POPULATION GROWTH AND ECONOMIC DEVELOPMENT

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Classical political economy rested on an endogenous explanation of population growth. The theory was given up towards the end of the 19th century when the neoclassical school of economic analysis was in the process of being formulated. By now, it is an established tradition of economic theorizing that the growth of population cannot be satisfactorily explained in economic terms. Most of the contemporary models of economic growth treat the population problem in an extraordinarily perfunctory manner. In fact, very often all that is said is that population will grow at an arbitrary exponential rate. Assuming conveniently behaved production functions, unchanged savings rates and an exponentially growing population, it is quite easy to work out the dynamics of growth extending into the indefinite future, which is often characterized by the existence of steady state equilibria which turn out to be globally stable in a majority of cases.

Thie mode of theorizing is used not merely to illustrate logical properties connected with "well-behaved" dynamical systems, but also as a method of explaining historical change, as well as for purposes of forecasting future developments.

Of late, this particular mode of analyzing economic growth has been subjected to criticism for treating capital as a factor of production on par with labour. However, as regards the treatment of labour, very little is said by the critics, presumably on the ground that economic analysis is unable to elucidate population movements through developing its own set of hypotheses.

While many of these critics tend to relate their own formulation of the process of economic growth to the classical models of growth, it is rather surprising that unlike the classical economists, their treatment of the labour problem is extremely sketchy, if not altogether non-existent. In other words, whatever may be the difference between the neo-classicists and their critics on the question of treating capital, their treatment of labour as a factor of production is identical.

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* This Technical Address was delivered on 55th April, 1974 on the occasion of the 27th Annual Conference of the Society held in New Delhi from 25th to 28th April, 1974.

The above observation takes on an added interest if one recalls that the rapid acceptance of neoclassical economics was largely facilitated by the observed increase in the real wages in the developed countries which was accompanied by a reduction in fertility rates from 1870's onwards. In other words, it was generally believed that the classical way of looking at the problem of distribution and growth could not be sustained because its central assumption that an increase in the level of real wages would be followed by increased fertility had failed the test of experience.

There is little doubt that many formulations by the classical economists of the population problem were based on a mechanical extrapolation of the limited experience of Britain in the early stage of industrialization. To that extent, the formulation was bound to be limited and unreliable. Afterall, a complete under standing of the spurt in population growth which accompanied the industrial development of Britain has not yet been achieved. It would, therefore, not be surprising if the contemporary understanding of the problem was somewhat one-sided.

What is, however, of importance is that the inability of one particular mode of explanation was considered as decisive enough ground for rejecting other possible formulations involving interdependence between the growth of population and the process of capital accumulation.

The matter received some considerable attention in Britain towards the end of the 19th century and in the early years of this century. A National Birth Commission was set up in 1913, which gave a variety of reasons as possible explanations for the decline in birth rates, including some economic but also a large number of so-called non-economic factors. Among the economic factors responsible, the increase in the standard of comfort and the desire for luxury were prominently mentioned.

In more recent years, these ideas have assumed the form of a theory of demographic transition, which has given rise to certain possible typologies of growth processes.

However, of late, criticism has been voiced by quite a few demographers that the typology put forward in the light of the above theory requires a drastic reconsideration because the rapid decline in morality that has been experienced in many developing countries has given rise to an altogether unprecedented set of facts. Basically, what is being urged by the critics is that if the decline in mortality rate can be explained only in exogenous terms such as the effectiveness of public policy in mitigating health hazards and in preventing recurrence of famines and widespread epidemics, a similar remedy has to be found in regard to bringing down the fertility rate. The following table constructed by Alfred Sauvy illustrates the force behind the first part of the argument :

TABLE 1*

		Length of life
Western Europe		
1789	100	30
1870	160	40
1913	280	50
1938	340	60
1962	450	70
Latin America (temperature)	212	64
Latin America (tropical part)	116	54
Asia (less USSR, China and Japan)	49	48
Africa	52	42

The Table is no doubt based on very heroic assumptions. Nonetheless, it shows that if the standard of living in Western Europe around 1789 is taken as a unit, then the length of life in the so-called third world has increased in a manner which is altogether out of line with what happened in Western Europe. Clearly this has resulted in a drastically different set of demographic conditions which pose problems whose implications have to be fully comprehended. However, the leap from the first part of the argument to the second suggests that there do exist policies which are both socially acceptable and operationally feasible in regard to the less developed parts of the world which can prove as effective in bringing down fertility as relatively low-cost medicine has been in bringing down the death rate. Before we deal with this argument it is worth mentioning in passing that the alleged superiority of investment in preventing births over other modes of investment is large beside the point in this context, quite apart from the conceptual ambiguities and statistical deficiencies from which these estimates suffer. This is largely because it can be shown without too much difficulty that in quite a few countries, other things remaining the same, a lower rate of growth of population will improve social welfare, current and perspective, on the assumption that the distribution of income will not deteriorate.† Thus, it is not

* See A. Sauvy : General Theory of Population, p. 205, Weidenfeld and Nicolson, London, 1969.

† The qualification relating to the distribution of incomes cannot be assumed away in theoretical analysis since it is possible to demonstrate that under certain circumstances family planning practices will lead to a worse distribution of incomes. This is not an argument against family planning. It merely qualifies the use of simple minded cost-benefit calculations.

necessary to waste one's time in establishing the *prima facie* presumption for population planning. However, to say that population is best planned by reducing birth rates does not amount to saying anything more than the obvious and the tantological. We use the expression 'obvious' because so far nobody has suggested that population growth should be brought down by increasing the mortality rate. It would, therefore, follow arithmetically that the effort must be based on reducing birth rates. Similarly, it would follow that if family planning programmes are defined as all these measures which prevent births from taking place, obviously the most effective method of reducing birth rates is to practise family planning on a larger scale.

The proposition advanced by advocates of family planning acquires a more substantial content only if three further propositions are accepted : (*1*) the problem of controlling fertility rates is essentially a biomedical problem ; (*2*) there exist socially acceptable methods of bringing about these changes in the reproductive sphere on a large enough scale through devices such as sterilization, etc. ; and (*3*) that economic factors involved in the choice of a family size are relatively insignificant.

2. It is worth our while to analyse each one of these propositions. Let us take the first proposition first. The proposition was formulated in an elaborate form by Raymond Pearl and his associates who argued that there was one universal law of growth for all living matter. This argument was substantiated by reference to the fundamental similarities of the metabolic process in all living organisms. Pearl's analysis rested on two propositions : (*a*) growth occurs in cycles ; (*b*) at any point within a single cycle of growth, the increment in population size depends on (*1*) the absolute size already attained ; (*2*) and the amount of actual and potential resources for the support of growth which was still unused or unexpended within the given universe. It is clear that Pearl's formulation is far too general to permit of any careful test unless one has got operational criteria for identifying different cycles of growth as well as methods for determining what is a resource, potential or actual, independent of technological knowledge and the amount of capital invested. The logistic curve of growth which was first developed by Verhulst and rediscovered by Pearl in connection with quantifying his law of growth is at best a descriptive hypothesis and has got little explanatory power by itself for explaining growth of a human population in any but the most primitive.

The above criticism of the Pearl formulation could have been regarded as redundant fifty years after its initial formulation if it were not for the fact that more recently the question of limits to growth has again come up as a matter of global concern. It is not the place to attempt a detailed critique of these recent models. But it is only proper to mention that recent proponents of the theory are unable to defend their argument in merely biological terms. In fact, there is an implicit recognition that styles of living and the process

of technological change have to be explicitly taken into account in conducting any meaningful discussion of the subject.

It is also recognised that controlling population growth by itself would not solve the problem. Thus, Forrester, whose work was the main inspiration behind the work done by Meadows and others, admits quite as much when he defines his solution for the attainment of global equilibrium as consisting of several components: (*a*) reduction in natural resource usage rate; (*b*) reduction in the generation of pollutants; (*c*) reduction in gross investment; (*d*) reduction of food production; (*e*) reduction of birth rates.

Whatever may be the merits of this package, it is quite clear that he is not thinking in completely naturalistic terms. Profound institutional changes are called for. Furthermore, if the global equilibrium is to be characterized by a better distribution of world incomes, there is an urgent need for restructuring international economic relationships, including large-scale planning of international capital transfers.

It would, therefore, appear that, whatever suggestive value the naturalistic models have, they cannot explain much of the past experience of population growth nor can they be used as a safe basis for extrapolation into the future. This reminds one of Schumpeter's caustic observation regarding the Malthusian theory that the only thing valuable about the theory was its qualifications.

3. We may now take up the second proposition. It is necessary here not to confuse the micro-economic effectiveness with macroeconomic significance. Nor is it permissible to take the experience of countries characterized by very different sets of socio-economic conditions.

The first thing to do is to analyze the experience that we have gained so far. It is well-known that while family planning programmes have been with us for quite some time, work got into real strides from the middle of the sixties onwards.

S.N. Agarwala has estimated that the number of births averted has been about 1.2 million on the average from 1965-66 onwards. According to him, this should have led to a 2 point decline in birth rate.* The question to ask is whether we have any independent estimate for checking Dr. Agarwala's surmise which incidentally reflects the official point of view as well.

One independent piece of evidence that is suggested is the data furnished by the Sample Registration System. Let us look at these data. For the years, 1968-70, the sample registration data furnish the following estimates of birth rates:

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* See S.N. Agarwala: *India's Population Problems*, p. 167, TMH, 1972.

TABLE 2

1968	rural	39.0
	urban	...
1969	rural	38.8
	urban	32.6
	pooled	37.6
1970	rural	38.9
	urban	29.7
	pooled	37.6

On the face of it, this would suggest a small decline, compared with a figure of 41 which is Agarwala's estimate for the birth rate in 1965-66.

However, it is necessary to bear in mind that the SRS data suffer from underregistration which is admitted by everybody including Dr. Agarwala himself. He is also quite explicit on the fact that the "extent of underregistration is not fully known."* Agarwala's estimate for 1966 is practically the same as the estimate which was prepared at the time of 1961 Census. It is necessary to look at the estimates for birth rates prepared for the last sixty years. Using a uniform method such as the reverse survival method first used by K. Davis, the following time series of estimates for birth rates was** obtained:

Decade	*Birth rate*
1901-11 ..	49.2
1911-21 ..	48.1
1921-31 ..	46.4
1931-41 ..	45.2
1941-51 ..	39.9
1951-61 ..	40.9

The figure of 41 used by Dr. Agarwala for 1965-66 would correspond to the estimate for 1961 computed by the reverse survival method. However, it is well-known that in view of difficulties connected with under-enumeration of children etc., it is not safe to rely for estimate of birth rates for country like India on one method only. The assumption of quasi-stability based on a modification of the original Lotka equation is often used to devise independent estimates,

* See S.N. Agarwala, *op. cit.*, p. 119.

** See "Indian Population Bulletin" edited by A. Mitra, 1967, p. 71.

according to the quasi-stable technique, the estimates for these decades have been computed as follows:*

Decade	*Birth rate*
1901-11 ..	52.4
1911-21 ..	—
1921-31 ..	50.8
1931-41 ..	46.2
1941-51 ..	43.1
1951-61 ..	40.4

These estimates show a slowly declining birth rate which is quite consistent with an unchanged fertility rate combined with a decline in the mortality rate. The question to decide is whether the decline shown by the SRS data is perceptibly larger than the decline due to change in the age distribution, etc., so that we can say something definitive about the success of the family planning programmes.

Unfortunately, whatever preliminary analyses we have got of the 1971 Census data do not lend much support to the hypothesis of an accelerated decline. According to the estimates of birth rate obtained on the basis of 1% sample data of the 1971 Census, we get two estimates, one of 41.1 corresponding to the use of reverse survival method and 40.0 if we use the quasi-stable technique. From these data, it is difficult to conclude that the figure of 37.6 obtained by SRS data establish anything at all regarding the decline in birth rate, when allowance is taken for possible under registration.**

The above analysis is by no means conclusive, nor is it our intention to suggest that the family planning programmes have not produced any results. All that is urged here is that a much more thorough analysis of the data is called for.

In this respect, it is extremely important to examine inter-state variations for which adequate data do not exist so far.

A recent interesting study carried out by Mr. P.R. Gopinathan Nair suggests that the birth rate in the State of Kerala has declined. However, according to Mr. Nair, "Continuous and significant decline in birth rate in Kerala began in the early sixties." This predates the launching of family planning programmes on any significant scale. Nair, therefore, seeks a justification for his findings in factors such as education and greater access to public health facilities.

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* See S. N. Agarwala, *op cit*, p. 118.

More recently, yet another set of estimates has been worked out by Dr. P. Dasgupta, which gives an estimate of 39.2 for the year 1961. See P. Dasgupta, "Estimation of Demographic Measures for India, 1881-1961, based on census age distribution", *Population Studies*, 1971, pp. 390-414.

** A figure of 5% has been used for drawing up SRS data in certain preliminary estimates prepared by the Census authorities.

While it is difficult to conclude anything definitive from Mr. Nair's present study, it is undoubtedly quite suggestive and requires closer scrutiny*.

What is important is that as of today, there is no definitive assessment of the efficacy of family planning programmes on a macro-economic level.**

Perhaps, when the data called by the 1971 Census are analyzed on the State-wise basis, it would be possible to say more regarding the effectiveness of these programmes. Perhaps, it is only through carrying out a careful piece of disaggregative analysis that we shall learn more as to the response functions that may be involved. It is also necessary at this stage to take explicit note of economic factors which may help or hinder the possible effectiveness of such programmes.

4. There is a basic difficulty in dealing with the role of economic factors in determining the size of a family. A part of the difficulty has already been referred to, *i.e.*, the assumption widely prevalent since 1970's that economic analysis does not have much to say about factors determining the growth of population. Following from this basic presumption, the explanation of the process of family formation has been largely left to the sociologists with an empiricist bias. It is none of my contention that sociologists do not have much to contribute to this highly complex question. On the contrary, it is perfectly possible that most of the explanation has to come from sociological analysis. All that I would like to point out is that a *prima facie* case exists for thinking that the sociological analysis itself may gain in depth from, considering certain economic factors. This is because it is possible to show that sociological variables in certain cases serve as proxies for the operation of certain underlying economic processes or where no such explanation is possible as supplementary hypotheses which can improve our understanding of the sources of variations.

Primarily, the problem turns on the relationship between the demand for labour and the supply of labour. It may be recalled that classical economists had postulated that an increase in demand for labour would be promptly followed by an increase in the supply of labour, so that in the long run the level of real wages would not rise,

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* More recently we have got Sample Registration Data for two more years. The pooled birth rate data for these two years have been estimated at 36.9 and 36.6 respectively. Difference between the estimate of 36.8 for 1970-71 and 36.6 is not significant enough to warrant any further comment.

** See P.R. Gopinathan Nair, "Decline in Birth Rate in Kerala: A Hypothesis about Inter-relationships between Demographic variables, Health Services and Education," Working Paper No. 19, Centre for Development Studies, Trivandrum, February, 1974.

a larger population would be maintained by a larger amount of variable capital, if one would use an old-fashioned Ricardian expression.

This analysis was found inadequate to explain the rise of real wages which was partly responsible for abandonment of the classical formulation. However, as Ricardo had explicitly noted, his analysis was perfectly consistent with an increase in real wages for an indefinite period of time. He wrote, "Notwithstanding the tendency of wages to conform to their natural rate, their market may, in an improving society for an indefinite period, be constantly above it."* If we add to it, the fact that the extent of lag involved in the adjustment could be a variable one, it is possible to maintain that a high rate of population growth was compatible with a rise in real wages provided the rate of capital formation was high enough and in Marxian terms the organic composition of capital did not rise unduly.

However, the main defficiency in this theory consisted in the fact that no attention was paid to the possibility that fertility rate could also *decline*. It is this phenomenon whose explanation has usually been found wanting.

It is at this stage that the question of changes in the quality of the labour force becomes very important. Classical economists took skilled labour as a certain standard multiple of unskilled labour. There was very little that was said on the quality of the labour force beyond this point. The fact that with a changing industrial profile as well as through a process of mechanization of agriculture, the skill requirement of an economy could change significantly was not seriously envisaged. As a result, the possibility that with an increasing level of real wages, a part of surplus of wages over customary consumption level could be invested in children by limiting the family size and allowing them to acquire more skill was missed. Furthermore, with the improvement of social security arrangements reduction in mortality rate, and the growth of education, of the economic advantage of having a smaller family size with a larger average level of education, was more closely perceived.

No doubt the process was greatly facilitated by the growing urbanization which accompanied the process of industrialization as well as through establishment of the wide-spread network of communications which came to be established as a part of the process of sustained growth. But it would appear difficult to deny that the balance of advantages came to be attached to acquiring superior skill rather than in having a larger family. The factory legislation prohibiting the use of child and female labour was also an important

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* See D. Ricardo : *Principles*, (the sarlfa edition), pp. 94-95.

contributory factor. The problem was perceived by Marshall although he did not offer any explicit analysis.*

What is the relevance of the analysis to contemporary underdeveloped countries such as India. Are there reasons to believe that in the years to come, the balance of economic advantage would come to rest with having a smaller family size ?

It is extremely difficult to hazard any answer to this question. However, it is possible to identify a few relevant factors which will have a significant bearing on the question. First of all, it is well-known that the only differential advantage that the small farms in India possess is due to their greater intensity of labour use. Children, therefore, have an asset value in Indian agriculture which is unlikely to change unless the average size of farms goes up coupled with greater mechanization of agricultural operations. However, the requirement of a better distribution of immediate incomes requires that small and marginal farmers should be encouraged and that the pace of mechanization of agriculture be strictly controlled. It is, therefore, neither possible nor desirable to recommend labour displacing technological and institutional changes. Would this lead to an increase in fertility ? A strict Malthusian would be inclined to argue positively. However, the evidence on the point is hardly conclusive in favour of a Malthusian verdict, especially if one takes into account the effects of reduced mortality levels on fertility rates. In a well-known study D.M. Heer carried out a cross-sectional analysis involving 41 countries which testified to the existence of a strong correlation between fertility and infant mortality levels**. While Heer's findings are capable of being interpreted in more than one way, similar findings have been reported by other authors such as Frederiksen and Taylor, and would appear to be broadly consistent with whatever data we possess regarding inter-State variations within India itself. It would, therefore, be improper to ignore the results of these studies, which indicate the possible positive effects that rural public health programmes may have in reducing fertility rates in the rural areas through increasing survival possibilities of children. In addition, the income effect may also pull in the same direction if the standard of living tends to improve, as the data relating to the 19th century Britain bear out. On top of it, with the wide-spread adoption of better techniques and the accelerated modernization of agriculture, it is also likely that the skill requirements of the rural population will change, which will tend to place a premium on *quality* as distinct from *quantity*.

The process of decline in fertility can get accelerated if the pace of industrial development is stepped up. The existence of an inverse

* Very recently, an attempt has been made by Gary Becker to develop an economic theory of fertility by extending the conventional theory of consumer behaviour to the special problems posed by fertility analysis. To this data, his approach has remained a highly controversial one. See G.S. Becker, "An Economic Analysis of Fertility," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries, Princeton, 1960.

** See D.M. Heer, "Economic Development and Fertility", Demography 1966, Vol. 3, pp. 423-444.

relationship between the level of industrialization and fertility seems to be borne out by most data. However, mere transfer of surplus labour to cities is unlikely to reduce the birth rate, because the large mass of job-seekers in urban areas in India constitutes an overflow of unskilled labour from rural areas.

The above analysis would suggest that there are hardly any theoretical reasons to believe that sustained economic growth would not lend to a decline in fertility rates. Whatever empirical evidence one has got regarding countries of the Far East, such as Taiwan, where a significant decline in birth rates has taken place, also does not lend any support to the contrary hypothesis.

However, in all cases, it would appear that some improvement in economic conditions has preceded the decline in birth rates. Is there a threshold level of income here which can prove important in determining the course of population growth ? I believe that a great deal of work is here called for in determining whether such thresholds exist.

Assuming that such thresholds exist, we may be forced to conclude that no soft solution exists to the problem of controlling population growth. This would be true even if it can be demonstrated that threshold level varies inversely with the expenditure on family planning. However, in the latter case, a genuine problem would arise as to how best to allocate outlays on demographic investment as distinct from investment in material goods. To the extent that health and education are positively correlated with improvement in real income levels, they do not raise any independent problem of allocation. To the extent that such expenditure can be regarded as autonomous and yet highly relevant for determining fertility rates as empirical data would suggest, demographic investment must include them.

There is no a priori method as to how best to determine the weight to be given to one form of investment or other. It is, however, clear that if demographic investment is defined to include the whole package of expenditure on health, education and family planning, there is sufficient evidence to warrant a positive weight to such investment even if the index of welfare is measured in conventional terms such as increases in income per capita, etc. If an adjustment is made to allow for a better distribution of incomes, the case would gain in strength.

However, there is hardly any evidence empirically to suggest that the need for directly productive investment can go down. In fact, to the extent that a threshold level of incomes exists, and the current level of incomes is below the threshold level, the need for stepping up directly productive investment is so much the greater.

Taking the need for stepping up demographic investment side by side with investment in material goods, it is quite clear that there is no escape from stepping up the share of accumulation, in national income. If the need for improving the distribution of incomes is recognized, the crux of the problem would lie in our ability to raise the share of savings without depressing the average level of consumption of the less affluent sections of the community. To this most vital problem, there is as yet no evidence that any soft solution exists.