new instruments for investigating the demographic phenomena. An extremely fertile field is that of economic demography, especially of the active population, yet insufficiently explored. [1])

ANALYSE LONGITUDINALE, DEMOGRAPHIE POTENTIELLE ET COMPTES DEMOGRAPHIQUES

On y donne un bref aperçu historique sur la création et le développement des concepts et des méthodes de la démographie, présentant par la suite quelques notions spécifiques à la méthode classique, ainsi que certains taux. Sont discutées ensuite l'analyse transversale et l'analsye longitudinale et on relève les caractéristiques et les avantages de chacune.

Cette première partie de l'ouvrage s'achève par la comparaison des catégories d'indices pouvant être formées à l'aide des deux genres d'analyse et mettant en évidence leur valeur pour la recherche démographique.

La seconde partie porte sur les conceptions et les méthodes de la demographie potentielle.

ПРОДОЛЬНЫЙ АНАЛИЗ, ПОТЕНЦИАЛЬНАЯ ДЕМОГРАФИЯ И ДЕМОГРАФИЧЕСКИЕ СЧЕТА

В настоящей статье делается краткий исторический обзор создания и развития концепции и методологии демографи и, после чего приводится несколько специфических понятий классического метода, а также некоторые показатели. Затем авторы говорят о поперечном и продольном анализах и выявляют как их характеристики, так и преимущества каждого из них.

Эта первая часть статьи заканчивается сопоставлением категорий показателей, которые могут быть разработаны при помощи указанных двух методов анализа, и выявляется их значение для демографических исследований.

Вторая часть рассматривает понятия и методы потенциальной демографии.

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[1]) Vl. Trebici. Populaţia României şi creşterea economică. Studii de demografie economică. (The Population of Romania and Economic Growth. Studies of Economic Demography) Editura politică, 1971, pages 312 and fol. (Especially, the estimation of the national income according to age and to the active life potential).