

## ECONOMIC CONSEQUENCES OF DEMOGRAPHIC CHANGES

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### Summary

The economic consequences of population growth are a subject of hot debate. The first school is neo-malthusian ; it sees in rapid population growth a major obstacle to economic development, notably in poor countries. The opposite theory believes in the virtues of technical progress driven by population pressure, thus providing a response to new challenges. Finally for the ageing and declining populations of the industrial world, a stagnation theory, based on the idea that population growth was a crucial source of economic progress (and endorsed by KEYNES) flourished in the context of the Great Depression in the 1930s.

However, empirical studies do not support exclusively one school of thought or the other. As shown by national experience, besides population growth (or increase in the working population), many factors like good governance, quality of infrastructure,

investment in human capital, or urban tradition play a key role in sustained long-term economic growth.

## **1. Introduction**

Taking a somewhat simplified view, we can distinguish two opposing theoretical perspectives on the nature of demographic influences. Both are in their own fashion basically deterministic. The first sees in demographic growth a major obstacle to economic improvement, whilst the second perceives it as an indispensable stimulant. The first is prompted by fears of excess, the second by fears of insufficiency. In reality, they are not as incompatible as they may at first appear, because they do not refer to the same universe. One begins from the static or declining populations of the industrial world, whilst the other focuses on rapid demographic growth in less developed countries.

We shall consider first the theory of stagnation, illustrated by the works of Keynes (1937) and Hansen (1939) and then the neo-Malthusian theory. Both accord a strategic role to the same factor - the formation of capital.

## **2. Two theories**

### **2.1 Stagnation theory**

#### **The Sources of Long-Term Growth**

The theory of stagnation was developed during the 1930s and belongs to the same body of ideas as the West's preoccupation with population decline. Hansen, noting that "economists raised in the tradition of Malthusian theory think in static terms and have tended to give the cessation of demographic growth an optimistic interpretation", conceded that the continuation of nineteenth century growth rates would have given rise to insoluble problems ; but he argued, in opposition to Malthusian interpretations, that it would be falling into "ill-founded optimism" to ignore the structural imbalances which would have to be faced in the case of prolonged decline. Hansen here relies on Adam Smith, who regarded population growth as both a cause and a consequence of economic progress. For Smith, the mechanism of this interaction was as follows : population growth stimulates the division of labour, leading to increased productivity ; this produces a rise in income and an additional accumulation of capital ; and these factors, in turn, bring about a rise in rates of pay, thereby tending to promote further population growth. Thus, a spiral of growth is set in motion : a growing population, by extending the market and stimulating creativity, facilitates the division of labour and production of wealth ; this in turn encourages population growth (through mortality decline and the incentive to marry).

Economic progress, for Hansen, consists in three elements : (1) inventions ; (2) discovery and exploitation of land and new resources ; and (3) population growth.

Demographic growth in the second half of the 19th century is responsible for approximately 40 % of the total volume of the formation of capital in Western Europe

and 60 % in the US. With the advent of stationary populations, these economies could therefore lose half of their investment incentives.

Thus -and on this point the analyses of Keynes and Hansen are in complete agreement- population decline (or at least the slackening of rates of growth), by reducing investment opportunities, tends to aggravate unemployment and economic depression as demand falls below what investors had expected. In the analysis of long-term economic growth prospects, Keynes attributes a crucial role to demographic growth, which represents, in his view, the principal determinant of demand.

Population's role within the demand for goods is particularly important in the construction and housing sector, which in less developed countries may represent up to a third of gross investment. Kuznets (1965), for example, in his reconstruction of American growth over the long term (1870-1955), stresses the relation between long fluctuations in rates of population growth and corresponding fluctuations in housing construction. Oscillations in net or gross housing construction reflect -either immediately or after a slight interval- variations in net population growth. The same applies to other aspects of capital outlay, for example, infrastructure.

## **2.2 The neo-malthusian theory**

The aim of this theory is to measure the influence of fertility declines in economic growth ; it singles out the accumulation of capital as the principal determinant of economic growth. A decline in fertility accelerates total income growth and especially the growth of per capita income. The authors usually give three possible explanations of this mechanism : the improvement in productivity per worker ; the resources freed by a decline in the ratio of dependants (due to the fall in the number of births) ; and the savings increase resulting from a rise in average income.

The neo-malthusian model is however limited by some bias : a) the temporal perspective is short, generally 15 to 30 years, the economic consequences of the birth of an individual may make themselves felt over a very long interval - say equal to the length of his or her life. The economic implications of a birth are at first negative (consumption) then gradually become positive as the cumulative balance between personal production and personal consumption since birth is cancelled out b) the definition of investment does not include social and human investment, the model fails to consider state expenditure on infrastructure, schools, education, health and housing c) the hypothesis of the zero marginal productivity of the marginal worker does not seem realistic : new generations are better educated than older ones.

## **3. Economic progress and demographic transition in poor countries : fifty years of experience, 1950-1999**

The simplest experimental approach to the relation between population and economic growth (although its use requires some care) is to calculate the correlation between population growth and increases in per capita income at constant prices over a given period.

### 3.1 The data

We shall take the beginning of the 1950s as our starting-point, as much for historical reasons as on account of statistical constraints. The general picture of population growth in poor countries from the 1950s onwards is one in which, beginning from a rise in preceding decades, rates move gradually towards a peak in the 1960s, followed by continuing decline since the 1970s. The period 1950-99 thus marks a distinctive historical phase of maximum population growth in the less developed world. Furthermore, national accounts for most of the less developed countries only became available in the last 50 years.

During the period 1950-1970, the weighted annual average rate of increase in real product per capita, in countries is higher in countries where population growth is faster and the reverse where demographic growth is smaller. Therefore, the more rapid the demographic growth, the more significant economic progress tend to be. But this empirical observation does not hold as the general rule, for the following decades, the results change dramatically : countries with rapid population growth (namely in sub-saharan Africa) experience the lowest growth in per capita income. This sort of result in contiguous periods is somewhat disconcerting. But the explanation is in fact simple : the composition of each group of countries has changed in relation to the history of demographic transition. This being the case, the coefficient of linear correlation between the two series of growth indices, at first positive, then becomes negative.

However the correlation is very weak. It would therefore seem that differences in population growth were not an important variable in explaining contrasting patterns of economic growth. In other words, the general view that rapid population increase is inimical to the country concerned has not been proven. Countries with bad economic performance seem more stricken by political circumstances, corruption and mismanagement than by rapid population growth. The best example is that of sub-Saharan Africa : one third of the countries are involved in civil or international war, and the others are governed by non-democratic and highly corrupted élites.

### 3.2 Interpretation

Where a correlation exists, it may still contain ambiguities ; all historical interactions between two phenomena A and B may in fact be given five different interpretations which are not mutually exclusive. One could be dealing with either the influence of A on B, or that of B on A, or the interaction between A and B, or the action of third phenomenon C on A and B (Thus, demographic growth and economic growth may respond to the same external impetus, such as institutional change or technical progress) or finally a pure coincidence. Conversely, in addition to certain reasons already mentioned, the absence of any significant correlation may arise from the action of opposing forces which tend to cancel each other out. It is possible to construct a list (not an exhaustive one) of factors which impel a correlation in one direction or the other.

1. Factors tending towards negative correlation. This heading embraces the familiar neo-Malthusian arguments according to which rapid population growth hinders economic development. We shall only review them briefly here :

- Population growth increases the pressure on natural resources, for instance, limited land or space. In the agricultural sphere, particularly, this means a decline in the average surface area of arable land per labourer, according to the law of diminishing returns. Because of the time it takes for institutions to adjust, such pressure constitutes an obstacle to the process of breaking with traditional forms.
- Continuing high fertility forces most of the population to devote its time and energy to bringing up children. Productive labour outside the home is noticeably reduced, particularly among women.
- The degree of investment necessary to guarantee additional members of the population the same standard of living (which is to say, demographic investments, in Sauvy's parlance) is such that the potential for private and public capital formation is seriously reduced. A 3 % rate of demographic increase, for example, will absorb from 9 % to 12 % of the national income, where the incremental capital - output ratio is 3 or 4. This results in a decline of investment in plant per worker, which in turn affects improvements in productivity. Conversely, a decline in fertility releases resources for the accumulation of capital : it has been demonstrated that, in the US, for example, the contraction in education costs, on the one hand, and the increase in human and non-human capital, on the other, have been almost symmetrical.
- Economic development tends, over a greater or lesser span of time to result in a greater decline in the crude birth-rate than in the crude death-rate (i.e. the third phase of demographic transition), causing population growth to slow down.
- The less developed world begins with an already considerable handicap : per capita income is many times less than it was in the currently developed countries just before their industrial revolution (Kuznets 1954) ; current rates of demographic growth are 1.5 to 2 times higher in the developing world than they were in the Old World when its growth rates were at their peak.

2. Factors tending toward positive correlation. These factors may arise equally from the effect of income of population, or vice versa.

- Economic growth may stimulate population growth by raising fertility (through reducing certain forms of sterility, intra-uterine deaths, etc) ; by encouraging immigration (which, in turn, stimulates further economic growth) ; and above all by reducing mortality. The positive effect of improvements in health conditions is probably less fundamental in its direct influence, which could include : the gradual disappearance of economic losses connected with early death ; a reduction of the destabilizing effects of death on family organization ; and an increased psychological and physiological capacity for work. It is estimated that in certain tropical countries the proportion of people with malaria may have been as high as three-fifths. The indirect influence of better health on socio-economic change proceeds via its capacity to transform the environment. Thus, in early modern Europe, as much as in contemporary poor countries, malaria

long caused the neglect of vast tracts of arable land ; control over death promoted the emergence of rational attitudes, encouraging the decline of traditional fatalism, and facilitating the birth of the idea of progress. The decline of the immemorial tyranny of disease was a historical turning-point with incalculable and far-reaching implications. It represents a pre-condition to the modernization of societies or so to speak, the first face of progress. It was accompanied by an increase in the quantity and -even more so- the quality of labour. In this sense, there is a cumulative interaction between access to greater prosperity and the improvement in a population's state of health : they constitute a mutual exchange which sets in motion highly complex mechanisms in which the growth of income enables higher standards of nutrition and education, which in turn are capable of feeding back into further increases in income itself and population.

- The influence of demographic increase on economic growth. Under favourable circumstances ,industrialization may turn demographic growth into a valuable stimulant to the rise in standards of living, both by procuring labour to exploit natural resources and by widening the markets necessary to absorb and make profitable the fruits of mass production. 19th and 20th centuries are one example. In other words, demographic increase can affect the supply and demand of economic agents.

The potential impact of such increases on the bulk of national income is as follows. An increase in the number of inhabitants is accompanied by an increase in needs and consumption ; this mechanism, while obvious, is complicated by the degree to which it actually operates. Investment, for instance may increase with population growth ; in India, the net rate of capita accumulation more than doubled in relation to national income between the beginning of the 1950s and the beginning of the 1990s. Such an expansion of needs facilitates realization of economies of scale and the intensification of productive efforts by mobilizing labour capacity and underexploited resources and by changing methods of cultivation (e.g. reduction of fallow land, use of fertilizers, irrigation, mechanization, multiple harvesting practices : see Boserup 1965, 1981).

Changes in employment opportunities are the source of two mechanisms which generate gains in productivity :

1. Geographic and sectoral migration, connected with demographic pressure in rural areas. The transfer of the working population from low productivity agriculture to sectors with high productivity -even in countries with too large a surplus agricultural population to be absorbed- is generally the result of an improvement in average productivity. As a generale rule, growth of the non-agricultural work-force has a strong positive relation with that of real productivity per head. The economic history of Japan best illustrates this process. This mechanism relates largely to differences in incomes between the agricultural and other sectors.

An increase in the non-agricultural population can also cause a rise in food prices which is capable of reducing the rigidity of agricultural supply ; by affecting wage costs such

an increase can facilitate the adoption of industrial strategies relying on intensive labour to manufacture goods.

2. The replacement of generations of illiterate or semi-literate labourers by new and better-educated generations more open to modernity. This process is all the more important because, despite regular exposure of gaps in the educational process, considerable progress has been made in the last few decades. While slow and imperceptible, like all structural phenomena, such developments can prove decisive in the long term.

## **Conclusion**

There is a clear contradiction between the paradigms prevailing in the economic literature and historical reality. Dominant theories are unable to account for economic development over the last few decades. A singular fact remains to be explained : in developing countries (except in Africa) the growth rate of GNP per capita between 1950 and 1998, according to World Bank estimates, was higher than that of developed countries. This finding is all the more astonishing given that the industrialized nations, with considerably fewer demographic constraints, experienced an annual increase in per capita income of only around 2 % during the phase of their greatest expansion, up to the mid-twentieth century. A considerable number of the less developed countries had, moreover, been at zero growth for centuries. The disasters forecast in the post-war period were not realized, in spite of a larger demographic boom than was expected. Even the economic projections made before 1975 by renowned experts erred in the direction of excessive pessimism.

The maxim : "there are no poor countries, merely badly run ones" doubtless conveys more than a modicum of truth.

## **4. Secular growth in the industrial world**

Modern economic development has a long history. From the eighteenth century onwards, Western countries experienced a lasting increase in their rates of demographic growth. While admitting a degree of impoverishment, it appears that already in that period increases in agricultural production were at least equal to population growth. For over two centuries there was a considerable population increase, but, in contrast to past increases, this wave of growth was not interrupted by famine. Moreover, instead of a resulting fall in living standards, which had been the case hitherto via the well-known mechanisms described by Malthus, there was a rapid economic expansion.

A new demographic and economic system emerged, characterized by unprecedented growth in both sectors. The definitive feature is, rather, the fact of acceleration consequent on important technical innovations in the harnessing of energy. The nature of this phenomenon extended well beyond the industrial sphere, simultaneously transforming the realm of ideas, social structures, and political institutions. Really, one is dealing here with a general acceleration in history. In western Europe, change escalated from 1840 onwards : European prosperity became manifest, population growth increased, and domination over other continents was established. Mass

migration, encouraged by falls in the cost of sea travel and the development of railways, commenced.

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### Bibliography

ASHTON, T.S. (1948) : The industrial Revolution, 1760-1830 (London : Oxford University Press). [An historical study of the beginning of the industrialization in England]

BAIROCH, C. (1981) : The Main Trends in National Economic Disparities since the Industrial Revolution, in P. Bairoch and M. Lévy-Leboyer (eds.), Disparities in Economic Development since the Industrial Revolution (London), 3-17. [A study of international inequalities between developed countries and the third world]

BAIROCH, P. (1981) : Population Growth and Long Term International Economic Growth, IUSSP International Conference on Population, Manila, 1981, 141-63. [This communication shows the negative aspect of population growth]

BOSERUP, E. (1965) : The Conditions of Agricultural Growth (London : Allen & Unwin).

BOSERUP, E. (1965) : The Conditions of Agricultural Growth : The Conditions of Agrarian Change under Population Pressure (London : Allen & Unwin).

- (1970) : Woman's Role in Economic Development (London : Allen & Unwin).

(1981) : Population and Technology (Oxford : Blackwell). [These two books are unconventional : they illustrate the impact of population pressure on agricultural innovation and on global technical progress]

- (1981) : Population and Technology (Oxford : Blackwell).

[The positive role of population pressure on output]

BURINGH, F. et al. (1975) : Computation of the Absolute Maximum Food Production of the World (Wageningen). [This presents the resources of the planet]

CHENERY, H.B., and SYRQUIN, M. (1975) : Patterns of Development, 1950-1970 (Oxford : Oxford University Press). [Describes all the facets of economic development]

CHESNAIS, J.C. (1992) : The demographic transition (Oxford : Blackwell). [A summary of the patterns and implications of the demographic transition worldwide]

CHESNAIS, J.C. and SAUVY, A. (1973) : Progrès économique et accroissement de la population : une expérience commentée, Population, 4-5 : 843-57. [This article shows that, contrary to the common belief, there is no statistical correlation between the rate of population growth and the rate of economic growth]

CLARK, C. (1971) : Population Growth and Land Use (London : Macmillan). [A classic on agricultural economics]

COALE, A.J. (1979) : Population Growth and Economic Development, Foreign Affairs, 415-29. [This paper shows the negative impact of high fertility on the accumulation of capital]

DENISON, E. F. (1980) : The Contribution of Capital to Economic Growth, AER, 70 (May), 220-24. [An attempt to decompose the factors of economic growth]

EBERSTADT, N. (1981) : Hunger and Ideology, Commentary, (July), 40-49. [An article on the origins of famine in the XXth century : it is not physical capacity but leader's deliberate will]

HANSEN, A.H. (1939) : Economic Progress and Declining Population Growth, AER, 29 : 1-15. [The negative impact of population decline on economic growth]

HANSEN, A.H. (1939) : Economic Progress and Declining Population Growth, AER, 29 : 1-15. [This paper is the key paper of the stagnationist literature. The end of population growth deletes one source of long-term economic growth]

KEYNES, J.M. (1937) : Some Economic Consequences of a Declining Population, Eugenics Review, 29 : 13-17. [Keynes argues that population decline depresses demand]

KUZNETS, S. (1954) : Underdeveloped Countries and the Preindustrial Phase in the Advanced Countries, Proceedings of the World Population Conference, Rome, 1954, V. 947-70.

(1965) : Demographic Aspects of Modern Economic Growth, World Population Conference, Belgrade.

KUZNETS, S. (1965) : Economic Growth and Structure (Norton). [A summary of empirical evidence on national economic experiences]

(1967) : Population and Economic Growth, Proceedings of the American Philosophical Society (June), 170-93. [Three seminal papers on the role of population growth on modern economic growth. A positive view]

KUZNETS, S. (1975) : Population Trends and Modern Economic Growth : Notes towards an Historical Perspective, in UN, The Population Debate : Dimensions and Perspectives, World Population Conference, Bucharest, 1974, i (New York : UN). [An analytical paper on the demographic mechanisms affecting the rise in income]

KUZNETS, S. (1977) : Two Centuries of Economic Growth : Reflections on US Experience, AER, 67 (1), 1-14. [The role of population dynamism in the supremacy of America]

MADDISON, A. (1995) : Monitoring the world economy 1820-1992, OECD, Paris. [A statistical presentation of national accounts]

MADDISON, A. (1995) : Monitoring the World Economy, OECD, Paris. [A summary of long time series on national accounts, labor force, etc]

SAUVY, A. (1943) : Richesse et population, Paris, Payot. [A book on the influence of French population stagnation on the backwardness of many economic sectors]

SAUVY, A. (1972) : Les charges et les avantages de la croissance de la population, Population, 1 : 9-26. [An analytical study of costs and benefits of population growth]

SCHULTZ, R. (1961) : Investment in Human Capital, AER, 51 (Mar.), 1-17. [This article argues that education is a key for economic development]

SIMON, J.L. (1977) : The Economics of Population Growth (Princeton, NJ : Princeton University Press), 165. [A complete book -a non-malthusian one- with many econometric presentations on population economics]

World Bank (1984) : World Development Report, 1984 (Washington, DC). [Special report on the interaction between population change and economic development]

World Bank (2000) : World Development Report, 2000. Special subject. Attacking poverty (Washington, DC). [An annual report studying a given topic and the corresponding policy recommendations, followed by a worldwide detailed statistical appendix]

World Bank Atlas : latest editions, 1997, 1998, 1999, 2000 (Washington). [An annual compendium of worldwide statistics]

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