

Expectation of Life as a Factor of Economic Growth

Further Comments

I

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According to Professor Dasgupta, "expectation of life and not the rate of increase of population as such is the determining factor in the process of economic growth and stagnation".

Thus the percentage of the working population to the total population is determined. Professor Dasgupta implies, by the expectation of life at birth and the birth rate has nothing to do with it.

This is anything but correct.

Higher expectation of life at birth without simultaneous reduction in the birth rate, instead of increasing the proportion of the working population to the total population, actually diminishes it.

THAT capital scarcity is a vital factor hindering our economic development has been recognised on all hands. Professor A K Dasgupta without denying the indispensability of capital in the growth process has added a new item in the list of scarce factors (*The Economic Weekly*, Annual number, February 1964). It is "expectation of life at birth". (We think this is what he really had in mind when he wrote "average expectation of life", on simply "expectation of life" both of which not being related to any age do not mean anything.) Indeed, he even goes to the length of evolving a theory of under-development with "expectation of life at birth" as the key variable and styles it as a "demographic theory of stagnation". His theory may be summed up as follows:

In underdeveloped countries like India "expectation of life at birth" is very low with its logical corollary of high mortality rates. Due to high mortality rates a small percentage of population attains the "economically active" or "working" age and even among those who attain it, the duration of working life is short. (There is no hard and fast demarcation of the age-bracket of the "economically active population". Some take it from 15-59, some from 15-64; other minor variations are also not absent.) The result is a low ratio of workers to non-workers. A large number has to be maintained by the production of a small section which tells upon the size of the surplus of production over consumption that could otherwise have been formed. The size of the surplus determines investment and investment determines income. That for a long period

in pre-Plan India high death-rate (in other words, low expectation at birth) co-existed with more or less constant per capita income occurs to Professor Dasgupta as a case proving the validity of his theory.

Given the analysis, a policy measure obviously suggests itself. Expectation of life at birth is to be raised. Higher expectation would increase the ratio of workers to non-workers which in its turn would promote surplus, it being accepted that the size of the surplus, more than any other factor, determines the rate of growth.

Birth Rate, Vital Factor

The premise of Professor Dasgupta that the ratio of workers to non-workers is an increasing function of "expectation of life at birth" does not lead to his conclusion that higher "expectation of life at birth" means greater surplus unless one also assumes jobs await potential workers. But this is an unrealistic assumption. In the past full employment never obtained in India. Nor is our present situation any better. Unemployment has always been and still is a part of the Indian picture. It is precisely due to this factor that our planners are forced to strike a balance between two contrary policies of investment in capital-intensive industries and invest-

ment in labour-intensive industries even when they are conscious that the former leads to quicker development. Why India alone, "absolute over-population"¹ in agriculture and lack of employment opportunities outside it have been unanimously recognised by modern growth economists as the economic characteristics of underdeveloped areas.

When Professor Dasgupta writes "Expectation of life and not the rate of increase of population as such, is the determining factor in the process of economic growth and stagnation" by implication he means that the percentage of the "working" group in the total population is determined solely by "expectation of life at birth" and the birth rate has nothing to do with it. This is anything but correct. It has been clearly shown* that higher expectation of life at birth without simultaneous reduction in the birth rate instead of increasing the percentage of the working population in the total population diminishes it.

To every "expectation of life at birth" different series of age-specific mortality rates may correspond.

¹ United Nations, "The Aging of Population and Its Economic and Social Implications", 1953, and Frank Lorimer, in "Demographic Analysis" (Ed) J J Spengler and O D Duncan.

Percentage of Stable Population (15-59 Age-Group)

Gross Reproduction Rate	E=20 yrs	E=30	E=40	E=50	E=60.4	E=70.2
4.0	52.4	49.2	47.3	45.8	44.4	43.3
3.0	57.6	54.5	52.5	50.9	49.6	48.4
2.5	60.7	57.6	55.6	53.9	52.6	51.4
2.0	64.0	60.9	58.8	57.2	55.8	54.7
1.5	66.9	63.8	61.6	60.0	58.7	57.7
1.0	68.3	65.0	62.6	60.7	59.4	58.6

Among these, the UN experts assume that there is a central series around which all others are distributed. Thus for "every expectation of life at birth" there is a definite pattern of age-specific mortality rate, and it is through these rates that "expectation of life" affects the age-structure of a population. But births also influence the age-composition of the population. So gross reproduction rate must also be taken into account. But except in a stable population the age-composition in every demographic situation is affected not only by prevailing death and gross reproduction rates but also by the past magnitude of these rates. So the effect of a higher "expectation of life at birth", gross reproduction rate remaining constant, or of a change in gross reproduction rate, "expectation of life at birth" remaining constant can be studied only in a stable population where death-rate and gross reproduction rate assume constant values, and age-structure is invariant with respect to time. Bearing it in mind the UN experts have started with a stable population characterised by a certain expectation of life at birth and gross reproduction rate. Then keeping one variable constant they have changed the other and after all forces have worked their influence and the situation has once again stabilised, of course at different values, they have recorded the percentage that the age-group 15-59 is of the total population. Their results are given in the table, (p 615).

Similar calculation has been made by Lorimer. He has constructed a stable population which very closely resembles the Indian Census population of 1931 on the basis of (i) constant sex and age-specific death rates as represented in the official life table for India, 1921-31 (expectation of life at birth being 27) and (ii) a gross reproduction rate of 3.061. Starting with this stable population he goes on reducing the mortality rate, the gross reproduction rate being left constant, so that after thirty years the situation has stabilised at the Japanese "expectation of life at birth" which is 45. The effect of this higher "expectation of life at birth" he finds, is to reduce the proportion in the age-group 15-64 years from 56.6 per cent to 53.7 per cent, and to

raise to some extent the proportion of children under 15 years and the proportion of aged persons, to years or more, this is because reduction of very high mortality in the first few years of life has the same effect as a rise in the birth rate and increases the proportion of children.

Both the calculations thus run contrary to the hypothesis Professor Dasgupta has upheld. The opinion of the UN experts in the matter seems worth quoting: 'The reduction of mortality, to which aging at the apex of the population pyramid has so often been attributed, in fact had virtually no effect. It actually resulted in substantial rejuvenation at the base. The reduction also led to a reduction in the proportion of adults ...' Contrary views like that of Professor Dasgupta, the UN experts diagnose, may result from working with a stationary population. As the UN table shows, declining mortality affects age-composition considerably only when it is associated with low gross reproduction rates. A stationary population presupposes a balance between mortality and fertility. So when death rate is declining, by definition fertility rate has also got to decline which yields the favourable result of larger proportion of adults. But from actual experience in the under-developed countries one finds that even a rise in expectation of life at birth by 10 years has not led to any reduction in fertility.

II

S IN Agarwala

HAVE read with great interest Professor A K Dasgupta's article. Professor Dasgupta has rightly pointed out that the ability of a given population to eke out a surplus above consumption depends, among other things, upon the fraction of life that a person spends on productive activity. He, therefore, points out that the size of the population or, for that matter, the rate of population growth is not a very meaningful variable in economic growth; it is expectation of life which is the determining factor.

While the use of life expectancy as a factor in economic growth seems appropriate, Professor Dasgupta appears to have mixed up the concepts of 'expectation of life at birth' and 'length of working life'. The fact that expectation of life at

birth which was 32.5 years in 1941-50 and that in the 1951-61 decade it had risen to 41.9 years would not necessarily and automatically lead to a rise in the length of working life has to be appreciated. The expectation of life at birth is a function not only of the prevailing mortality at age zero but also of that at all the ages following it, say, up to age 100. It is, therefore, theoretically conceivable that the expectation of life at birth could increase because of improvement in infant and child mortality alone, that is, between ages 0-15. In the case of India, much greater improvement in child and infant mortality has taken place than in mortality in other age groups. Of the total gain of 9.4 years in the expectation of life at birth during 1946-1956 (the mid-points of the 1941-51 and 1951-61 decade) nearly fifty per cent is between ages 0-15 and only 33 per cent (by 3 years) between ages 15-55. The following table which gives male expectation of life at birth at selected ages and has been taken from the official life tables is interesting :

Male Life at Selected Ages
(In years)

Age	1941-50	1951-60
0	32.5	41.9
15	36.2	41.0
45	17.6	19.7
50	14.9	17.0
55	12.4	14.0

Though Professor Dasgupta is correct theoretically that an increase in expectation of life may also tend to increase the length of working life, he fails to appreciate that this need not necessarily happen. In India and in other developing countries, it may increase the length of life of the 'economically dependent' population (aged 0-15 and above 55) much more than that of the working population so that it need not be a positive factor in economic growth. It is pertinent to point out that according to a rough estimate while 10 per cent of the national income of India was spent on the maintenance of children between ages 0-15 in 1901, the percentages have now gone up to between 13-11.

* It may be pointed out that for finding out the average length of working life not only the factor of mortality but also of non-availability due to unemployment and under-employment should be taken into account.