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DEMOGRAPHIC ASPECTS OF SAVING, INVESTMENT, EMPLOYMENT AND PRODUCTIVITY

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I. Introduction

1. The pages that follow represent a survey of current economic thinking concerning demographic aspects of savings, investment, employment and productivity in the contemporary world. The unifying element underlying the views on these topics lies in the fact that the four variables considered are determinants of economic growth, defined as a sustained increase of income per capita. The subdivisions of this paper therefore can be thought of as corresponding to the framework of the traditional summary form of the aggregate production function of an economy, according to which changes of output are affected by changes in the quantity of capital and labor employed in the productive process, and by a factor associated with changes in the quality of these inputs, in the mode of organization of production, and in the levels of applied technology. The latter variables will be subsumed in our discussion under the general notion of "productivity", while questions relative to the accumulation of capital will be discussed under the separate headings of saving and investment. The fact that in the literature the demographically induced changes in these variables are discussed mainly with reference to their bearing on economic growth, will naturally manifest itself throughout the present survey. At the same time the discussion will remain compartmentalized to the successive examination of demographic influences on saving, investment, employment, and productivity, and no attempt will be made to consider the joint effects of these and other variables on economic growth.[1]

2. An appraisal of the relevant literature reveals two sources of unfruitful controversy, or of seemingly contradictory views concerning the subject of the present survey. One source is an insufficient specificity as to the conditions under which certain views are held to be valid, and the other is an unwarranted tendency to generalize findings that were originally advanced as pertaining to well circumscribed situations only. The relatively

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[1] This task is performed by a paper presented by Professor Simon Kuznets at this conference.

narrow interpretation which is adopted in this review removes what seems to be the most important source of such controversies and contradictions in this field: the distinctly different appearance of the economic implications of demographic factors when considered from different vantage points with reference to historical time. As was noted in the previous paragraph this review is limited to views concerning the economies of the contemporary world only. More specifically the time period relevant to our discussion is limited to the relatively recent past and to the not too remote future: a time span that may be roughly thought of as covering the length of not more than a few generations, fading in significance as the time horizon is extended.

3. The views that are thus delineated for our examination come into sharper focus when contrasted, first of all, with views on the demographic aspects of economic growth based on the study of economic history. To the economic historian the relationships between economic trends and demographic changes present themselves as part of an intricate network of mutually interdependent variables where the problems of identifying causes and effects are often impossible to solve. As a sheer description it appears that historically economic stagnation or slowness of progress is invariably associated with stagnation or slowness of population growth. This fact has been interpreted in different ways; e.g. by considering such situations as evidence for the existence of a low level equilibrium state brought about by an inevitable tendency of population to expand when unchecked, as in the Malthusian system, or by merely assuming that population size passively adjusts itself to the limits of environment as determined by the state of technology and the desired standard of living. On the other hand, acceleration of economic growth, as observed in particular in the modern era leading into the industrial revolution, tends to coincide with acceleration of population growth. Once again interpretations differ. Sometimes, and rather impressionistically, an autonomous spurt in population is said to have sparked off the rapid economic development in the Western World.[2] More often population growth is credited with no such role but is held to be an important f ctor that was necessary for, or sustained even if it did not cause, economic growth.[3] Meaningful discussion of the interrelations that have actually obtained is hampered by the lack of adequate historical data. A statistical documentation of the covariance in demographic and economic trends covering a relatively wide range of countries is feasible only for about the past 100 years, but even for this period the interpretation of the facts remains far from unambiguous.[4] If

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[2] J.R. Hicks, Value and Capital, Oxford, Clarendon Press, 1939, p. 302.

[3] See e.g. Max Weber, General Economic History, Collier Books New York, 1961, pp. 258-259.

[4] For the most thorough survey of the relevant material see Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations", Part I, Economic Development and Cultural Change, Vol. V, No. 1 (October 1956), pp. 5-94.

population growth has been accompanied by rising per capita income, would a slower expansion of population have caused faster or slower economic growth and through what mechanism? If population growth affected economic growth positively, would an even faster growth have an even stronger positive effect? Observation of the past yields no easy answer to such queries. The possibility of controlled experiments is not open to us, and the legitimacy of assuming alternative population trends in the past in order to trace the effects of various alternatives in a mental exercise, is questionable, since the population trends as actually observed were an inseparable part of the fabric of the whole socio-economic picture. Under these circumstances the basic fact, that in the broad sweep of history the association of population growth and economic growth is unmistakeable, tends to overshadow the niceties of its interpretation and inevitably to color the views on the nature of the demographic - economic relationship obtained from the study of economic history.

4. A second set of views, related to our subject but not covered in this survey, has to do with long run aspects of the demographic - economic relationships. In contrast to most views that belong to the category described in the previous paragraph, these views tend to introduce a pessimistic bias to the discussion of the relevant problems. It can be easily demonstrated that maintenance of positive rates of population growth in the long run is an impossibility. For this proposition to hold true all that is necessary is to select a sufficiently long -- although, if growth rates on currently observed average levels are assumed, in historical terms by no means extravagantly long -- time period.[5] It follows that eventually continued economic growth, or maintenance of a high level of prosperity, must prove inconsistent with continued growth of population, and, further, that continued population growth must eventually generate forces that will check that growth. Contemporary popular discussion of the economic aspects of population growth often tends to be dominated by such considerations. But also in much of recent theorizing on economic growth the influence of demographic factors is recognized, if at all, simply through the introduction in one form or another, of these fundamental ideas. Thus it is emphasized that unchecked population growth is bound to lead to increasing resource scarcities, hence ultimately to diminishing returns on each additional increment of population size. As required by the logic of this proposition in many of the formal models that have been worked out population growth is entered as an endogenous variable, determined, usually in an inverse relation, by such factors as the level of the wage rate, or the rate of increase of per capita income. When components of population growth, such as birth and death rates, are considered separately - which often is not the case - it is usually assumed that death rates are inversely related to the variables mentioned, while birth rates are typically considered constant, alternatively it

[5] Cf. P.C. Putnam, The Future of Land Based on Nuclear Fuels, Oak Ridge, 1960, p. 18.

is assumed that they tend to decline at a certain point, or show a hump in the function of, say, income per capita.[6] The majority of these models is at a very high level of abstraction and refer to no specific historical or institutional setting. Others, in the classical tradition, are offered as broad historical generalizations, and thus merge with the genre described in the previous paragraph, that explain the persistence of underdevelopment, or that give a picture of future long run growth in general. In any case, whatever illumination these models might provide in a search to understand the mechanics of growth sub specie aeternitatis, as it were, the assumptions they incorporate as to the forms of the demographic - economic interrelationships have little resemblance to or are patently at variance with, the relationships generally believed to be pertinent to contemporary economies.

5. The previous paragraphs provide a negative definition of the literature to be surveyed. The delineation that was suggested is obviously only an approximate one: discussions of historical aspects of the demographic - economic relationships, or consideration of the nature of these relationships in long-run growth models often overlaps with, or have a bearing on, the discussion of the same problems as they exist in the present day world. The essential point is, however, that the literature as a whole exhibits a more or less discontinuous treatment of these problems depending on the historical reference period used by the various authors. Since this peculiarity of the treatment is largely implicit in the discussions, the remaining part of this introduction briefly summarizes what seem to be the salient features of the contemporary economic and demographic picture that are responsible for this discontinuity, and the distinguishing characteristics of the literature to be surveyed that result from these features.[7]

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6 See e.g. Harvey Leibenstein, A Theory of Economic Demographic Development, Princeton, Princeton University Press, 1954; Trygve Haavelmo, A Study in the Theory of Economic Evolution, Amsterdam, North Holland Publishing Co., 1954; Robert M. Solow, "A Contribution to the Theory of Economic Growth" Quarterly Journal of Economics, Vol. 70, (February 1956) pp. 90-91; Richard R. Nelson, "A Theory of the low Level Equilibrium Trap in Underdeveloped Economies", American Economic Review, Vol. 46, No. 5, (December 1956), pp. 897-898; N. Kaldor, "A Model of Economic Growth", Economic Journal, Vol. 67, No. 268 (December 1957), pp. 591-624; D. W. Jorgenson, "The Development of a Dual Economy", Economic Journal, Vol. 71, No. 282, (June 1961), pp. 309-334.

7 For a discussion of historical shifts in economic thought concerning population see Joseph J. Spengler, "The Population Problem: Yesterday, Today, Tomorrow", Southern Economic Journal, Vol. XXVII, No. 3 (January 1961), pp. 194-208.

6. First, the contemporary world is characterized by sharp differences among countries with respect to the level of economic development obtained. Due to this fact, and also to spectacular technical advances in the field of transportation and communication, economic progress in most countries now appears not as a process in which conditions are created that are suited for the initiation and maintenance of growth-promoting agents, but rather as a process in which transmission and adaptation of such agents takes place. Population growth often looms large as a factor explaining the historical emergence or the continued maintenance of autonomously generated economic progress; such positive demographic effects alone may have partly or entirely offset, or even overshadowed, possible negative consequences of population growth. For reasons just stated, in present day underdeveloped countries these effects are not judged important and seldom considered at all.

7. Second, in the advanced countries the production of innovation, new knowledge, or technological progress in general, has become institutionalized and quasi-automatic to an extent unknown in earlier ages. Under these conditions the multifarous influences demographic factors have exerted on such progress in the past are no longer considered operative, or sufficiently strong, or indispensable, for continued growth.

8. Third, in recent decades there has been a rapid increase both in the understanding of the mechanisms that control economic growth, and in the extent to which purposeful social action is desired and undertaken to promote such growth. This observation seems to be valid, although at varying degrees for economies with widely differing institutional arrangements, as well as at different levels of development. These may range, for example from relatively developed free market economies where maintenance of full employment and control of business fluctuations have become an avowed objective of government policy, and where this objective is pursued by means of monetary and fiscal policies, to developing economies attempting to carry out rapid industrialization through state ownership of, or rigid control over, the means of production -- natural resources, capital and labor. These changes have deeply modified the relative weights of the effects through which demographic factors influence economic growth. The modification has two facets. First, certain favorable economic effects imputable to population growth now appear to be attainable by means of various policy measures, more efficiently and at a lesser cost. Maintenance of a high level of investment demand in a market economy can be cited as an example. Secondly, policy measures are now available, or are more readily applied, to take advantage of certain demographic conditions which might have no, or only negligible, growth-promoting effects in the absence of state intervention. The increased possibility of taxation consequent upon certain changes in the age distribution that arise in an economy with a very low propensity to save can serve as an example. Naturally, the relative desirability and effectiveness of various lines of action open to policy-makers is far from being a matter of agreement among

economists. The point is, however, that in contemporary discussions of the economic effects of population change the latter tends to be viewed as part of a socio-economic matrix that at any given moment must be accepted as inherited from the past, but that is essentially manipulable offering a more or less wide range of alternative lines of action. Population growth will be judged in such a perspective very differently than is the case when it is viewed in the evolutionary change of history.

9. Fourth, there has been a marked tendency in the recent literature to de-emphasize the importance of natural resources in economic development. To some extent this shift is merely due to a rethinking and revision of tenets concerning the existence of an increasing scarcity of natural resources that presumably accompanies populatin growth because of the absolute fixity, or decreasing quality, of such resources. In the tradition of Malthus and Ricardo belief in such scarcities constituted the foundation of theories on demographic-economic relationships. But the shift in emphasis reflects also objective changes, in particular cumulative developments in technology, resulting in a vastly increased substitutability of various inputs, involving not only that of reproducible capital and labor for natural resources, but also mutual substitutability of non-reproducible resources, increasingly conceived of not as tons and acres but rather as atoms, molecules, and units of energy. Consequently, natural resource-availability is now generally assigned a modest and passive role in economic development, that further diminishes in importance as development proceeds since income elasticity of demand tends to be low for goods high in natural resource-content.[8] Obviously, other things being equal, the advantages of a higher resource-population ratio are not disputed. But limited availability of resources is no longer considered an absolute barrier to development in the forseeable future, or even a cause of diminishing returns to increases of capital or labor. Instead, any experienced or expected diminishing returns to the latter are attributed to other deficiencies, in particular to inadequate endowments with reproducible capital. These statements are thought to be applicable with few exceptions to populations within existing national boundaries, and to all such populations if international trade is taken into account.[9] But, once again, the assumed

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[8] For a thorough discussion of these issues see Harold J. Barnett and Chandler Morse, Scarcity and Growth, The Economics of Natural Resource Availability, Baltimore, The Johns Hopkins Press, 1963, in particular Part III. Also the papers and discussions in Joseph J. Spengler, (ed.), Natural Resources and Economic Growth, Washington, Resources for the Future, Inc., 1961, especially the papers by J. H. Adler and T. V. Schultz; and Joseph J. Spengler, "The Population Problem...", pp. 201-202.

[9] Cf. Ansley J. Coale, "Population and Economic Development" in Philip M. Hauser, (ed.), The Population Dilemma, Prentice Hall, Englewood Cliffs, N.J., pp. 58-59.

time horizon must be made explicit: in the long run continued population growth must lead to resource scarcities if only because of the ultimate limitation of space.

10. Fifth, the demography of the contemporary world shows many characteristics that are unlike those found in previous experience, hence limiting the usefulness of historical analogies in judging the role of population in the process of development. Neither can these characteristics be expected to continue to be relevant in the indefinite future. The most significant features of the contemporary demographic picture are the following. First, the possibilities of international migration are reduced: external migration no longer affects substantially the growth rate of national populations.[10] Second, current death rates in all countries either represent very low levels compared to death rates in earlier experience, or can be expected to reach such levels in the forseeable future. Such rates are being established by and large independently from the degree of economic development. This is explained by the fact that mortality can be successfully controlled by such devices of the existing medical technology and public health measures that are inexpensive, and the application of which can be taken for granted since it meets universal approval. This proposition is obviously subject to constraints, primarily to the existence of minimum levels of nutrition and shelter, but such constraints in the relatively short run need not become operative.[11] Third, due primarily to early marriage, levels of fertility are in general substantially higher in the less developed countries of today than was the case in the countries that have undergone modernization in earlier times. The mortality and fertility characteristics of underdeveloped countries have produced, or tend to produce, rates of population growth that are exceptionally high, and, invariably, age distributions that are exceptionally young.

11. The distinguishing features of the contemporary economic and demographic picture, are reflected in the corresponding literature in many ways. Some of these were pointed out in the preceding paragraphs. Some general remarks are finally in order to

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[10] It can also be added that international population movements on the European scale would have little impact on the growth of populous countries of today. As Irene Taeuber points out the number of immigrants the United States has received between 1820 and 1955 represents less than one year's population growth of contemporary Asia. "Asian Populations: The Critical Decades", in Stuart Mudd, (ed.), The Population Crisis and the Use of World Resources, Dr. W. Junk Publishers, The Hague 1964, pp. 141-142.

[11] Cf. United Nations, Department of Economic and Social Affairs, Population Bulletin No. 6, New York 1963, Chapter I.

insure a proper perspective on the scope of this survey. First, it is to be noted that the survey covers the dominant themes on the economic effects of demographic factors: these are discussed almost exclusively as working through the variables to be dealt with below: saving, investment, employment and productivity. This corresponds to a view of the development process according to which the basic "tricks of growth" are simple: abstaining from the consumption of a sufficiently large part of the social product, investing the part saved in the accumulation of society's capital stock, insuring a sufficiently high level of employment relative to population, and increasing the productivity of labor. To explain the historical role of population in the development process these categories are highly inadequate. But these categories are the strategic ones when the will to grow--even if possessed by only a relatively small modernizing elite -- can be taken for granted; when a backlog of accessible technology, know-how, and entrepreneurship already exists; when technological development has become a conscious, institutionalized process; and when potential resources represent a non-limitational variable.

12. Secondly, preoccupation with the relatively short term, as well as a certain change in the intellectual climate implied by the developments outlined in paragraph 8 above, explains that the literature surveyed tends to be strongly policy-oriented, although this orientation often is not explicit. This, in turn, manifests itself in a certain lack of generality and in some apparent imbalances in the treatment of various problems. Thus, interest tends to be focused on problems of change, as opposed to explanation of existing states. Analysis of problems is mainly with reference to national populations. Even when the analysis is less specific, assumptions about levels and changes in demographic quantities are strongly conscious of the typical existing parameter values and of the actual ranges of choices and possibilities. Thus, e.g., little consideration is given to international migration. With respect to mortality, effects of its decline are considered, but those of its increase are not, although it is obvious that analysis of the former is not applicable to the latter by a mere mechanical reversal of the conclusions. Implications of alternative fertility trends are paid more attention then mortality trends: apparently in part because decline, or a steady low level of mortality tends to be taken for granted, hence is considered a less "strategic" variable. The same factors explain that, as measured by a crude division of the literature into two groups, there is a markedly smaller interest in the "developed" countries--in which the economic effects of demographic trends appear to be less pronounced, or relatively less important -- than in "developing" countries. These and other imbalances in interest and emphasis will be apparent in the following survey.

II Demographic Aspects of Saving

13. This section discusses the effects of demographic factors on the fundamental economic choice that concerns the allocation of income between current and future uses. Income, as reckoned with reference to an appropriate time period such as a calendar year, can either be consumed in that period, or it can be saved. The rationale of saving is that present income can be invested, i.e. disposed of in such a manner that

permits future consumption to be substituted for present consumption. In a primitive economy the acts of saving and investment are closely interconnected: saving is performed when an opportunity to invest both offers itself and is desired. In an exchange economy saving and investment may be separate acts, arrived at by different decision makers, hence the aggregate of desired (ex ante) saving may differ from the level of investment prevailing at a given time as reflected by the distribution of production between consumer goods and investment goods. The resulting disequilibrium will induce an adjustment process that may involve changes in income, employment, and prices. In particular if aggregate desired saving exceeds the level of investment a process of contraction and deflation will ensue until saving is sufficiently curtailed. On the other hand a deficiency of ex ante saving will induce an expansion of output and employment provided that there is a slack in the economy in the form of underutilized capital and labor resources. If the latter condition does not obtain, the movement towards equilibrium will involve inflationary price movements resulting in a reduction of real consumption, hence an increase in real saving. This brief outline of a rather involved argument[12] is of importance in the present context since it indicates that the effect of saving on economic growth cannot be evaluated without reference to the level of investment and, in particular, that if the level of investment is inadequate individual efforts to maintain a high level of saving may have a perverse effect on the economy, hence on the level of saving itself, which, ex post, necessarily equals the level of investment. Thus in discussing saving the level of investment must also be specified. Unless stated otherwise the views on the demographic aspects of saving surveyed below assume that investment demand is sufficiently high to make the desired level of saving realizable.

14. No consensus exists among economists concerning the nature and importance of the influences demographic factors exert on saving. The various elements of such influences described by various authors are badly integrated. As a rule little statistical documentation is available and the arguments advanced are largely speculative in character. No systematic treatment of the subject is yet in existence. Such a treatment, as a minimum, should examine the role of various demographic factors, in particular the role of fertility, mortality, growth and age distribution. A distinction should be made between the effect of the level in any of these variables on the one hand, and the effect of a change in that level. The notion of "saving" that may be influenced by these factors as used in the literature may mean

12 The argument in its modern form originates from J. M. Keynes, (The General Theory of Employment, Interest and Money, London, Harcourt and Brace, 1936.) For a concise discussion of the issues see W. Arthur Lewis, The Theory of Economic Growth, London, Allen and Unwin, Ltd., 1955, pp. 213ff.

"capacity to save", or "motivation to save", as well as actual performance. These differences in usage need to be, but not always are, made explicit. A further distinction that is required concerns the identification of the type of saving affected: personal saving, business saving, and government saving may react differently to various demographic stimuli. The behavior of personal saving may further be differentiated depending on the source of income - e.g. wages versus profits or rent - from which such saving originated. Finally it is important to note that the relative weight, and sometimes the very nature, of the demographic effects on saving may be different depending on the prevailing economic characteristics and the institutional-social setting, hence assumptions concerning the latter should be spelled out when discussing such effects.

15. The main difficulty in trying to establish how demographic factors affect saving, (or any other economic variable) lies in the fact that the variable in question is likely to be affected by many influences, besides demographic ones. Consider for example the widely held opinion according to which the differences in saving behavior, as measured by the proportion saved out of total income, are related to differences in per capita income.[13] Thus, in this spirit, insufficient saving in less developed countries is often considered to be a consequence of poverty.[14] If this relation is valid it follows that the rate of saving is affected by demographic factors insofar as such factors are instrumental in the determination of the level of per capita income. Since at any given time the latter is the outcome of a vast variety of forces, such a proposition is not particularly helpful. The approach followed under these circumstances is to consider hypothetical situations that are identical at a given point of time with respect to some appropriately selected economic parameters - in this case per capita income - but differ in certain specified demographic attributes. The question then is asked: how is this posited demographic differential likely to affect saving in subsequent time periods? Or, to determine the effects of changes in the demographic parameters, a particular initial state may be specified, the modification of which is observed under alternative time trends in the demographic parameters. Distinction should then be made between direct and indirect effects.

[13] This follows e.g. from the Keynesian formulation of the consumption function. Keynes, The General Theory, p. 96.

[14] E.g. H.W. Singer, "Economic Progress in Underdeveloped Countries", Social Research, Vol. 16 (March, 1949), p.5; Jacob Viner, International Trade and Economic Development, The Free Press, Glencoe, Illinois, 1952 p. 133; Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries, Oxford University Press, New York, 1953, p. 5; W. Brand, The Struggle for a Higher Standard of Living, W. Van Hoeve Ltd., The Hague and Bandung, 1958, p. 60.

The former can be observed in isolation only in the first time period when the ceteris paribus assumption is still valid. In later periods the economic parameters will have presumably started to diverge, and any differences in saving will reflect the cumulative effects of past demographic differentials that have operated on the economy through a variety of mechanisms. Unless stated otherwise the views cited below refer to direct effects only.

16. A demographic characteristic considered to be important in connection with saving is the distribution of population by age. For the purpose in question the age distribution can be described with reasonable adequacy by breaking down the population into three broad groups: children, working-age adults, and persons past the working age. Somewhat mechanically the ages that define the boundaries of these groups can be taken as 15 or 20, and 60 or 65 years, respectively. Sometimes children and old persons are lumped together and said to constitute the group of "dependents", in contrast to persons who are at least potential participants of the labor force. It is apparent that if two populations differ substantially in their age distributions, and if this difference is also manifest in the proportions economically active, identical levels of per capita income must indicate different levels of development as shown by the fact that on this assumption the level of income per employed person is much higher when the proportion of dependents is also high. It is not clear, therefore, nor is it of particular interest to ask, what the comparative rates of saving will be under these circumstances. More meaningful is a comparison between two populations of differing age distributions when these populations have the same number of persons economically active endowed by the same co-operant economic factors. On these assumptions the absolute level of income will be identical in the two cases. It is asserted then that in the population with the higher number of dependents there will be a lower propensity to save since the consumption needs of a larger population will have to be satisfied out of income which is the same as that available to the smaller population. The obvious equivalent on the micro-economic level is the proposition that, given the same income and the same number of working age persons per family, families with a larger number of children or old persons to support will tend to save less than families with a lower number of dependents.[15]

17. The evaluation of the situation described above requires first of all a specification of the differences with respect to age distribution. Statistical data indicate that such differences can be substantial. For example in 1960 the dependency ratio - calculated as the number of persons 65 and over plus persons under 15 divided by the number of persons 15-64 - was 1.91 in Mexico and 1.34 in Italy.[16] Theoretical considerations

[15] Ansley J. Coale and Edgar M. Hoover, Population Growth and Economic Development in Low-Income Countries, Princeton, Princeton University Press, 1958, pp. 24-25.

[16] Calculated from census data published in United Nations, Demographic Yearbook, 1963, New York, 1964.

concerning the possible types of human age distributions point to the same conclusion. The latter are particularly helpful because they reveal the relative importance of the factors - in the absence of migration, fertility and mortality - that shape the age distribution. No discussion of the extensive literature on this subject can be undertaken here. For the present purpose it is sufficient to state that the dominant determinant of the age distribution is the level of fertility that has prevailed in the past: the higher is that level the younger tends to be the age distribution, i.e. the higher is child dependency and the lower is old age dependency. The absolute numerical importance of the latter, however, is much less pronounced. The influence of mortality is moderate; given the level of fertility low mortality causes a younger age distribution,[17] hence a higher child dependency, while on the proportions at old age it exerts a small effect the nature of which depends on the level of fertility. The scope of variation can be suggested by the following figures showing the percentage of persons under age 15 and at and over age 65 in female stable populations, i.e. in populations that experienced unchanging schedules of fertility and mortality in the past. The populations shown are characterized by two levels of the gross reproduction rate (GRR), and two levels of the expectation of life at birth ($\mathring{e}_0$). Since specification of a GRR and an $\mathring{e}_0$ strictly speaking is not sufficient to uniquely determine stable populations, there exist minor variations in stable age distributions depending on the exact shape of the fertility and mortality functions; but these do not change the orders of magnitude.[18]

	Persons under 15		Persons 65 and over	
	$\mathring{e}_0$=25	$\mathring{e}_0$=65	$\mathring{e}_0$=25	$\mathring{e}_0$=65
GRR=1.25	18.0	23.8	10.8	12.2
GRR=3.50	41.2	49.7	2.4	2.2

High fertility is thus shown to cause a high dependency rate, in particular when it is associated with low mortality.

18. While the differences between two given age distributions lend themselves easily to quantitative description, it is much less obvious how strong an effect such differences will exert on the proportion of income saved. In comparing, for example, two of the populations for which age distribution figures are shown above - e.g. those with a mortality level of $\mathring{e}_0$=65 - it is easily calculated that per capita income is 34 per cent higher when fertility has been steadily low in the past (GRR=1.25; the

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17 For very low levels of mortality this statement needs qualification.

18 Cf. Ansley J. Coale and Paul Demeny, Regional Model Life Tables and Stable Populations, Princeton, 1965. The figures are from pp. 78 and 110.

birth rate in this population is 17.6 per 1000) than it is when fertility has been steadily high (GRR=3.5 -- a birth rate of 47.5) assuming, as stated earlier, that the same volume of income is associated with the same number of persons between age 15 and 65. Were the proportions of income saved identical in the two populations, the same numerical differences would hold concerning per capita saving or per capita consumption. However, if the premise that lower per capita income produces a higher proportion consumed is accepted, the saving-income ratio will be lower in the high fertility population. Per capita consumption then will be less than 34 per cent higher in the low fertility case, and per capita saving will be more than 34 per cent higher. There is no theoretical basis to suggest the extent of substitution of saving for consumption at higher income levels. In fact, further qualitative arguments tend to indicate that even the direction of the net effect on the saving ratio attributable to differences in age distribution is subject to some uncertainty. Such arguments can be classified into three categories according to whether the primary variable through which the influence of age distribution is assumed to be exerted is consumption, or is saving, or is the level of income.

19. As stated above, due to higher consumption needs the capacity to save can be expected to be relatively small if the dependency rate is relatively high. There are some alleviating circumstances, however. First of all, there exist objective differences in individual needs that reduce the effective dependency burden. Consumption requirements of children and old persons are commonly considered smaller than those of persons at the working ages. These differences are sometimes quantified if only for illustrative purposes: a child's consumption needs e.g.. may be taken as equivalent to .7 adult consumption units. Such weights may be based on observation of actual consumption patterns, or on studies establishing standard requirements.[19] There are obvious difficulties in establishing such units of equivalence; e.g. apparent differences between the consumption needs of a retired and of a middle aged person may reflect essentially work-related consumption needs that should properly be recognized as costs.[20] Also, the treatment of income as a homogeneous quantity implicit in the use of conversion factors conceals the fact that some needs of dependents are as high or higher than those of non-dependents. The impact of dependents on the various components of the consumption function - such as food, medical services or schools - will thus be different and there will be also significant

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19 United Nations, The Aging of Populations and its Economic and Social Implications, Population Studies, No. 26, New York, 1956, pp. 61ff. Coale and Hoover, Population Growth pp. 238ff.

20 Cf. Simon Kuznets, Economic Change, New York, Norton & Co., 1953, pp. 195-196.

variations within these broad categories as well.[21] Furthermore, consumption standards depend on levels of development as do relative costs, i.e. the society's relative ability to provide different kinds of goods and services. Thus no general conclusion can be reached as to the extent in which lesser objective consumption needs may tend to decrease the capacity to save to a lesser degree than is suggested by comparisons merely of dependency ratios. But the existence of such a tendency, nevertheless, is well established.

20. Secondly, there are substantial economies involved in supporting a larger, rather than a smaller, number of dependents, at least to the extent that the support is exercised within small units of consumption, such as a family or a household. Alternatively it might be said that the number of households in a population is in some respect a more important determinant of consumption needs than is the number of persons.[22] Thus a specification of demographic differentials merely in terms of population composition by individuals is not sufficient to judge consumption needs. No simple generalization is possible concerning the relation between age distribution and average size of household, since the latter depends not only on past fertility and mortality characteristics but also on nuptiality, divorce, and, most of all, on the rules that regulate the formation and composition of households. As an empirical observation it can be suggested, however, that higher dependency ratios usually are accompanied by higher average household size as well. Accordingly the impact

21 E.G. Jean Crockett, "Population Change and Demand for Food" in Ansley J. Coale (ed.), Demographic and Economic Change in Developed Countries, Princeton, Princeton University Press, 1960, pp. 462ff; and Ansley J. Coale, "Population Change and Demand, Prices, and the Level of Employment", ibid. p. 369. Concerning such changes due to aging see Sidney Goldstein, Consumption Patterns of the Aged, Philadelphia, Wharton School of Finance and Commerce, 1960 and Robert E. Dodge, "Purchasing Habits and Market Potentialities of the Older Consumer", in Problems of the Aging, Law and Contemporary Problems, Duke University, 1962, No. 1, pp. 142-156.

22 Cf. Yves Martin, "Niveau de vie des familles suivant le nombre d'enfants", Population, Vol. II, No. 3 (Juil. - Sept. 1956), especially pp. 409-415: Roland Pressat, "Un essai de perspectives de ménages", Union internationale pour l'étude scientifique de la population, International Population Conference Wien 1959, Wien 1959, p. 113. On the problem of establishing consumption equivalence-scales among families with different composition see F.G. Forsyth, "The Relationship between Family Size and Family Expenditure", Journal of the Royal Statistical Society, Series A, Vol. 123, No. 4, (1960) pp. 367-397. A comprehensive discussion is given in M.H. David, Family Composition and Consumption, Amsterdam, North Holland Publishing Co., 1962, especially Chapter II.

of a higher dependency ratio on the capacity to save is lessened.

21. Thirdly, if the rate of saving associated with a low dependency ratio can be adopted by a population with a high dependency burden, without depressing per capita consumption under certain minimum standards, there is no a priori reason why high dependency need imply a lower saving ratio at all. Instead of substituting consumption for saving, one kind of consumption may be substituted for consumption of another kind: e.g. "necessities" may be substituted for "luxuries". Psychologically even the implied lower per capita consumption may be questioned: particularly in societies where family size is by and large the outcome of conscious planning, having children may be considered simply as one type of consumption chosen in preference to an array of alternative consumption possibilities.[23]

22. Differences in age distribution are sometimes held to affect directly the rate of saving in ways that run counter to the depressing influence of high dependency on saving exerted through higher consumption needs. The reasoning is based on the assumption that it is more relevant to look at saving not as a residual after certain consumption requirements have been met, but rather as a result of a positive decision to provide for future contingencies. Thus it was suggested that a larger number of dependent children may itself provide an additional incentive to save. To the extent, however, that such saving is oriented towards meeting anticipated future expenses - cost of education, dowery, wedding ceremonies etc. - savings and dissavings will tend to cancel out, since the time delay in the consumptive use of the accumulated funds will be most likely moderate. However if the acts of saving and dissaving are separated by a substantial time period, and if these acts are closely correlated with age, age distribution differences will affect the average saving ratio for the whole population. This is the case in particular with savings motivated by the desire to provide for the years of

23 Harvey Leibenstein, Economic Backwardness and Economic Growth, John Wiley & Sons, New York, 1957, pp. 161-163; Bernard Okun, Trends in Birth Rates in the United States since 1870, Baltimore, The Johns Hopkins Press, 1958, pp. 174-182; Gary S. Becker, "An Economic Analysis of Fertility", in Coale, Demographic and Economic Change..., pp. 210-217; Simon Kuznets, "Population Change and Aggregate Output", ibid, pp. 331-332.

retirement.[24] Saving takes place during the active life span, liquidation of savings during old age. In a stationary population, apart from effects of economic growth, not relevant in the present context, the positive net saving due to provision for old age will be zero, savings of the active population being exactly offset by dissavings of the retired. But in a growing population the ratio of people in the working age to people above the working age is higher than the corresponding stationary ratio, hence saving, on balance, will be positive. This is due to the familiar cohort effect: by assumption saving decisions are taken with reference to the expected life span in a generation, but saving is measured with reference to a given calendar year. The effect is obviously relevant only if a particular social arrangement for the support of the aged prevails, i.e. when the retired are assumed to live on their lifetime savings. Such a system may be contrasted with arrangements in which support of the aged is a family responsibility, as in traditional societies, or with a system in which such support is socialized and arranged in accordance with budgetary methods.[25] To evaluate the effect of age distribution on the balance of individual saving for old age the mortality and fertility components of the age distribution should be considered separately. The individual decisions will be directly affected only by mortality, that -- given the age of retirement -- determines the ratio of the expected years in retirement to the years to be spent in active life. Naturally individual expectations as to this ratio are highly uncertain. If saving is accumulated individually this uncertainty will result in oversaving even over each generation, provided that a high degree of security is desired. The nature of generational death distributions associated to various levels of mortality is such that the oversaving will be particularly important if mortality is high, although greater uncertainty itself may have a depressing effect on saving. But such uncertainties are typically eliminated by pooling arrangements that in effect provide almost perfect foresight for the individual. E.g. if saving for old age consists of the purchase of life annuities, the cost of these, hence the required proportions

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24 James S. Duesenberry, Income, Saving and the Theory of Consumer Behavior, Cambridge, Mass., Harvard University Press, 1949, pp. 41-43; R.F. Harrod, Towards a Dynamic Economics, London, Macmillan, 1952, Chapter 11; Simon Kuznets, "International Differences in Capital Formation and Financing", in Moses Abramovitz (ed.), Capital Formation and Economic Growth, Princeton, Princeton University Press, 1955, pp. 48-49 and 98-103; Kuznets, "Population Change...", p. 332; W. Eizenga, Demographic Factors and Savings, Amsterdam, North-Holland Publishing Company, 1961, Chapter 11.

25 For a discussion of such alternatives see Alfred Sauvy, L'Europe et sa population, Paris, Editions Internationales, 1953, pp. 77ff., and United Nations, The Aging of Populations..., pp. 74-81.

saved during working years, will be the larger the lower mortality is for the group as a whole. Given the level of fertility, low mortality also results in a somewhat higher ratio of old-age to working-age persons -- i.e. in higher disbursements by insurance companies -- but this effect will be minor compared to the higher rate of saving in the working ages. Hence the lower is mortality, the stronger is the net effect on the "period" saving ratio. Similar reasoning shows that given the level of mortality the period saving ratio is positively related to fertility. Besides these demographic factors the importance of this effect will obviously depend on the desired standard of living following retirement relative to that during the working years; on the economic factors influencing the cost of a given annuity, in particular the prevailing rate of interest; and on the average time distance between saving and dissaving in each generation. These latter in turn are influenced by demographic factors. For instance, the age pattern, as well as the level of these savings may be affected by the level of child dependency, i.e. by fertility. Efforts to set aside funds for retirement may be postponed, e.g., until children become self supporting. Concentration of saving for old age to the years immediately preceding retirement will naturally diminish the portent of the above considerations.

23. The assumption that the same aggregate output is associated with the same number of working age people even though dependency ratios differ is also subject to question, apart from the obvious problems of comparing income aggregates with necessarily differing composition. Low dependency rates may reflect preference for more leisure instead of preference for more consumption and saving. Or, conversely, a higher number of dependents to be supported may elicit a larger input of labor,[26] such as more intensive work, longer working days and higher labor force participation rates. It may also be associated with differences in the average age of entry into, or exit from, the labor force; differences which could result in higher output in the high dependency population, offsetting to some extent the positive influence of low dependency rates on income per capita, hence presumably on the savings ratio. The significance of these remarks is obviously dependent upon the responsiveness of output to additional inputs of labor prevailing in a given economy, and also on the general level of the labor force characteristics mentioned; e.g. the age at retirement cannot be extended if people do not retire to begin with. It should also be observed that insofar as dependents are maintained within the framework of family, high dependency itself requires the expenditure of a larger amount of work, typically that of the housewife, the product of which

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26 Kuznets, "Population Change....", pp. 331-332 and pp. 337-340.

is not included in the conventional calculus of income, and which is directly competitive with "value-creating" work. The same is true of time spent in pregnancy. High dependency rates as well as wasteful patterns of reproduction -- high fertility balanced with high infant and childhood mortality -- thus tend to be negatively associated with labor force participatin rates of women.[27]

24. The view according to which higher saving ratios are associated with higher absolute levels of income per capita, hence - other things equal - with lower dependency rates, has been challenged, or complemented, by alternative explanations concerning the determinants of saving. Specifically it has been suggested that consumption patterns are interdependent, that is saving behavior is affected by an individual's or a family's relative position in the income distribution.[28] Accordingly between two culturally isolated economies which have the same aggregate income and the same number of people in the working ages, but which differ in dependency ratios, any divergence in the respective income distributions may be a more important source of difference in the saving ratios than is the implied difference in per capita incomes. There is no agreement, however, whether a more equal distribution of income stimulates or hampers saving. It seems useful to distinguish between two aspects of this question. One is the division of income between people whose saving is motivated by the desire to invest and to expand business - and who, therefore, tend to save automatically a considerable part of their incomes - and people whose saving behavior is governed by considerations of the kind discussed in the previous paragraphs, such as desires to provide for dependents, for old age and emergencies, and for various consumption-oriented future purchases. A more pronounced inequality of the income distribution in the sense of a larger share of total income accruing to the former group obviously has a positive effect on saving.[29] The second aspect is the distribution of income within the latter group, that typically embraces the large majority of the population. Demographic influences discussed thus far in this section concerned essentially the saving of this group only. It has been argued that a higher degree of inequality within this group may entail a smaller proportion saved, since the demonstrated superiority of the consumption standards of richer people with whom low income people come into contact tend to increase the propensity to consume of the latter.[30]

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27 Clarence D. Long, The Labor Force Under Changing Income and Employment, Princeton, Princeton University Press, 1958, pp. 114-116 and 123-133.

28 Duesenberry, Income, Saving,..., Chapter III.

29 Concerning demographic influences on this division see paragraph 28 below.

30 Ibid., pp. 44-45.

Consequently in comparing two economies that conform to the assumptions stated above, even if the distribution of income among the economically active is identical in the two cases, saving behavior may still be appreciably different provided that there are significant differences in the variance around the average dependency rate per income recipient. While such differences undoubtedly exist the ways in which they are related to the customary average measure of fertility and mortality, and to the age distribution implied by these measures, remain largely unexplored. Higher levels of fertility - or younger age distributions - appear to provide a significantly larger room for variation in family size than do lower levels, implying larger inequalities of income hence a possible negative influence on savings. However this conclusion may need modification when the units in which income-sharing takes place are larger than the nuclear family. Also, saving decisions may be based on permanent, rather then temporary income,[31] in which case expected family size may be more relevant for determining saving behavior than is actual family size. But high fertility is likely to imply a high degree of uniformity in the expected ultimate family size.

25. It has also been pointed out, that the effects of interdependence of individual consumption functions on saving may be operative not only within, but also among individual nations.[32] The existence of such an "international demonstration effect" would imply that if two previously isolated economies suddenly come into contact the propensity to save in the poorer country will fall. If the countries concerned had different age distribution savings in the high-dependency population would tend to be depressed.

26. A different aspect of the interdependence of consumption patterns has been invoked in another argument concerning demographic influences on saving. This argument asserts that consumption levels in low income groups in turn influence the consumption level of groups located higher in the hierarchy of incomes by depressing the socially accepted standards of living. Larger dependency rates in the low income families therefore may indirectly constribute to thriftiness in the society as a whole even if these families themselves save little, or not at all.[33]

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31 As argued by Milton Freedman in A Theory of the Consumption Function, Princeton, Princeton University Press, 1957.

32 Nurkse, Problems of Capital Formation..., Chapter III. For critical commentaries see Jacob Viner, "Stability and Progress: The Poorer Countries' Problem", in Douglas Gague (ed.), Stability and Progress in the World Economy, Macmillan, London, 1958, pp. 55-56 and Everett E. Hagen, On the Theory of Social Change, The Dorsey Press, Inc. Homewood, Illinois, 1962, pp. 41-42.

33 Kuznets, Population Change..., p.333.

27. The distribution of income, when measured in terms of income per family, rather than per income recipient, may be significantly affected by the patterns of nuptiality prevailing in a population. Specifically a system of late marriage creates an important potential source of saving insofar as it relieves men in the productive young adult ages from the burden of supporting a family, and stimulates economic activity of young females. Since a large proportion of the savings of unmarried young people is likely to represent merely consumption that is temporarily postponed, the effect on net saving as noted earlier in a different context, may be minor. It is to be observed at this juncture, however, the level of gross savings may have important economic implications of its own, since it will be reflected in the composition of demand, hence in the composition of the capital stock, in the occupational distribution, and in other related characteristics. Saving in anticipation of a delayed marriage for example may generate a high demand for consumer durables the production of which requires a wide array of specialized skills. Such demand may provide an important stimulus to development in a traditional, low-income society.[34]

28. The division of income between "automatic savers" and the broad mass of income recipients referred to in paragraph 24 above is likely to be of paramount importance in determining the level of saving. The distinction between these groups does not necessarily correspond to the distinction between high-income and low-income groups: high income may not imply high level of saving as often shown by the consumption behavior of rich landowning classes in traditional societies. The emergence of people with a persistently high propensity to save with the purpose to accumulate capital is part of the fundamental socio-economic transformation traditional societies must undergo as they adopt new techniques of production that require the use of large doses of reproducible capital. To initiate such a transformation entrepreneurs must acquire control over such capital and there must exist a class of people that can be induced to work in cooperation with that capital in exchange for some remuneration, usually in the form of wages. Once these pre-conditions for the existence of a "modern", or "capitalist" sector have been met the process of modernization can be pictured as the expansion of the modern sector relative to the traditional or "subsistence" sector, involving a continuous reinvestment of the surplus realized in the modern sector, and a consequent increase of the proportion of the

34 John Hajnal, "European Marriage Patterns in Perspective", in D.V. Glass and D.E.C. Eversley, (eds.), Population in History, forthcoming.

labor force there employed.[35] This "dualistic" stage of the development process comes to a successful end when the traditional sector has been completely eliminated, i.e. when the modern sector embraces the whole economy. This process of modernization as well as the subsequent maintenance of economic growth may be carried out under the control of private entrepreneurs, perhaps operating in corporate forms; it may be organized through the agency of the state, or there may exist a mixture of these alternatives. Assuming that no economic role is played by the state the surplus of the modern sector is realized as profits: the larger is the share of profits within the total national income, ceteris paribus the higher is the rate of saving. It should be noted that this proposition does not require that all profits be saved, neither does it exclude other sources of business-oriented savings. A considerable portion of profits may in fact be spent on consumption, while the desire to establish or expand family business, including the desire to improve the land, may constitute a strong motivation to save from property incomes other than profits, and also from salaries and wages. The proposition merely requires that the marginal propensity to save from profits be higher than from other sources of income, the fulfillment of which condition appears to be verified by the statistically established fact that the overall saving ratio does rise pari passu with the rise of the share of profits in total income during the first stage of development, and then tends to level off as the share of profits stabilizes.[36] Demographic factors are believed to affect the share of profits, hence savings, by virtue of their influence on the level of wages.[37] While this influence may be of considerable importance it is conditioned by many characteristics of the

35 The modern formulation of the view of the development process outlined here and underlying the arguments in the following paragraphs is due to W. Arthur Lewis. See in particular his "Development with Unlimited Supplies of Labour", The Manchester School, Vol. 22 (May 1954), pp. 139-192. Further elaboration of the Lewis model is found in Gustav Ranis and J.C.H. Fei, "A Theory of Economic Development", American Economic Review, Vol. 51 (September 1961), pp. 533-558; Stephen Enke, "Economic Development with Unlimited and Limited Supplies of Labor", Oxford Economic Papers, Vol. 14 (June 1962), pp. 159-173; and John C.H. Fei and Gustav Ranis, Development of the Labor Surplus Economy, Richard D. Irwin, Inc., Homewood, Ill., 1964.

36 W. Arthur Lewis, "Unlimited Labor: Further Notes", The Manchester School Vol. 26 (January 1958), pp. 16-17. On this topic see also Alfred Sauvy, Théorie générale de la population, Vol. 1 (Third Edition) Presses Universitaires de France, Paris, 1963, pp. 231-235.

37 Coale and Hoover, Population Growth..., pp. 315-317, and John H. Habakkuk, "Population Growth and Economic Development", in Lectures on Economic Development published by the Faculty of Economics, Istanbul University, Istanbul, 1958, pp. 31-33.

economy, therefore no simple generalization is possible about its nature. Only the more important considerations that have a bearing on the wage level in the modern sector will be outlined in the following paragraphs.

29. At the first stage of capitalist development employment in the modern sector is typically limited by the scarcity of capital, i.e. at the going rate of real wages there is an excess supply of labor that cannot be profitably absorbed by the capitalist sector since additional employment would depress the marginal productivity of labor below the wage rate. Under competitive conditions this circumstance tends to hold down wages to a minimum level consistent with a smooth flow of labor into the modern sector as capital accumulates, and expansion takes place with wages fixed at that low level. In the classical economic doctrine the equilibrium level of this minimum wage was directly tied to demographic conditions it having been identified as the minimum subsistence consumption level necessary for the simple reproduction of the labor force. This formulation hardly provides an objective standard since "subsistence" is a socially, rather than biologically determined quantity, influenced, among other things, by the prevailing relative preferences for material goods and family size. Nevertheless the classical view does indicate a connection between the level of real wages and demographic characteristics that is generally considered real in dualistic economies, namely that when wage earners have to support larger families the larger consumption needs tend to generate upward pressures on wages.[38] This connection appears to be less direct if the modern sector is developing not on the basis of a fully committed labor force that has severed its ties to the traditional sector, but, rather, employs casual or migrant labor - consisting for example predominantly of unmarried males - that maintain its connection with, or eventually returns to, the subsistence economy. This latter observation points to the necessity to consider the role that the conditions prevailing in the non-capitalist segment of the economy are likely to play in determining the capitalist wages. The consumption levels obtainable in the traditional sector, most importantly in peasant agriculture, set the floor below which wage levels in the modern sector cannot sink. If that level is directly linked to the average product, in particular to the average product of peasant agriculture, it is apparent that, given the productivity of the population in the working age, a higher dependency ratio, or what is equivalent in the present context, a younger population, means lower consumption per capita. This will also imply a lower industrial wage rate but only to the extent that those moving into the modern sector have less than average

38 At an early stage of development such pressures may be lessened by increased employment of women and children. Cf. Sydney H. Coontz, Population Theories and the Economic Interpretation, Routledge and Kegan Paul Ltd., London, 1957 pp. 150-151, and also Chapter 8.

responsibilities for supporting dependents.[39] This differential effect of the age structure however will work in the opposite direction if peasants have to pay rent, and rents are so adjusted as to leave a minimum consumption level for the agricultural population.

30. Apart from any effect of differing age structures the differences in consumption standards established in peasant agriculture, hence the differences in the wage level at which labor is available to the modern sector, depend to a large extent on the factor endowments that prevail in the subsistence sector. As a rough indicator of the latter one can take some index of population density, such as the ratio of the agricultural population to the amount of arable land available. Given the level of technology in the traditional sector it is customary to speak of "high population pressure" or "overpopulation" when such measures of population density exceed a certain level that is bound to be associated with some empirical characteristics of peasant agriculture, such as a sharply decreasing or a very low level of the marginal productivity of labor. How far demographic factors are identifiable as a "cause" of overpopulation so defined must remain a moot question. The essential fact remains however that as a result of past economic and demographic history there are marked differences with respect to population pressures prevailing in the traditional sector among the various countries that are embarking on, or are currently undergoing, economic modernization. Such differences may have a powerful influence on the rate of accumulation in the economy in general, and in the modern sector in particular. There are two aspects of an overpopulated state that appear to be conducive to relatively higher levels of accumulation. First, the low average productivity in the subsistence sector imply that low consumption standards have been established, which enables the modern sector to attract its labor supply at a low wage rate. Thus given the stock of capital that exists at a given time in the modern sector it will be profitable to employ a greater number of workers, and the volume of profits will be higher. The validity of this argument depends however on the assumption that there are no trading relations between the two sectors; i.e. that the subsistence economy merely serves as a supplier of labor for the capitalist sector which exists as an isolated enclave within the economy as a whole. This condition typically requires the availability of export markets for the products of the capitalist sector. Wage goods - that under the given conditions consist mainly of food - may then be imported; alternatively they must be produced by the capitalist sector itself in a quantity necessary for the maintenance and the continued expansion of its work force. If, however the traditional sector is to supply food, hence serve as a market, for the modern sector the effect of population pressure in peasant agriculture will

39 Dipak Mazumdar, "Underemployment in Agriculture and the Industrial Wage Rate", Economica, Vol. 26 (November 1959), p. 332.

be adverse since the lower are the consumption levels of the agricultural population the smaller will be the volume of extra marketed surplus -- the difference between total agricultural output and the subsistence sector's own consumption requirements -- that is likely to accompany the release of workers to industry. The terms of trade between the two sectors then will favor agriculture with the consequence that while industrial wages will be low in terms of wage goods, they will be high-hence profits low-in terms of the products of the industrial sector itself. A second apparent advantage of rural overpopulation is sometimes perceived in the fact that such a state implies, by definition, a very low marginal productivity of labor: in the extreme case, it is contended, marginal labor productivity may in fact be zero over a broad range. Under such circumstances the removal of labor from subsistence agriculture does not entail a reduction of the total food production. But even if the empirical validity of these premises id accepted [40] the problem of inducing peasant agriculture to release the food necessary to feed the labor drawn into industry remains, and, on balance, is likely to be more difficult to solve with initially low per capita output and consumption levels. More importantly, furthermore, low population pressure in peasant agriculture -- as shown by the existence of positive and relatively high marginal productivity and relatively high average productivity of labor -- does not necessarily imply that removal of workers will result in a fall of food output. Limited production levels in the pre-industrial economy having a favorable population density may feflect simply the absence of attractive exchange relationships available to the peasants, in other words a self-sufficiency with respect to "subsistence" products. In such economies therefore a a substantial margin of surplus capacity is likely to exist both in the form of underutilized land and underutilized labor even without any radical improvements in the existing agricultural techniques. This surplus capacity will be activated -- and, pari passu, peasant savings increased -- once the marketing of agricultural surplus in exchange for industrial products becomes feasible; a possibility precluded by the absence of free or undercultivated land in overpopulated countries.[41] It follows that under conditions of high population pressure an expansion of domestic food production

40 For further discussion see Section IV below.

41 Hla Myint, The Economics of the Developing Countries, Praeger, New York, 1964, Chapter 3. A differing interpretation is given in Nurkse, Problems of Capital Formation..., pp. 49-56. For a collection of empirical studies of related interest see Raymond Firth and B.S. Yamey, Capital, Saving and Credit in Peasant Societies, Aldine Publishing Co., Chicago, 1964. Another interpretation of savings behavior in traditional agriculture is given in Theodore W. Schultz, Transforming Traditional Agriculture, Yale University Press, New Haven, 1964, Chapters 5 and 6.

i.e. the establishment of the basic precondition for a home-based industrialization program, requires an early reorganization of peasant agriculture, and/or the inclusion of capitalistic agriculture within the developing modern sector. While both these measures are necessary in the long run irrespective of the initial conditions of the traditional economy high population pressure makes the solution of these problems not only more urgent but also more difficult to accomplish. The foregoing considerations indicate that in the early stages of modernization demographic conditions, in particular the population density that prevail in the traditional sector, are likely to have an important influence on the rate of saving through their bearing on the level of wages in the capitalist sector, through the terms of trade between the two sectors, and through the level of peasant savings. On balance both low population density and low dependency rates appear to favor the rate of accumulation.

31. As was indicated earlier the above conclusions do not follow, i.e. low average productivity in the subsistence sector (associated, ceteris paribus, with high population density or high dependency rates) may actually favor accumulation through low wage rates, provided that sufficient export markets can be found for the products of the developing industrial sector and wage goods can be imported. How far this is feasible may be strongly influenced by another demographic factor, namely the absolute size of the population in question. The achievement of a high rate of saving through foreign trade may be a realistic possibility for a small country, but the same solution is less likely to be open to the same degree for a large population due to the adverse effects on its export and import prices that the attempt to adopt that solution would tend to generate.[42]

32. Implicit in the analysis of the dualistic economy is the conclusion that if two economies in that stage of development differ with respect to the rate of population growth, while other things are kept equal, this differential is not likely to appreciably affect the volume of saving via an influence on the wage level. This is so because the additional supply of labor provided by a higher rate of population growth will constitute merely one component of the total supply, which is from a practical standpoint unlimited regardless of the rate of population growth. On the other hand once the mature stage of development has been reached, and the supply of labor has become inelastic, population growth represents the only, or at any rate the major source of newly offered work on the labor market, hence differences in the rate of population growth as such will no longer be unimportant. Insofar as a higher rate of population growth in the short period results in a lower capital/labor ratio it will tend to exercise a depressing influence on the marginal productivity of labor, which under competitive conditions will determine the wage rate throughout the economy, and therefore it will increase the share of income accruing to entrepreneurs, hence the rate of saving.[43]

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42 Cf. Viner, International Trade..., pp. 141-142.

43 Cf. Joan Robinson, The Accumulation of Capital, Macmillan, London, 1956, pp. 343-347.

In a fully developed economy the demographic effect on the wage level just described is likely to be the only one about which a generalization is possible; the effects outlined for the case of the dualistic economy both tend to disappear or diminish in importance. Specifically larger families per wage earner will have no effect on the remuneration of labor, and the effect of differentials in population density on the relative shares of labor and capital will become not only small, but also unpredictable in its direction. Higher density however will remain to be associated with a higher share of rents within total income: the effects of this on saving will depend on the distribution of the ownership of land among persons with differing saving behavior.

33. The discussion in the previous paragraphs concerning the effects demographic factors may exert on the level of profits hence, indirectly on the rate of accumulation in the modern sector, was based on the assumption that wages are an outcome of the actions of individual workers and entrepreneurs taking full advantage of their respective bargaining positions in the market for labor. This assumption seldom conforms closely to the reality of the contemporary world. Thus, for example, modern entreprises established in developing countries for a variety of reasons may be patterned after their counterparts in more advanced economies paying high wages and following labor policies irrespective of the conditions of the local labor supply. Pressure of organized labor in the modern segment of a developing economy may successfully achieve the same result. As a consequence of such phenomena wages, profits, and accumulation may become divorced from the prevailing demographic conditions. Given the saving behavior of various classes of income receivers this means that any positive income distribution effect that may be associated with higher dependency ratios, with higher population growth, and higher population pressures in the subsistence economy, will tend to be neutralized.[44]

34. An examination of the ways in which the economic role played by governments may influence saving is likely to modify some of the conclusions reached thus far. The fact that the nature and extent of that role varies widely from country to country makes the state the natural main unit for the analysis of demographic-economic interrelationships; it also explains why statements about that role which may be valid in one country may have only limited applicability in another country. A detailed examination would therefore require a careful differentiation among various types of governments as to their economic functions; only the most rudimentary distinctions will be made in the following brief discussion. As the simplest case one may consider a situation in

44 Cf. the papers on "Minimum Wages and Other Labor Standards Considered in Relation to Economic Growth in Underdeveloped Countries" in the Journal of Farm Economics Vol. 38, (May 1956), pp. 513-545. For a discussion of empirical evidence see Lloyd G. Reynolds, "Wages and Employment in a Labor-Surplus Economy", American Economic Review, Vol. 55 (March 1965), pp. 19-39.

which saving and investment remain essentially outside the government's sphere of action, the latter being limited to the provision of a more or less wide range of services consumed collectively, or available for individuals freely or below market prices. Usually a considerable part of such services is geared to the needs of particular age groups, as is the case with schooling, or in other instances the need for the service in question is highly sensitive to the age distribution of the population, as is the case with medical care. The effect of a high proportion of persons in the young dependent ages is analogous to the case when these dependents are supported by their families: given the standards of provision per person a higher dependency rate will require a higher level of expenditure for a given total population. Moreover a shift from private to public responsibility for satisfying certain needs is usually associated with higher average levels of provision, which, in turn, tends to make the dependency burden both higher and more closely proportional to the relative size of the dependent population. This is so for example when the public action is designed to correct for the private failure - that may be due to inability or lack of willingness or foresight on the part of individual families - to meet the standards of provision society considers desirable. Furthermore, while some economies in the state provision of services are undoubtedly associated with larger numbers, such economies of scale are not likely to be comparable to those realized within families. Differences in this respect as actually experienced may be due partly to the different level of service rendered. To illustrate with an example; the transmission of skills to children within the family may be accomplished with equal success whatever is the number of children per family, while the cost of formal schooling of a given quality is likely to be roughly proportionate to the number of pupils being trained. But even if the assumption of part of the child dependency burden by the government makes no difference as far as the total cost of supporting children is concerned, the distribution of incomes will be modified as a result of the collective action, which is therefore bound to have an impact on the volume of private savings. Given the propensities to save of the various classes of income receivers the strength and direction of this impact will depend on the revenue-raising policy prusued by the government. Insofar as persons with a high marginal propensity to save are made to carry a higher tax load than would be their share if no income-redistribution is involved, or, conversely, if those who benefit from the scheme are poor savers, the effect will be negative.[45]

35. The role of government with respect to the support of the old age population may be limited to forcing individuals to provide for their retirement years during their working life. The provision for old age "dependents" may then be carried out in the

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45 Cf. Lewis, The Theory of Economic Growth, pp. 239-244 and Peter T. Bauer and Basil S. Yamey, The Economics of Under-developed Countires, University of Chicago Press, Chicago, 1957, pp. 201-204.

framework of a compulsory retirement-saving scheme run on the basis of actuarial principles and possibly also including safeguards against inflation and guarantees for an equitable participation in the gains derived from technological progress.[46] Retired persons then receive essentially property incomes the basis of which is acquired as a result of pre-retirement saving. The effect of the proportion of old age people, relative to those in the working age, is the same outlined earlier, with the difference that rational behavior, so judged by society, is generalized, hence the need to rely upon younger relatives for support (in a sense, to capitalize on investment in the raising of offspring), or, alternatively, the condition of relative poverty in old age, are eliminated. Characteristically, however, government action leading to these results is organized on a pay-as-you-go basis, i.e. is financed essentially by taxing the active population in each time period to the extent required by the number of old persons receiving government allocations in this period, and by the average level of allocation per person.[47] To the extent that such an arrangement is adopted the positive effects that a high rate of population growth tends to exert on saving is eliminated.

36. When the responsibilities undertaken by the government include an active role in capital formation the differential effect of demographic factors on saving through government finance is no longer limited to the adverse influence that a required higher level of taxation may exert on private voluntary saving. Consider first economies in which the government undertakes certain social-overhead type investments and raises funds that are subsequently placed at the disposal of private entrepreneurs. Particularly in less developed countries where the level of government expenditures is essentially dependent on the ability of the government to raise revenues (rather than - as in the more developed countries - the level of expenditures setting the volume of revenues raised), government expenditures on consumption are in an obvious competition with government saving and investment.[48] Unless taxes are fully

46 Cf. Joseph J. Spengler and Juanita M. Kreps, "Equity and Social Credit for the Retired", in Juanita M. Kreps (ed.), Employment, Income, and Retirement Problems of the Aged, Duke Universty Press, Durham, N.C., 1963, pp. 220-229.

47 On this topic see John Black, "A Note on the Economics of National Super-Annuation", Economic Journal, Vol. 68, (June 1958), pp. 338-352; Alfred Sauvy, Théorie Générale de la Population Vol. II, Presses Universitaires de France, Paris 1959, pp. 58-62; Kingsley Davis, "Population and Welfare in Industrial Societies", Population Review (Madras), Vol. 6, (January 1962), pp. 23-25.

48 Walter W. Heller, "Fiscal Policies for Underdeveloped Economies", in Haskell P. Wald, (ed.), Conference on Agricultural Taxation and Economic Development, Harvard Law School, Cambridge, 1954, p. 66.

offset by an equivalent drop in private saving, the more successful is the government in mobilizing funds, and the lower is the part of such funds that must be reserved to finance consumption, the higher will be the overall rate of saving. On both scores low dependency rates will be economically favorable. The conclusion is even further reinforced when highly centralized economies are considered that seek to maximize the rate of saving. The specific devices by which saving is achieved and accumulated in the hands of the government may take various forms: beyond, or instead of, the conventional means of taxation. They may include, for example, compulsory arrangements for the marketing of certain part of the product of the subsistence sector, if any; a measure the significance of which is implied in the above discussion. Or, in the industrial sector, saving may appear in a form analogous to profits, namely as the centralized surplus of state entreprises the volume of which, furthermore, is directly under the influence of the wage and price policies set by the government.[49] With the determined application of such devices of accumulation the calculus of the dependency burden will appear in its pure form: given the level of austerity the government is able to impose, or the society is willing to accept, a difference in the age structure of the population will be directly translated to a difference in the division of national income between consumption and saving.[50]

37. For convenience of exposition the demographic aspects of saving were discussed in this section by the device of comparing states identical in every aspect except some specified demographic characteristics. The same reasoning can be readily applied for comparisons between different states of a given population as observed at, or projected to, different points in time. The artificiality of keeping other things equal in such comparisons is clearly revealed; during the time required for a significant demographic differential to appear many other data of the economy in question will have changed and divergences in saving behavior can not be imputed to the demographic change alone. But the conclusions described above should give a guidance for evaluating the implication on saving of a given modification of the demographic parameters. As an example the effect of changes in the age structure may be considered. The distribution by age of the population is a function of past trends of fertility, mortality, and migration; a drastic transformation of that structure is obviously not likely to occur in any single year. Therefore if one's attention is focused on so short a time span the variable does not appear as a possibly important factor in modifying the conditions in which capital formation takes place. But the accumulated effect of sustained change in the factors mentioned may be nevertheless substantial within a relatively few years time. As

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49 Cf. Horace Belshaw, Population Growth and Levels of Consumption, Allen & Unwin Ltd., London, 1956, Chapter VII.

50 Coale, "Population and Economic Development", pp. 54-55.

an illustration two examples will be cited here. In the USSR, as a result of a rapid decline of fertility, the number of children in 1940 was some 13 million fewer than would have been the case had fertility remained on its 1926 level.[51] This spectacular drop in the child dependency rate coincided with, and undoubtedly facilitated, a very high level of capital formation, rapid industrialization, an increase of the female labor participation rates, an expansion of educational and health facilities and other economic and social changes. Another illustration is the upturn of the US dependency rate (measured as the ratio of persons under age 20 plus persons over 65 to persons age 20 to 64) from the level of .73 in 1950 to .91 in 1960.[52] It is noteworthy that the impact of this change on consumption levels has been widely interpreted as a "strain", a "reimposition of the strenuous life" and a "choice of lesser affluence".[53] Such comments are of added interest when the figures quoted are put in historical perspective revealing that the indicated change represents a relatively modest variation. For example, the comparable US rate in 1820 stood at 1.53.

38. The effects of changing demographic conditions on saving and consumption naturally will be specific to the characteristics of the particular pattern of change being contemplated. The task of the analyist is to trace the detailed time sequence of the various transitory states the effect of which on saving and consumption may then be evaluated along the lines described above, taking into account also any changes in economic behavior that might be traceable to the change in, rather than to the current level of, the various parameters.[54] The issue may be illustrated by the often encountered task of considering the effects of hypothetical future courses of population change exerted through the age distribution. Starting from a given initial state the specification of expected trends of fertility, mortality and migration permit a separate examination of the influence of the basic

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51 Frank Lorimer, "Dynamic Aspects of the Relation of Population to Economic Development", in Joseph J. Spengler and Otis Dudley Duncan, (eds.), Demographic Analysis, The Free Press, Glencoe, Ill., 1956 (reprinted from the Bulletin of the International Statistical Institute, Vol. 33, No. 4), pp. 454-455.

52 Donald J. Bogue, The Population of the United States, The Free Press, Glencoe, Ill., 1959, p. 102.

53 E.G. W.W. Rostow, The Stages of Economic Growth, Cambridge, 1960, pp. 81 and 91.

54 Cf. Erich Streissler, "Population Change and Economic Growth", Zeitschrift für Nationalökonomie, Band XVII, Heft 2, 1957, pp. 332-340.

components of population change.[55] A conspicuous characteristic of changing fertility is that it does not affect the age structure of the adult population for some two decades following the onset of change; a reduction of fertility during this period constitutes an unqualified lessening of the dependency burden.[56] If fertility stabilizes at a lower level, ceteris paribus so will the overall dependency rate, within which however the weight of the old age component will be higher. The effect of such changes on consumption patterns will be conditioned by the time pattern[57] and the sources of the specified fertility change - e.g. whether it was a consequence of a changing family size, a change of the age at marriage, or a change of the proportions married - besides being dependent on the characteristics of the general socio-economic matrix. As indicated above, however, even if these required data are available our knowledge about the relevant relationships is not sufficient to permit precise quantitative estimates. In particular the prediction of private voluntary saving poses difficult problems of interpretation since with respect to this component of saving it is clearly not permissible to assume a close link between changes in the capacity to save - the variable directly influenced by demographic factors - and actual saving performance. "Saving capacity", or "potential saving", may be thought of as the residual over some "necessary" consumption level per capita, the latter being defined perhaps as a quasi-biological minimum, consistent with the maintenance of some standard of productivity (a concept of possible relevance for example in a war economy); or identified with consumption sustained in the indefinite future to secure the "currently" existing standard of living (i.e. assuming a marginal propensity to save of unity); or implying a certain rate of improvement over time above the current standards; etc. Not only individual saving behavior has no obvious relation to the magnitude of saving capacity, however defined, but it is also

55 For such analyses see e.g., Jean Bourgeois-Pichat, "Charges de la population active", Journal de la Societé de Statistique de Paris, 91e Année, Nos. 3-4, pp. 94-114; Léon Tabah, "Le problème population-investissement-niveau de vie dans les pays sous-developpes", in Institut national d'études démographiques, Le Tiers Monde", Travaux et Documents, Cahier No. 27, 1956 pp. 227-288; Coale and Hoover, Population Growth..., especially Parts 2 and 4; Mahmoud Seklani, "Variations de la Structure Par Age et Charges de la Population Active dans les Pays Sous-Developpes", in Union internationale pour l'etude scientifique de la population, International Population Conference New York 1961, Tome II, London 1963, pp. 527-532.

56 Cf. United Nations, The Future Growth of World Population, Population Studies, No. 28, New York, 1958, Chapter 4, and Frank W. Notestein, "Mortality, Fertility, the Size-Age Distribution, and the Growth Rate", in Coale, Demographic and Economic Change..., pp. 261-275.

57 E.g. Michael Tacke, "Der Einfluss der Bevölkerungsvermehrung auf die Konsumnachfrage", Zeitschrift für die Gesamte Staatswissenschaft, Vol. 119, (Aug. 1963), pp. 476-495.

open to question how far it is meaningful to seek to establish a cause-effect relation between a given demographic change and subsequent saving behavior. If, for example, statistical observation does show that smaller families save more this may be due to the fact that those who want to save elect to have smaller families, rather than the other way around. Or it may be assumed that the urge to save and the desire to limit the size of one's family are merely two aspects of the same phenomenon and both are to be explained by a deeper set of causes. (Similar problems of interpretation are involved in evaluating for instance the effect of urbanization on private voluntary saving, given an initial observed difference in the propensity to save between the urban and the rural population.[58]) Alternatively saving differentials observed at a given time with respect to demographic criteria may be used to "predict" future changes in saving as the demographic structure undergoes changes, but the likelihood that such structural changes will also be accompanied by shifts in individual preference functions that may be of an offsetting nature, must be kept in mind.[59] On the other hand an unequivocal evaluation of a given demographic change with respect to its effect on saving capacity is usually possible: in the typical range of fertility levels reduced fertility results in a higher capacity to save, not only in the short period but also in the long run. The reverse of this statement is valid for the case of an increase in fertility.

39. The effect of a change - for practical purposes a decline-in mortality has a less pronounced effect on population structure than does fertility change since it affects numbers of people at all ages. For analytical purposes the influence on the various age groups is sometimes treated separately,[60] however the

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58 For a discussion of the effect of urbanization on saving see Secretariat of the Economic Commission for Latin America, "Creation of Employment opportunities in Relation to Labour Supply", in Philip M. Hauser (ed.), Urbanization in Latin America, International Documents Service, New York 1961, pp. 132-136.

59 For example from United States data Eizenga has calculated that between 1900 and 1950 as a result of changes in the family size structure the individual saving-income ratio should have risen from 7.2 per cent to 20.4 per cent. In fact, if consumer durables are excluded from the calculation, there occured virtually no change. Eizenga, Demographic Factors..., pp. 102-105. See also R.W. Goldsmith, A Study of Saving in the United States Vol. I, Princeton University Press, Princeton, 1955, and Vol. III of the same work, by R.W. Goldsmith, D.S. Brady, and H. Mendershausen (Princeton, 1956).

60 E.g. Eizenga, Demographic Factors..., pp. 11-13.

close intercorrelations of age specific mortality rates permit little variation in the overall effect[61] which can be described as an increase in both juvenile and old age dependency; at moderate and high levels of mortality the former factor being the more important one. Thus, measured in terms of the conventional dependency rate, an improvement in mortality reduces the society's capacity to save, although, as indicated above in the argument concerning the related topic, the higher number of years expected to be spent in old age adds a powerful motivation to save more where saving for old age is an individual responsibility. The fact that the decline of mortality results in higher dependency rates in general, including also a higher young age dependency, must be stressed since, despite the fact that the relevant mechanism of the dynamics of age distribution has been clarified,[62] it is sometimes asserted that a reduction of mortality eliminates the economic waste involved in the loss of investment made in raising children who fail to survive.[63] The assertion is correct when applied to individuals but not so when related to society as a whole and based on an age distribution argument alone. Nevertheless other favorable economic aspects of mortality reduction, such as derived from lessened morbidity and increased capacity to work, in all likelihood outweigh this adverse influence on saving. Prolongation of life is in itself a primary goal of economic development hence whatever is the net effect on accumulation, or on other economic variables, policies aimed at reducing mortality are not

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61 To generalize about the effects of migratory movements on the age distribution is less simple, but the analysis itself can be carried out analoguously to that of mortality - migration adding (or removing) specified proportions to (or from) the population. Cf. Léon Tabah et Alberto Cataldi, "Effets d'une immigration dans quelques populations modèles", Population, Vol. 18, No. 4, (Oct.-Dec. 1963), pp. 683-696. See also Brinley Thomas, International Migration and Economic Development, Unesco, Paris, 1961 pp. 48-51.

62 John D. Durand, "Population Structure as a Factor in Manpower and Dependency Problems", Population Bulletin No. 3, (United Nations), October 1953, pp. 11-13.

63 E.g. W. Lee Hansen, "A Note on the Cost of Children's Mortality", Journal of Political Economy, Vol. 65, (June 1957), pp. 257-262. The paper criticizes the quantitative conclusions of an earlier formulation by D. Gosh but appears to accept the misleading cohort-approach. Also Theodore K. Ruprecht, "The Cost of Child Mortality in Developed and Underdeveloped Countries", Proceedings of the Thirty-Third Annual Conference of the Western Economic Association, 1958, pp. 21-24. See also Frederic A. Mehta, "Economic Implications of Demographic Growth in India", Economia Internazionale, Vol. 8, No. 4, (Novembre, 1955), pp. 817-819.

likely to be modified.[64] The actual nature of the dependency burden is sometimes revealed however by policies concerning international migration pursued by some states that encourage or discourage in or our migration depending on the age of the migrating person.

40. The foregoing discussion has indicated the potentially important effect of demographic factors on saving - particularly in underdeveloped countries in which the past and current high level of fertility implies the possibility for an advantageous transformation of the age structure. However, since the arguments surveyed implicitly assume that, ceteris paribus, higher per capita saving is economically desirable, these arguments may be invalidated, or their significance may be lessened, if the volume of savings itself is assigned an unimportant or possibly a perverse role in the process of development. Some controversial points bearing upon this question will be discussed briefly in the remaining part of this section. First, it is sometimes asserted - to a certain extent as a reaction against an earlier tendency in the literature to emphasize the role of saving and capital accumulation to the neglect of other growth-promoting agents - that inadequacy of saving does not constitute an effective limitational factor in development, in view of the existence of other phenomena such as the limited capacity of the economy to absorb productive investment, or the lack of foreign exchange.[65] These phenomena may mutually explain each other or can be explained by lack of domestically available cooperant productive factors, in particular of entrepreneurship and of skilled labor, as well as by deficient institutional arrangements. In such situations, it is said, increased savings are not forthcoming because they are not needed; or sometimes it is asserted that savings in fact are abundant but are "wasted":"savings" usually being defined in this context to include outlays that in some sense are considered "unnecessary," such as various kinds of ceremonial expenditures. The validity of such arguments cannot be evaluated without reference to the specific situation to which they are applied. It should be noted, however, that even if domestic saving is not a limitational variable as such,

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[64] Cf., however, Sauvy, Théorie Générale ..., Vol. I, Chapter 26.

[65] E.g. United Nations, Department of Economic and Social Affairs, Studies in Long-Term Economic Projections for the World Economy, New York, 1964, pp. 50-51; M. J. Mamalakis, "'Forced Saving' in Underdeveloped Countries. A Rediscovery or a Misapplication of a Concept?", Economia Internazionale, Vol. 17 (August 1964), pp. 420-422.

its actual level may still be influenced by demographic factors if such factors have a bearing on the effective limit, e.g. on the availability of foreign exchange. As to the more general limitation of the absorptive capacity, undoubtedly in any economy there does exist an upper limit beyond which limit return on investment falls to zero.[66] Yet when the situation typical of most underdeveloped countries prevails, i.e. one characterized by a low level of capital accumulation, a general inadequacy of overhead capital, a less than full utilization of the supply of unskilled labor, some scope - even for larger countries - for raising total proceeds from exports by price competition, some possibility to reduce imports of non-essential consumer goods, and the availability of foreign capital as well as technical and entrepreneurial know-how at competitive prices, a higher level of domestic saving for practical purposes can always be translated into capital formation even if with a decreasing efficiency.[67]

41. Secondly, it will be recalled that in low income countries a translation of increased saving capacity that may appear as a result of a demographic change (such as a decline of fertility) into actual savings may require some form of social compulsion, e.g. exerted through taxation, or through permission of high income inequalities. In such circumstances, even if it is recognized that an increased rate of saving results in an increased rate of income growth, it may be argued that this does not establish the case for higher saving ratios. The final end of the economic process is consumption; sacrificing current consumption may be justifiable only up to the point where on the margin the resulting investment generates an income stream that is valued as highly as the current consumption foregone.[68] This formulation makes it clear that maximization of saving is not a proper objective per se, and indicates that the policies which may be required for demographic changes significantly to affect savings are possibly undesirable.[69] To weigh this argument properly in any given situation requires a judgment on the question how the economy's overall savings ratio should be determined and on what constitutes the optimum rate of saving. These questions involve difficult problems of objective economic calculation concerning future income as well as ethical judgments concerning the desirability of the existing income distribution; the possible external economies and diseconomies of consumption and investment; the extent in which the interest of generations yet unborn are to

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66 Cf. Branko Horvat, "The Optimum Rate of Investment," Economic Journal, Vol. 68 (December 1958) pp. 747-767.

67 For a balanced statement see W. B. Reddaway, "The Economics of Underdeveloped Countries," Economic Journal, Vol. 73 (March,1963)pp.6-9

68 Jan Tinbergen,"The Optimum Rate of Saving," Economic Journal, Vol.66 (December 1956) pp. 603-609.

69 See e.g. Bauer and Yamey, The Economics ..., Chapter 13.

be taken into account; and similar problems.[70] Obviously wide differences in individual opinion may exist concerning these matters. However there appears to be a substantial degree of consensus that in most underdeveloped countries the actual rates of saving are not only below the absorptive capacity of the respective economies, but are also below the socially optimum rates by a substantial margin. If this premise is granted the objective of optimization in the above sense and that of maximizing the saving ratio coincide for practical purposes, establishing the case for policies and institutional arrangements that facilitate a high level of capital formation. This strengthens the argument concerning the importance of demographic influences on savings.[71]

42. Given a strong policy of austerity it may be argued, however, that the rate of saving could be increased up to the absorptive capacity of an economy regardless of the demographic characteristics of the population, i.e. the capacity to save may be less of a restriction than the economy's ability to productively invest savings. If, in fact, the latter happens to be positively affected by the same demographic factors that tend to decrease saving capacity, the effective rate of saving may actually be lower when, theoretically, the economy could save more. This argument deserves further investigation, but on empirical grounds it appears to have little practical significance. An examination of the historical experience suggests that even when the strongest emphasis is laid on capital accumulation net capital formation is not likely to much exceed 15 per cent of total income for reasons not obviously traceable to zero net returns on marginal investments.[72] When per

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70 Cf. Maurice Dobb, Economic Growth and Planning, Routledge & Kegan, London, 1960, Chapter 2; Amartya Kumar Sen, "On Optimising the Rate of Saving," Economic Journal, Vol. 71 (September 1961), pp. 479-496; and Stephen A. Marglin, "The Social Rate of Discount and the Optimal Rate of Investment," Quarterly Journal of Economics, Vol. 77 (February 1963), pp. 95-111.

71 This conclusion could be shown to be valid for sharply differing approaches to the problem of development policy. For a discussion contrasting the "Ricardian" and "Malthusian" (named after the author of the "Principles" rather than the author of the "Essay") strategy of development see Arthur Smithies, "Rising Expectations and Economic Development," Economic Journal, Vol. 71 (June 1961) pp. 255-272.

72 See Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations," Part V, Economic Development and Cultural Change, Vol. VIII, No. 4, Part II (July 1960) especially pp. 26-32.

capita incomes and saving are very low to begin with, saving capacity must be necessarily low, and its expansion is bound to be modest and lagging behind the opportunities for productive investment. Even more importantly, there are strict economic limitations on a policy seeking to maximize investment at the expense of consumption. The discussion thus far treated these quantities as if they were clearly distinguishable from each other, in practice the line of demarcation in many instances is difficult to draw. It can be said in fact that to a varying degree all consumption expenditures affect the capacity and the motivation to work as well as the quality of the future labor supply.[73] From this it follows that - abstracting from any limits of absorptive capacity - even if the maximization of income growth is accepted as an objective it is not likely to be served simply by maximizing the saving ratio at any given time, but rather by maintaining a balance between what is "mostly consumption" and what is "mostly investment" which is optimal from the point of view of the stated objective.[74] Apart from the very short run this means that the resources that can be released for investment in the narrow sense will be always more limited than the availability of strict controls over consumption, and the willingness to use these controls would suggest.[75] Thus a lessening of the pressure of consumption needs is likely to be a realizable advantage for higher rates of accumulation in all low income countries.

43. Finally, it is a possibility that the level of investment in an economy is lower than would be warranted by the volume of ex ante saving, not because of a scarcity of productive resources of any kind, but because of the inadequate level of demand caused by various factors, among them demographic ones such as a slow or, particularly, decelerating population growth that results in excessive thriftiness, and discourages investments. If such conditions are sustained output will settle down at a less than full employment equilibrium. The existence of such a situation in an economy may be tested by determining whether an upward shift in the consumption

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[73] See Leibenstein, Economic Backwardness ..., Chapter 6; H. Correa, The Economics of Human Resources, North Holland Publishing Co., Amsterdam, 1963, Chapter 4.

[74] The size of the total consumption fund will depend on the structure of consumption. For a discussion of policies that seek to maximize the "necessary" components and thereby reduce total consumption see J. E. Meade, "Mauritius: A Case Study in Malthusian Economics," Economic Journal, Vol. 71 (September 1961), pp. 521-534.

[75] Cf. Rudolf Bicanic, "Economic Growth under Centralized and Decentralized Planning," in M. K. Haldar and Robin Ghosh (eds.) Problems of Economic Growth, Congress for Cultural Freedom, Delhi, 1960, pp. 121-142.

function results in a higher level of output, as opposed to its leading merely to increased prices. This test by and large limits the applicability of the argument to developed market economies where, given the condition of less than full employment, it is indeed demonstrable that a demographic change which increases the propensity to consume actually increases investments. The demographic aspects of the so-called stagnation thesis that elaborated the point just made made has received relatively little attention in recent literature.[76] This is explainable primarily by the fact that from a long run point of view the postulated rising propensity to save has not been vindicated: with the rise of per capita income consumption desires can shift upwards rapidly. An examination of the record of the United States suggests, for example, that long run capital accumulation was limited by the supply of saving, rather than by the opportunities to invest.[77] Neither are there any signs that point to the drying out of productive outlets for saving in the foreseeable future.[78] But, irrespective of these arguments, it is now generally recognized that there are no reasons why the realization of ex ante savings could not be better insured by means other than demographic stimuli. Given full employment the validity of the demographic influences on saving discussed in this section remains unqualified.

III Demographic Aspects of Investment

44. The previous section surveyed the opinions on the question how demographic phenomena affect the share of income that is set aside each year to increase an economy's stock of capital. The various forms in which an increase in capital is incorporated, and the influence an increase of capital exerts on total and per capita output are in turn related to demographic factors. A summary of the views on the nature of these relationships is the subject of the present section. To avoid repetition of methodological points the exposition may conveniently follow the lines along which the discussion of savings was developed. Thus relationships will first be stated in static terms followed by a description of their dynamic aspects. Influences attributable to population growth and structure on the one hand, and to population size and density on the other hand, will be separately discussed.

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76 For a survey of earlier writings see United Nations, The Determinants and Consequences of Population Trends, New York, 1953, especially pp. 241-246.

77 Simon Kuznets, Capital in the American Economy, Princeton University Press, Princeton, 1961

78 See, for example, Walter Adolf Jöhr, "Gedanken über die Wirtschaft in hundert Jahren", Schweizerische Zeitschrift für Volkswirtschaft und Statistik, Vol. 100 (September 1964) pp. 369-398.

45. The main focus of the literature concerning the present subject may be epitomized in terms of an extremely simplified model of an economy. This model - a widely popularized tautological adaptation of the analysis of the growth process originated by Harrod and Domar[79] - is best described by a numerical example presented in a normative framework. Assume that, for whatever reason, the relationship between the (average) stock of capital and the yearly flow of output is fixed over time, i.e. assume that the average and marginal capital output ratios are identical. Compare now two economies, both characterized by the same capital-output ratios - e.g. having a value of 4 - but experiencing differing rates of population increase, one population growing at a rate of 1 per cent, the other at a rate of 3 per cent per year. Suppose that the minimum objective of the development policies pursued is the maintenance of the existing level of per capita income. From the stated assumptions it follows that the population with the slower rate of growth must invest 4 per cent of its current income in contrast to the population with the higher rate of growth where the required rate of investment is 12 per cent. The achievement of the same developmental objective thus requires a much bigger effort when the rate of population growth is higher. The supply of investment funds as affected by demographic variables was the subject of the discussion of the previous section. As a crude summary of that discussion it can be stated that no reason was found why a higher rate of population growth could be expected to be accompanied by a substantially higher saving ratio: in underdeveloped economies in fact the association is normally a negative one. But these considerations need to be taken into account only if we seek a determination of the overall demographic effect on per capita income growth. To isolate the problem which is our present concern let it now be assumed that the supply of investment funds is a fixed proportion of the total income, unaffected by demographic variables. Using the above illustration suppose, for example, that the rate of accumulation is 12 per cent in both economies while other parameters remain the same. It is seen then that with a high rate of population growth all increase in the capital stock takes the form of what may be called "demographic investments" - investments required merely to maintain income per head constant[80] - while with the lower rate of population growth per capita income is increased

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[79] R.F. Harrod, "An Essay in Dynamic Theory," Economic Journal, Vol. 49 (March 1939), pp. 14-33; and E.D. Domar, "Capital Expansion, Rate of Growth and Employment," Econometrica, Vol. 14 (April 1946) pp. 137-147.

[80] Cf. Alfred Sauvy, "Investissements démographiques et investissements économiques," in Union internationale ..., International Population Conference, Wien 1959, p. 136; also idem, Théorie Générale ..., Vol. I, pp. 236 ff.

by approximately 2 per cent per year. Similar exercises performed with various sets of plausible parameter values show that - given the validity of the model - population growth is capable of nullifying a large part of the gains which, without it, could have been realized in per capita income. The relative significance of a given differential in demographic growth will depend on the change in total output; it will loom the larger the lower the rate of accumulation and the higher the capital-output ratio.

46. Various considerably more sophisticated forms of the model just outlined have also been worked out to illustrate the implications of hypothetical or expected courses of demographic and economic variables, notably to calculate investment requirements as dependent on population growth, and in particular to estimate the gap between capital needs and domestic saving in underdeveloped countries. The refinements of the model in some cases involve the differentiation of at least two basic sectors of the economy, such as industry and agriculture, with differing capital output ratios, while other modifications consist of introducing various categories of investments with differing effect on output. Suitably chosen parameters and behavioral assumptions make the relative size of the sectors or the structure of investment, as the case may be, vary subject to demographic influences.[81] The conclusions derived from such models concerning the economic drag of demographic investments can differ from those implied by the simple model stated above insofar as they incorporate a modification of the assumption that the marginal capital output ratio is independent of the rate of population growth. Their contribution to the topic of this section is therefore best described in examining the validity of this assumption.

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81 See in particular United Nations, Measures for the Economic Development of Under-developed Countries, New York, 1951; H. W. Singer, "The Mechanics of Economic Development," Indian Economic Review, Vol. I (August 1952) pp. 1-18; Tabah, "Le problème ..."; Leibenstein, Economic Backwardness ..., Chapter 14; Coale and Hoover, Population Growth ..., Chapter 17; J. N. Sinha, "Population Growth and Balance in Economic Development," Economic Development and Cultural Change, Vol. 7 (April 1959), pp. 206-215; G.A.T.T., International Trade 1959, Geneva 1960; P.N. Rosenstein-Rodan, "International Aid for Underdeveloped Countries," Review of Economics and Statistics, Vol. 43 (May 1961), pp. 107-138. (For a critique of the latter studies see Bela Balassa, "The Capital Needs of Developing Countries," Kyklos, Vol. 17, No. 2, 1964, pp. 197-206) see also: United Nations, The Capital Development Needs of the Less Developed Countries, New York, 1962.

47. Compare two populations that are in a stable demographic state but growing at different rates. Assume that total population, as well as income per person at the working age groups are identical in the two cases and so are the proportions of income saved and invested. There are at least two reasons for expecting that the composition of investment will so differ in the higher growth rate case as to make the contribution of the added capital to output smaller than the one obtained when the rate of population growth is lower. First, a difference of stable growth rates implies a difference in age distributions and therefore in dependency rates. Insofar as the care and maintenance of the dependent population contains elements which are classified as investment the share of these items within the total investment bill will be higher if the population is growing at a faster rate. This point can be elaborated exactly on the analogy of the corresponding argument put forth in the previous section and therefore it need not be discussed here.[82] Since the impact of the investments in question on output presumably will be felt only after some time lag, in the single period the result is a higher capital-output ratio for the faster growing population. The importance of this effect obviously depends on the definition of investment adopted. With a narrow definition the effect does not arise since formally it is fully absorbed by a ceteris paribus lower saving rate; this was the spirit underlying the treatment in the previous section. When the joint effect of all factors on per capita output is investigated naturally care must be exercised to preserve consistency of definitions and thereby avoid to account repeatedly for the effects of a given phenomenon. The point is raised here only because the alternative reasoning that uses a wide definition of the concept of investment is equally justifiable as was pointed out in paragraph 42 above. Thus, for example, outlays for the education of the young are frequently considered an investment in "human capital"[83] even though the calculus which sets their volume is only partially production-oriented.

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[82] It is necessary however to note again the relative importance of the factors that have generated the growth differential. If the latter is due to differing levels of mortality the age distribution difference is relatively minor, while the mortality difference itself may have significant implications not to be considered at this point. The comments on the age distribution effect in this paragraph refer to the case when the growth difference is caused by differing levels of fertility.

[83] Theodore W. Schultz, "Investment in Human Capital," American Economic Review, Vol. 51 (March 1961) pp. 1-17; Correa, The Economics ..., Chapter 8 and 13.

Similar treatment can reasonably be applied to broad categories of welfare-type services when they are provided by the state that directly or indirectly also functions as an investor of capital narrowly defined. Many such services are strongly biased in favor of dependent age groups. The second effect causing an unfavorable composition of investment when population growth is relatively high is due to the necessity to provide for the increments of the population certain overhead facilities, thus incurring investments that have relatively high capital-output ratios. Clearly this effect to a large extent is related to higher population growth as such, i.e. it is independent of the particular fertility and mortality conditions underlying a given growth rate.[84]

48. Some other differences in the structure of investment that may be expected to accompany different rates of population growth may also not be negligible. For example, the two populations in the previous paragraph's example by assumption differ in per capita income, in the number of families and their composition, and presumably in other demographic characteristics. Given the conditions on the supply side, these differences imply differences in the various demand elasticities hence in the sectoral distribution of new investment. However the outcome of this concerning the relative magnitudes of the capital output ratios is not clearly identifiable without reference to specific conditions.

49. The assumption that x per cent growth both in capital and population (which, in the stable state, can stand for "labor") results in x per cent increase of output implicitly attributes all extra output to new labor and investment. But many other "factors" contributing to production may also be identified and qualitative changes and changes in the extent already existing capacities are utilized, etc. could also increase or diminish output. Many of these (e.g. a change in weather conditions) may have little conceivable relation to demographic growth, but the existence or strength of others may depend on the level of that variable. There is some support for the argument that, ceteris paribus, a higher rate of growth increases the productivity of labor[85], hence decreases the marginal capital-output ratio.

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84 Coale and Hoover, Population Growth ..., Chapters 13 and 16. See also Henri J. Bruton, "Contemporary Theorizing on Economic Growth," in Bert F. Hoselitz, Theories of Economic Growth, The Free Press, Glencoe, Ill., 1960, pp. 268-284. For a discussion of the influence of population growth on the composition of investment in the United States see Kuznets, Capital in the American Economy, pp. 327-341.

85 See Section V.

50. Given the stock of capital and its rate of increase it is to be expected that the marginal capital-output ratio will be lower if the (stable) growth rate of the population is higher since the same amount of capital will be associated with a larger labor force. In such a comparison it will remain true that output per unit of labor will be lower when population is expanding faster; nevertheless it appears that the assumption of a capital output ratio independent of the growth of the labor force exaggerates the disadvantage of a higher rate of population growth as far as per capita income is concerned. This suggests that in calculating the growth of output - or in calculating capital requirements for a given increase in per capita income - the contribution of labor as well as capital should be separately accounted for. A simple production function often used for this purpose expresses total output as dependent on the product of capital and labor, each raised to suitably chosen powers indicating the elasticity of output with respect to the given factor of production.[86] An elasticity of .6 for labor, for example, means that one per cent addition to the labor force - capital and all other things referred to in the previous paragraph being constant - contributes to a .006 increase in total product, i.e. the marginal productivity of labor is .6 times the average output-labor ratio. The response of output to changes in labor or in capital naturally depends on the conditions prevailing in the given economy, in particular on the existing technology and on the factor endowments. In this connection, and on the hypothesis that the only factors of production are labor and capital, two extreme situations may be pictured. First, assume that technology is constant, and, subject to maximization of output, in every line of production the most capital intensive methods are used, capital being freely available. The rate of capital accumulation then cannot exceed the rate of population growth but adjusts itself to it automatically by increasing at the same rate; per capita income is constant; and expansion of output can be properly described as dependent on population growth only. In no contemporary economy are these conditions of much relevance but they underscore the truism that from the point of view of per capita income a lower rate of population growth is an advantage only as long as technological progress, or the existence of an unapplied technological backlog,

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[86] C. W. Cobb and P.H. Douglas, "A Theory of Production, American Economic Review, Supplement Vol. 18, No. 1 (March 1928) pp. 139-165. For applications of the Cobb-Douglas function in analyzing demographic-economic interrelationships see e.g., Coale and Hoover, Population Growth ..., Chapter 22, and United Nations, "Growth Models for Illustrating the Effects of Alternative Investment and Employment Policies," Economic Bulletin for Asia and the Far East, Vol. 9, No. 1 (June 1958), pp. 17-31.

or changes in preferences, make it possible to augment total income by capital deepening. Secondly, a situation may obtain which is the reverse of the one just described in the limited sense that the redundant factor is labor, instead of capital. This case, or at least close approximations thereto are empirically important: the point was argued in the previous section where the institutional setting in which the labor surplus appears and is accommodated was described in terms of a two-sector model. The main implication of that model in the present context is that given the wage rate employment in the capitalist sector is regulated by the available capital only, i.e. with a pool of reserve labor that exceeds the demand for labor at any given time the capital-labor ratio is insensitive to differences in population growth. It follows that ceteris paribus for practical purposes expansion of the modern sector is adequately described by the Harrod-Domar approach: given the increase of its capital stock the modern sector will tend to grow by the same proportion whether the rate of population growth is high or low. One may think of the population increments as accruing to the subsistence economy from where, in turn, workers are channeled to the modern sector in numbers dependent on the increase of that sector's capital stock. In the above comparison the direct impact of any difference in the growth of population is then simply a difference in the speed by which the modern sector expands relative to the subsistence economy.[87]

51. The discussion of the previous paragraphs confirm that given the rate of capital accumulation a higher population increase implies a lower per capita income, and conversely, the objective of a given increase in levels of living requires a higher rate of capital accumulation - as suggested at least qualitatively by the reasoning in the simple framework of the Harrod-Domar model. The qualifications surveyed thus far suggest that these conclusions are to be softened in case of a developed economy where labor is scarce and consumption levels are relatively high, and are to be strengthened when the opposite is the case. The extension of the analysis from the single period model to a longer process over time is straightforward: the relative advantage of lower population growth will presumably widen period after period, increasingly reinforced by feed-back effects of earlier gains on per capita income. One additional point needs to be added on this score. It was argued above that a higher rate of population growth will tend to reduce the share of the non-directly productive investments and therefore will raise the capital output ratio. Without seeking to give a precise definition of such investments the example of education can be invoked again: with a high dependency rate (high stable growth rate) the share of investments in education tends to be higher, while its effect on output - apart from adult education - is not immediately felt. But despite the inherent

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[87] Cf. Singer, "The Mechanics ...," and Sinha, "Population Growth ...".

ambiguity of any quantitative evaluation it is conceivable that the ultimate growth promoting effects of such expenditures are very strong. Such a view has been argued with increasing frequency in recent literature supported by the difficulty of explaining past trends of growth merely on the basis of increasing inputs of physical capital and numbers of man hours.[88] A part of the unexplained residual is undoubtedly imputable to investments in human capital, including investment in education. However, even if the effect of such investments is superior to the effects of increase in physical capital, it does not follow that a high dependency rate will be advantageous. Two extreme situations can be contemplated in between which reality will almost certainly lie. In one case educational investments per pupil are identical regardless of the proportion of the young in the total population. Then if childhood dependency is low a consistently higher proportion may be invested in other directions as long as population growth remains unchanged, while no disadvantage is suffered as to the amount of per capita educational investment.[89] Alternatively non-educational investments take the same proportion of expenditure regardless of the age distribution, in which case educational investment per pupil, hence the quality of education and the ultimate economic benefits therefrom are lowered. The argument is not materially changed if the lower average educational investment actually manifests itself in differing proportion of the young which are given an education of a certain quality; e.g. by a slower achievement of universal elementary education when the rate of population growth is high. The same considerations are applicable to similar expenditures, such as "investment"in health, in"welfare" or even simply in an increase of consumption, all of which have ultimate income increasing effects.[90]

52. The general character of the effects of a given rate of investment on per capita income under conditions of a change in the rate of population increase - as opposed, e.g. to the effects of the maintenance of the rate of increase - can be deduced from the discussion contained in the previous paragraphs. The relevant main considerations concern the amount of change in aggregate population growth as such, the factors underlying the change in the growth rate (i.e. fertility, mortality, or migration) and the associated changes in age distribution, in the rate of household formation, in headship rates, etc. Along the lines discussed above the influence of these

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88 E.g. W. B. Reddaway and A.D. Smith, "Progress in British Manufacturing Industries in the Period 1948-1954," Economic Journal, Vol. 70 (December 1959). For a critical discussion of the problem that cautions against the application of findings in developed countries to policies concerning education in poor countries see W. Arthur Lewis, "Education and Economic Development, International Social Science Journal, Vol. 14, No. 4, 1962, pp. 685-699.

89 Cf. however Part V below.

90 See Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations," Part VII, Economic Development and Cultural Change, Vol. X, No. 2, Part II (January 1962) pp. 59-60.

factors on the capital output ratio may be considered by tracing the resulting change in the composition of the capital and in the rate of growth of the labor force. Among the wide variety of possible patterns changes of fertility are of particular interest. A once and for all decline of fertility results in a transition towards an economically more advantageous age distribution, hence - ceteris paribus - in a lower capital-output ratio. The rate of growth of the labor force however is not affected for some two decades, i.e. during this period any advantage derived from a higher labor force concerning total output will be preserved by the smaller population. A detailed discussion of this process indicates that with an initially high level of fertility - i.e. one permitting a large absolute reduction - the potential gains are substantial.[91] The opposite process may be observed following a rise in fertility which augments the relative share of the younger age groups. The repercussions of changes in fertility or in other demographic characteristics, whether the change is unidirectional or fluctuating, may also include various accelerator and multiplier effects that can magnify or attenuate the impact of a given change. Increased fertility, for example, increases the rate at which additions to the various components of the capital stock must be made as the relatively enlarged cohorts are born, reach school age, enter the labor force, establish new households, etc. Such additionsparticularly in case of durables with a long life span may cause a disproportionate increase in demand: accommodation of such demand is made slightly less difficult by the fact that replacement demand is left temporarily unaffected.[92] Historical studies indicate that substantial changes in population growth, themselves largely induced, may also generate long term economic fluctuations of considerable complexity.[93]

53. A demographic factor that may affect the composition of investment and the capital-output ratio is the size of the population. Given the territorial limits of an economic unit static comparisons indicate that a larger, as opposed to a smaller, population is likely to be associated with certain economic

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91 Coale and Hoover, Population Growth ..., Part IV.

92 Joseph J. Spengler, "The Economics of Population Growth," in Mudd (ed.), The Population Crisis ..., pp. 84-85, see also Andreas Miller, "Die Wirtschaftlichen Auswirkungen des Bevölkerungswachstums," Schweizerische Zeitschrift für Volkswirtschaft und Statistik, Vol. 98, No. 3 (September 1962) pp. 253-275.

93 Simon Kuznets, "Long Swings in the Growth of Population and in Related Economic Variables," Proceedings of the American Philosophical Society, Vol. 102, No. 1 (February 1958) pp. 25-52, and Moses Abramovitz, "The Nature and Significance of Kuznets Cycles," Economic Development and Cultural Change, Vol. IX, No. 3 (April, 1961) pp. 243-245.

advantages stemming from the possibility of an increased division of labor and from other economies of large scale production that tend to reduce the amount of inputs per unit of output. Concerning this matter three questions are relevant in the present discussion. First, at what size of population are the economies of scale exhausted? Second, how far are these economies specific to population size as such? Third, how far considerations related to the change in size are likely to modify the results of the previous discussion concerning the differential effect of various rates of population increase on per capita income?

54. Answers to the first question are notoriously difficult as evidenced by the almost complete lack of attempts to quantify the concepts with which traditional optimum population theory operates.[94] There appears to be a consensus, nevertheless, that apart from some exceptional industries technical economies are exhausted by firms of rather moderate size. Large firms are not necessarily considered less economical; it is merely suggested that such firms are located on a plateau of constant cost reachable also by much smaller producing units. Neither is there clear evidence that historical trends point towards significantly larger firms if firm size is measured by the number of employees, as is relevant from the demographic standpoint, rather than in physical measures of output. A survey of advanced countries suggests that a population size of 10 to 15 million is sufficient for firms of optimal size to be established. However a limited number of industries, such as the aircraft or the automobile industry, are exceptions to this generalization. With respect to such industries differences between advanced nations of 10 to 15 million and nations of some 50 million appear to be as significant as differences between the latter and nations with a population size of perhaps 200 million. It is to be noted, furthermore, that - given the level of development - the advantage of large size is not confined to the possibility of achieving the minimum production-unit size that is needed for maximum technical efficiency. A large population tends to increase the competitiveness of the various markets since the same product will be produced by several or many firms even when specialization is on a high level. Conversely smallness of an economy will favor monopolistic and oligopolistic arrangements. Other advantages of a large size include the lessened risk associated with the addition of a new efficient unit of production to the market (a smaller growth being sufficient to justify such an addition), a greater adaptability of the economy to changes in structure, less dependence on the vagaries of international trade, a more varied structure of production offering a

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[94] Sauvy, Théorie Générale ..., and Léon Buquet, L'optimum de population, Presses Universitaires de France, Paris, 1956.

wider and more stimulating range of opportunities for the population, and other factors of a similar nature.[95]

55. A closer examination of the above arguments suggests, however, that realization of economies of scale is dependent essentially on the size of the market, as such, rather than on the size of population subject only to a relatively modest constraint concerning the minimum total population. Above that size most further gains are available as much by increasing income per capita as by increasing population numbers.[96] Some qualifications of this statement are necessary, but appear to have but limited importance. Thus it may be pointed out that if two economies have identical levels of total income but differ in population size (i.e. differ in income per capita), from the point of view of economies of scale there is some advantage in having the larger population since a lower per capita income implies a less pronounced diversity of consumption patterns, i.e. a more uniform bill of goods that is more likely to permit the release of such economies.[97] It is to be noted however that the advantage of lower incomes in this respect is likely to be restricted to incomes above some minimum level since production of the foodstuffs mainly consumed by receivers of low incomes involves little or no economies of scale. In sum, a rich nation can afford to be small in terms of population: despite its size it may reap much of the advantages of large scale production. On the other hand even a very populous nation may have a narrow market with respect to all goods except the basic necessities produced with little division of labor in the first place.

56. It follows from the arguments just outlined that a nation with a high growth rate and with a population that is already large in absolute terms cannot expect that further increases in its size will mitigate the economic disadvantages of population growth by providing economies of scale. The problem of smaller countries appears to be more difficult to evaluate . In such a country should a diversified expansion of productive facilities be preferred to a concentrated advance in certain directions only, the former pattern of development will turn out to be an unrealistic option whenever economies of scale are important. Such a solution is

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95 For a discussion of these questions see J. Jewkes, "Are the Economies of Scale Unlimited?", in E.A.G. Robinson (ed.), Economic Consequences of the Size of Nations, Macmillan, London, 1960, pp. 95-116, and Hollis B. Chenery, "Patterns of Industrial Growth," American Economic Review, Vol. 50 (September 1960) particularly pp. 644-646.

96 C.N. Vakil and P.R. Brahmanand, "The Problem of Developing Countries," in Robinson, Economic Consequences ..., pp. 134-135, and H.W. Singer, International Development: Growth and Change, McGraw Hill, New York, 1964, p. 193.

97 Robinson, The Accumulation of Capital, p. 344.

made impossible both because of an insufficient supply of savings to permit diversified investments of an optimum scale and because of an insufficient demand to justify optimum capacities.[98] In the short run to achieve a substantially larger-size population is clearly not possible even when international migration is not ruled out. In the long run demographic growth may change the size of population drastically and permit the achievement of economies of scale. Yet, unless the latter are exceptionally high and strongly population-dependent, the relative disadvantages of a faster, rather than slower, growth are not likely to be diminished. For example, as was indicated earlier, due to higher savings and to consequent cumulative effects on output not only per capita income but also total income can be expected to be higher in a declining fertility situation, as opposed to a situation characterized by a sustained high level of fertility, for several decades following the onset of fertility decline. Thus the population undergoing demographic transition is likely to be better off even with respect to economies of scale. These conclusions are reinforced if the population in question occupies a country that is small in terms of its resource endowments. It is then possible that any economies accompanying population growth will tend to be balanced by diminishing returns due to increasing resource scarcities, thus putting a check on the growth of income per capita. However such tendencies can be counteracted by faster accumulation of capital and by participation in external trade.[99] In a resource-poor country both solutions tend to put an additional premium on slower demographic growth (lower fertility).

57. Whether rich or poor in resources relative to population size countries appear to participate in international trade to an extent closely predictable on the basis of the size of their population, particularly when this datum is accompanied by information on the level of their development.[100] The common basis for trade is that countries can increase their income by exchanging products in the international market for goods in the production of which they

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98 Cf. T. Scitovsky, "Croissance balancée ou non balancée," Economie Appliquée, Vol. 12, No.-s 1-2 (January-June, 1959) pp. 7-22

99 Cf. Alfred Sauvy, "Evolution récente des idées sur le surpeuplement," Population, Vol. 15, No. 3 (June-July 1960), pp. 467-484.

100 For a discussion of this relationship see Karl W. Deutsch, Chester I. Bliss, and Alexander Eckstein, "Population, Sovereignty, and the Share of Foreign Trade," Economic Development and Cultural Change, Vol. X, No. 4 (July 1962) pp. 353-366.

have a comparative disadvantage. For countries that are small in terms of population the resulting specialization makes it possible to obtain most of the benefits of a wide market without the necessity of having a larger population. Small population size thus need not imply a higher capital-output ratio, nor does population increase offer the prospect of reducing capital-output ratios provided that the opportunities of trading internationally are taken advantage of.

58. To some extent overlapping with, but conceptually distinct from, the economies of scale are certain economic advantages and disadvantages that depend on the density characteristics of a country's population, i.e. on the manner in which the population is distributed over the national territory. There is no necessary relationship between these characteristics on the one hand, and either total population size or the size of the country's territory on the other hand. The example of Australia, a country which is large in territory, yet where the majority of the population (the total size of which is relatively modest) is concentrated in a small densely populated area, may serve as an illustration of this point. Concerning the economic effects it is believed that cost of operation per head of most social services is affected more by the degree of concentratedness of the population served than by the absolute size of the latter. The precise nature of this relationship however is hard to specify: cost of police protection per capita e.g. may first decline, then rise monotonically in the function of some appropriate index of density while in other instances the opposit form of the cost curve may obtain. Comparisons between communities that would shed light on this matter are difficult because of the widely differing standards of the services provided, and because of the many intervening influences, other than demographic ones, on the observed phenomena.[101] In a broader sense a higher degree of concentratedness of the population at least up to some point is economically advantageous because it makes the interaction of the various factors of production more efficient and because of the decreasing cost of overhead investment per unit of output. However since the volume of such investments tends to increase with increasing density (apart from any change imputable to the structural transformation, or to the change of income involved), a process of transition towards higher concentration shifts the structure of new investments strongly towards less directly productive outlays. In the short run it is sometimes possible to delay such investments by overtaxing the already existing facilities; however such a policy is soon likely to produce a heavy strain on the economy requiring remedial measures. Thus rapid urbanization - a process that may be strongly speeded up by a high rate of population growth - can be expected to result

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[101] Cf. A. E. G. Robinson, "The Size of the Nation and the Cost of Administration," in Robinson (ed.), Economic Consequences ..., pp. 223-240.

in relatively high capital-output ratios. It may be noted that the tempo of urbanization in present-day developing countries is higher than the historically observed rates registered at similar levels of development in the 19th century.[102]

59. Whether small or large, or whether highly concentrated or widely dispersed geographically, a country's population may be large in relation to some of its resources in the sense that - using a static comparison and taking the country in isolation - a smaller population would be able to maintain a higher standard of living than is accessible to the actual population. One escape from such a situation, as was noted above, is provided by participation in international trade. Naturally such an escape is feasible only if the country in question is able to capture foreign markets for some of its products that are not unduly dependent on scarce non-augmentable resources. In this connection concern was often expressed about the trading prospects of countries which successfully adopted this solution by exporting manufactured goods and obtaining in exchange many basic necessities for which domestic substitutes they could have produced - if at all - only subject to sharply diminishing returns. It was pointed out that historically access to foreign markets permitted population growth and urbanization on a scale which, in a number of instances, has gone far beyond the limits imposed by domestic sources of raw materials and food. But this was strictly a local solution: "overpopulation", once held to be inevitable because of limited land and resources, was avoided only temporarily by the opening up of new countries that specialized in the production of foodstuffs and raw materials. Eventually, it was argued, industrialization of primary producing countries will modify the historically established international division of labor and will unfavorably affect the well-being of older industrial countries. Such an argument was sometimes based on the expected loss of traditional lines of exports of the latter as goods like textiles were to be replaced by products manufactured locally by the newly industrialized countries. Compensation to be expected from increased demand for other products generated by the higher level of income consequent upon industrialization was held to be only partial. Thus the possibility of maintaining the traditional lines of imports - mainly food and raw materials - in the older industrial countries was predicted to become progressively more difficult as capacity to pay for such materials

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[102] Secretariat of ECLA, "Creation of Employment ...," pp. 136-148; for a contrary view see N.V.Sovani, "The Analysis of Over-Urbanization," Economic Development and Cultural Change, Vol. XII, No. 2 (January 1964) pp. 113-122. Cf. also Bert F. Hoselitz, Sociological Aspects of Economic Growth, The Free Press, Glencoe, Ill., 1960, Chapters 7-9.

with industrial exports was due to decrease. These difficulties were expected to be compounded by shifts in the terms of trade unfavorable to industrial products. Such shifts would follow efforts by the newly industrialized countries to export manufactured goods and, as their population increased, to import increasing quantities of food and raw materials themselves.[103] However none of these predictions were born out thus far by observed trends in world trade. On the contrary, demographic and economic developments in the old industrial countries such as the secular deceleration of the rate of population growth, a spectacular increase in domestic agricultural production, reduced use of raw material inputs per unit of output due to technological change, and other factors, made the old industrial countries less dependent on imports of primary products than they were in the prewar years. There is no evidence suggesting that the spread of industrialization reduces the scope of international specialization by narrowing the differences of the relative costs of production as was once believed[104]; trade among industrial countries in fact constitutes the most dynamic sector of world commerce. Neither is there a basis to expect that resource-poor but technologically advanced and capital-rich countries will find their export markets narrowed and their access to food and raw material imports thereby denied. Industrialization of primary producing countries is in the long run associated with an increased volume of their imports of manufactured goods.[105]

60. On the basis of the arguments just presented industrialization is often advocated as the only road towards economic betterment in underdeveloped countries. In view of the great differences in terms of land-population ratios among the countries that are now producers mainly or exclusively of primary goods this generalization is not felicitous. Some underdeveloped countries are not overpopulated in any meaningful sense and emphasis on further development of the primary sector supplying export markets in exchange for industrial goods may be the most advantageous way to allocate scarce investment resources. A strong industrial sector in such an economy would develop as a result of successful development of the primary export economy. In other countries rural overpopulation

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103 This was essentially the position of the Royal Commission on Population. See Papers of the Royal Commission on Population, Vol. III, Report of the Economics Committee, His Majesty's Stationery Office, London, 1950, pp. 10-13. Also: Buquet, L'optimum ...; pp. 272-274.

104 D. H. Robertson, "The Future of International Trade," Economic Journal, Vol. 48 (March 1938) pp. 1-14.

105 Alfred Maizels, Industrial Growth and World Trade, Cambridge University Press, Cambridge, 1963, p. 415. A full exposition is given in Chapters 5 and 6. See also United Nations, Economic Survey of Europe in 1957, Geneva, 1958, Chapter 4.

is found only with respect to the existing capital and other augmentable resources. "Industrialization" catering to the home market may then be the most desirable solution, a solution which obviously necessitates simultaneous and complementary advances in agriculture. Only in a few countries is population density high enough to make this solution inadequate and require industrialization directed mainly towards export markets permitting the country to rely on imports as the primary source of her food and raw materials.[106]

61. Demographic conditions will influence the particular mixture of the above described solutions concerning the allocation of investments also from the demand side. The first solution, development through the export of primary products, is often judged pessimistically because of the sluggish demand emanating from the industrialized nations for primary products. One explanation for this phenomen -- typical of the postwar experience in contrast to 19th century trends when markets for primary products were rapidly expanding -- is that above a certain standard of living, surpassed by most industrial countries, the income elasticity of demand for such products is low, therefore expansion of the market by and large depends on population growth in the importing countries. But in terms of population the share of the advanced nations within the world total is relatively modest, and the rate of population growth in the same countries is slower than that of the primary producing nations. Thus a purely demographic argument alone is sufficient to indicate the necessity of large-scale industrialization in the underdeveloped world as a whole. However there is no logical corollary of this proposition that would dictate a particular policy for a single nation. Such a policy must be formed in the light of the market opportunities - income and price elasticities - for the specific primary products in which a country has acquired, or is capable of acquiring, a comparative advantage. In view of the wide differences among various primary products in these respects[107] such opportunities may prove to be more attractive in a number of cases than the choice of alternative paths to development. This probability is strengthened when the fact is considered that for some countries already existing pressures of population will make it mandatory to chose the third solution, i.e. to become net importers of primary goods, and that continued population growth is likely to increase both the number of such countries

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106 See Raul Prebisch, "Commercial Policy in the Underdeveloped Countries," American Economic Review, Vol. 49 (May 1959), pp. 251-273; Ragnar Nurkse, Equilibrium and Growth in the World Economy, Harvard University Press, Cambridge, Mass., 1962, pp. 304-324 (from reprint of Patterns of Trade and Development, Wicksell Lectures, Stockholm, 1959); Taro Watanabe, "Over-Population and International Trade," Osaka Economic Papers, Vol. 4 (February 1956) pp. 23-45. Cf. also Viner, International Trade ..., Chapter 3.

107 E.g. see the analysis in L.M.Goreux, "Income and Food Consumption," Monthly Bulletin of Agricultural Economics and Statistics, Vol. 9, No. 10 (October 1960) pp. 1-13.

and the degree of their reliance on imports, and decrease the export capacity of others. As to the countries for which development through export of primary products is not feasible, a policy that neglects the primary sector, in particular agriculture, is still likely to be unsatisfactory. This is particularly so in the early period of industrial development when imports of capital goods must be financed by the exports of a still predominantly non-industrial economy and when due to low income levels per capita industrial expansion swells the domestic demand for marketed food. Whichever development strategy is chosen, given the level of the developmental effort, a higher rate of population growth would cut down on the surplus of agricultural production that can be marketed either abroad or domestically and hence would slow down the rate of modernization of the economy.[108]

62. The foregoing considerations suggest that from a strictly economic viewpoint "industrialization" is a desirable objective only if it is interpreted in the general sense as a process in which increments to the existing factors of production are so allocated as to maximize income per capita, or some other index of social welfare, over time. This formulation is naturally equally valid whether the level of development already achieved is low or high. It can also be said that in either case such a process involves changes in the volume and structure of the social product and shifts in the relative importance and in the pattern of interdependence of the various sectors of the economy, concurrently with changes in preferences, in prices of goods and of factors of production, changes in technology and in other related variables. However, given the maintenance of a near full-employment, in a relatively developed economy the required changes tend to be of a marginal character, each adjustment being capable of only a relatively insignificant modification of the existing economic status. In contrast, changes in an underdeveloped economy that are necessary for development often require discontinuous structural adjustments, while the mechanisms which may bring them about are typically unreliable or suboptimal. Hence the propensity to interfere with such mechanisms and the consequent, and often conflicting, rules and strategies that are recommended for promoting the development of backward economies.[109] As was shown in the preceding discussion, demographic factors exert a powerful influence on the level

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108 Gerald M. Meier, International Trade and Development, Harper & Row, New York, 1963, pp. 184 ff.; Myint, The Economics ..., Chapter 9.

109 For a general discussion of such criteria see United Nations, "Criteria for Allocating Investment Resources among Various Fields of Development in Underdeveloped Economies," Economic Bulletin for Asia and the Far East, Vol. 12, No. 1 (June 1961), pp. 30-44; also Hollis B. Chenery, "Comparative Advantage and Development Policy," American Economic Review, Vol. 51 (March 1961) pp. 18-51.

and structure of saving and investment hence on per capita income, thus presumably limiting the range of choice available for makers of policy in any given situation. Considerable flexibility with respect to allocating a given investment fund among the various branches of the economy may nevertheless exist, and to a certain extent this may be true concerning the choice of technology within a given industry as well. This is so primarily because varying total quantities of labor may be combined with a given capital stock and, furthermore, the total labor associated with that capital may be distributed in various fashions with respect to capital-labor ratios in the different branches of the economy. Given the size of the labor force such flexibility means flexibility of employment. Demographic aspects of this latter variable are discussed in the following section.

Demographic Aspects of Employment[110]

63. The acceptance of the level of income per capita, rather than total income, as a measure of welfare explains the unlike treatment economic literature accords to labor as contrasted to other factors of production, in particular to capital, with respect to their effect on development. Ceteris paribus, an increase in capital permits a higher standard of living. On the other hand, given the objective of increasing income per capita, labor's contribution to total output must be considered in conjunction with the size of the population having a claim for a share on that total. The outcome of these twin forces in the simplest formulation depends on two factors. First, other things equal, a higher amount of labor forthcoming from a given population normally means a higher output, both in the aggregate and per capita. Second, given the labor-population ratio scarcity of labor relative to other factors of production normally means a higher productivity of labor; increasing such scarcity in fact may be considered the very essence of economic development. Therefore, in examining the economic implications of demographic factors attention is properly focused on how these factors affect the share of the labor force of the total population, and on the rate of capital accumulation in relation to the labor force. This was the approach followed in the discussion of the previous section. However, if the labor force is not fully employed, that discussion must be

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110 The discussion in this section is limited to demographic aspects of employment that are directly relevant to the discussion in the preceding sections, in particular to the problem of investment strategies. A full treatment of demographic aspects of labor supply and employment is given in a paper presented by Mr. J. L. Sadie at this conference.

completed by considering the role of demographic factors, if any, in setting the level of employment.

64. Less than full employment of labor that is considered by some economists most important in the economically underdeveloped countries is of the variety attributable to a fundamental imbalance between the total population (or its working age component) and the society's stock of capital and natural resources, in particular land.[111] It is supposed to manifest itself in the fact that the marginal productivity of labor is zero, possibly over a broad range of the labor force that already exists, presumably because a lack of cooperant factors prevents part of the existing labor, and per force any further addition to it, to be productively employed. Occasionally it has been suggested that marginal productivity may in fact be negative, i.e. removal of some labor would cause a rise in the total output, while addition of more labor would cause total product to decline. Such situations are said to occur in peasant economies organized on the basis of family farms with each member of the family having equal access to the product, consequently the lack of full employment exists in a disguised form, i.e. manifests itself not by complete idleness of the redundant part of the labor force but by reduced work-contribution of all workers in the form of work-sharing, part time work, or work of very low productivity in general. The theoretical support for the possible existence of such a situation is obtained by a straightforward application of static optimum population theory, which in turn rests on the law of diminishing returns. Given a fixed level of technology and given the quantity of all factors of production except labor, further and further application of the latter will lead to a decreasing per capita product (i.e. to an over-optimum population) and eventually to a physical level of subsistence at which point maximum population is reached. When the average product is at such a level marginal product may be, although not necessarily is, zero, or even negative.[112] The plausibility that some densely populated countries may closely correspond to such a near-maximum population state is increased by the well-known flexibility of technical coefficients of production in agrarian economies as shown by the willingness to again and again subdivide the land as required by population pressure and to adopt more and more labor intensive but - with respect to labor - less productive cultivating techniques, in conjunction with the fact that recent spectacular increases in the size of many agrarian populations were clearly imputable to exogenous factors. Finally, the apparent contradiction between the presumably zero levels of

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111 Cf. James S. Duesenberry, "Some Aspects of the Theory of Economic Development," Explorations in Entrepreneurial History, Vol. 3 (December, 1950) pp. 63-102; Nurkse, Problems of Capital Formation ..., Chapter 2; Lewis, "Economic Development ...

112 Ragnar Nurkse, "Excess Population and Capital Construction," Malayan Economic Review, Vol. 2 (October 1957) pp. 1-11.

marginal productivity of labor in family farms and the simultaneous existence of an advanced capitalist sector paying relatively high wages in the same economies may be explained in terms of the two sector model described above (see especially paragraphs 28-31). Specifically it may be assumed that the advanced and the subsistence sectors are separated by various barriers to occupational and sectoral mobility or that the technical coefficients of production in the advanced sector are extremely rigid, permitting no substitution of labor for capital, consequently that employment in the modern sector is limited by the growth of the capital stock. The latter argument may be complemented by the assumption that not only substitutability of inputs in the manufacture of a given product is limited but so is substitutability of more labor intensive products for more capital intensive ones due to the composition of demand.[113]

65. It has been suggested that the case for the existence of disguised unemployment, i.e. of non-positive marginal productivity of labor, has been made more on the basis of deductive reasoning than on the basis of reliable statistical investigations. It also appears, however, that the intricacy of the concept makes measurement of marginal productivity in peasant farming - and consequently a disproving of the theory - extremely difficult. Thus the quantitative importance of disguised unemployment, if any, remains unresolved,[114] although cogent arguments were advanced that in the strict sense its occurrence must be very limited, particularly if it is conceded that seasonal inactivity cannot be meaningfully incorporated into the notion of disguised unemployment.[115] The controversy concerning the seemingly minor distinction between a zero-marginal productivity of labor and what is considered by the critics as a very low marginal productivity of labor has some importance since it separates the case when removal of labor is presumably feasible without a loss of agricultural production from the case when at least some loss is involved. However it has been pointed out that in many institutional settings even genuine zero marginal product of work is likely to be inconsistent with costless removal of labor since upon such removal the upward adjustment in

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113 Richard S. Eckaus, "The Factor Proportions Problem in Underdeveloped Areas," American Economic Review, Vol. 45 (September 1955) pp. 539-565.

114 Cf. Schultz, Transforming Traditional Agriculture, Chapter 4. For a summary of early estimates concerning under-utilization of rural labor see Colin Clark, "What Constitutes Rural Over-Population?" in United Nations, Proceedings of the World Population Conference, 1954, Vol. V, pp. 227-247. Also, idem, "Future Sources of Food Supply: Economic Problems," Journal of the Royal Statistical Society, Ser. A. Vol. 125, Part 3, 1962, especially pp. 429-442.

115 Jacob Viner, "Some Reflections on the Concept of Disguised Unemployment," The Indian Journal of Economics, Vol. 38 (July 1957) pp. 17-23 (reprint from Festschrift in honour of Prof. E. Gudin, Rio de Janeiro, 1957); Harry T. Oshima, "Underemployment in Backward Economies: An Empirical Comment," Journal of Political Economy, Vol. 66 (June 1958) pp. 259-264.

work intensity or work length of those remaining on the land would not be automatically forthcoming. It is argued that such adjustment would have to be induced by suitable incentives, in particular by making industrial consumer goods available to the peasants or by levying taxes to an extent equivalent to the consumption of those who left the farm. Alternatively or additionally provision of capital and reorganization of peasant farming would be necessary. Lack of sufficient funds for this purpose or lack of adequate incentives for the increase of the marketed food surplus will result in a stagnant volume of the latter and in a reduction of the total food production. It is questionable that coercive measures would be successful to check such a development except in the short run.[116]

66. The productive utilization of the removed agricultural labor surplus cannot be visualized as a costless enterprise either. It is to be expected, that even the most labor intensive projects that may be envisaged will require at least some mobilization of resources that are in scarce supply, specifically organizational talent and skilled labor, as well as investments in providing the necessary tools and some housing facilities. To attract labor away from the farms a higher real compensation must be provided than the one represented by the share in the family income foregone by the workers. Total consumption demand would therefore rise even if no rise in the standard of living for those who remain on the farm is permitted. Food consumption in particular would tend to increase, partly because of the income effect, and partly because of the increased physical consumption needs and the loss of economies involved in the home consumption of home-produced food.[117]

67. The arguments just outlined by no means imply that the obstacles to the productive utilization of a rural labor surplus cannot be surmounted or that such attempts should not be made. What these arguments indicate - insofar as their validity is accepted - is that the proposition according to which rural overpopulation is a "blessing in disguise" because it provides a pool of idle labor ready for mobilization that leads to painless creation of capital is entirely unwarranted. The removal and utilization of farm labor outside agriculture involves costs and as such must compete with alternative uses of resources. The problem therefore may be posed in the traditional terms as a problem of increasing the productivity of low productivity labor, whether leaving it in a given sector or moving it to another. High population pressure, as possibly manifest in disguised unemployment, appears in this

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116 Cf. Amartya Kumar Sen, Choice of Techniques, Basil Blackwell, Oxford, 1960, pp. 13-15; Myint, The Economics ..., pp. 85-90.

117 See Gardner Patterson, "Impact of Deficit Financing in Underdeveloped Countries: Some Neglected Aspects," Journal of Finance, Vol. 12 (May 1957) pp. 178-189; and N.V. Sovani, "Underemployment, Removable Surplus, and the Saving Fund," Artha Vijnana, Vol. 1 (March 1959) pp. 17-28.

respect as a distinct disadvantage. This disadvantage is highlighted in the differing production possibilities of the food producing sector depending on the level of population density. The existence of disguised unemployment by definition indicates that with the existing techniques the possibilities of further extensive and intensive cultivation have been substantially exhausted. The problem of meeting the extra demand for food consequent upon a shift of the sectoral distribution of the population will therefore be more difficult, hence, ceteris paribus, despite the greater theoretical labor surplus the amount of labor that is actually removable will be smaller. Modernization of the food producing sector offers a similar paradox: given the overcrowded agricultural setting not only marginal productivity of labor but also that of capital may be very low since effective investment of capital may require a higher land-labor ratio. (Cf. the discussion in paragraph 30 above). With high population pressure reallocation of agricultural labor therefore is more urgent, yet, as suggested above, is less feasible.

68. Turning now to dynamic considerations the above propositions may be sharpened. Static overpopulation is a heritage of past development characterized by an insufficient accumulation of capital, broadly interpreted, relative to population, which resulted in a low land-labor ratio. Under such circumstances it will be presumably important to accommodate all new increments to the total population in order to prevent a further increase in the existing agricultural density. The difficulties of accomplishing this appear very great when viewed in the light of the historical experience of the now industrialized countries where industrial development kept the agricultural populations from expanding only after the non-agricultural labor force had reached a much higher share of the labor force than is typical in agrarian countries today. At that time, furthermore, population growth was much slower and the employment yielding capacity of a given percentage of national income invested in industry was appreciably higher.[118] Given the rate of population growth a high initial population pressure therefore diminishes the room of maneuver concerning the allocation of labor among the various sectors. Consideration of differences in population growth in turn indicates that achievement of an objective concerning the size of the non-agricultural labor force (given the proportion of that labor within the total labor force) will require a much higher effort -- accommodation of a much faster growing non-agricultural population -- when the rate of growth is high. It should be noted again that the growth rate most relevant with respect to the present discussion is that of the labor force, a variable that in the short run is not sensitive to changes in

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[118] Cf. United Nations, Food and Agriculture Organization, "Agriculture in Economic Development," Monthly Bulletin of Agricultural Economics and Statistics, Vol. 13 (February, 1964), especially pp. 11-12.

mortality and, in particular, to changes in fertility. A reduced rate of fertility does not directly affect the pressure on the labor market for some 15 years.[119]

69. The above discussion indicates the importance that demographic variables - density and growth rate of the labor force - play in determining the constraints of employment policy in developing economies. A further point that should be made is that the economic implications of differences in the rate of population growth on the modern sector may be largely neutralized provided that the subsistence sector performs its function of accommodating the population not needed in the modern segment of the economy. The portent of this proposition goes beyond employment considerations: it strongly colors every facet of the demographic-economic relationships in a dualistic economy with respect to which economic reasoning couched in terms of average values (e.g. investment per capita) while in no way invalid is less meaningful than in a fully modernized economy. Insofar as particular importance is attributed to the development of the modern sector, as is often the case, the judgment about the economic implications of population trends will essentially depend on the flexibility with which the subsistence sector is able to absorb, retain, and release population. One crucial point in this respect has already been made, namely the significance of the population density to land, measured in some appropriate unit. This datum in turn is to be evaluated with reference to changes in population: the logical extension of the reasoning that leads to the concept of underemployment suggests that there is a limit to land subdivision, worksharing and further introduction of more labor intensive techniques; a point where disguised unemployment turns into open unemployment.[120]

70. Independently from the demographic conditions prevailing in the traditional sector it appears that in many developing countries powerful economic forces are at work which through their influence on the labor market of the modern sector achieve the same

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119 See Sinha, "Population Growth ...," and Coale, "Population Growth ...,", pp. 65-68. On problems of providing employment and reallocating the labor force with reference to population growth see also J.R. Hicks, Essays in World Economics, The Clarendon Press, Oxford, 1959, Chapter 9; and Gustav Ranis, "Allocation Criteria and Population Growth," American Economic Review, Vol. 53 (May 1963) pp. 619-633.

120 See the demonstration of this point in the framework of an analysis that decomposes the average land-labor ratio into its micro-components in Ashok Mathur, "The Anatomy of Disguised Unemployment," Oxford Economic Papers, Vol. 16 (July 1964), especially pp. 189-193. Cf. also N.K. Sarkar, "Some Effects of Population Growth on Indian Agriculture," in Union internationale, International Population Conference, New York 1961, Vol. II, pp. 509-514.

effect as excessively high population densities in the traditional sector are capable of achieving, i.e. a transformation of disguised unemployment, or low productivity employment, into open unemployment. The main form of manifestation of this phenomenon is migration of rural labor into cities in numbers that far exceed the employment needs of the developing urban industries. Among the factors that elicit this stream of migration the great disparity between wages paid in modern industry and earnings in the traditional sector appears to be most significant; industrial wages in contrast to the classical pattern of development are to a large extent immune to the pressures of the overabundant labor supply. The causes are partly institutional, reflecting government policies and strength of labor unions, and partly originate from management attitudes patterned after industrial practices in developed countries that favor a high level of mechanization of production and consequently discipline, permanency and high productivity of their work force: factors that make it profitable to pay high wages. Such practices, while typical of the most advanced segment of industry only, exercise an upward pull on wages throughout the modern sector and give a strong impetus to what has been called "decasualization" of labor, to further mechanization of production, and in general to the application of labor saving devices. The trend toward high capital intensity of new investment (in the sense of a high ratio of capital to labor) is partly a consequence of high wages, but there are many independent tendencies that work in the same direction. For example erroneous - although as a matter of practice often correct - identification of capital intensive methods with efficient methods in general, regardless of the prevailing wage level, is common among the managers of industry. Another factor is the prestige associated with new technology in conjunction with the fact that a high share of investment is carried out on public account and is frequently influenced by considerations not purely economic. Also, much of the new investment necessarily involves the importation of machinery incorporating technological research oriented towards the needs of economies where labor is scarce. In consequence of these and other similar factors even high levels of new investment fail to create a rapid expansion of jobs in industry, yet with much of the investment concentrated in the large urban centers the attraction of these centers remains high and their rapid increase through immigration continues. For various reasons, including the fact that open unemployment creates social problems that need immediate attention, social policies for relief tend to favor the urban areas, thereby to some extent accelerating the influx of migrants. With the traditional sector no longer absorbing the surplus labor, the problem of creating employment opportunities as distinct from the problem of insuring growth of output becomes increasingly important and, pari passu,

the rate of population growth assumes an increasing economic significance.[121]

71. Given the existence of high population pressure and given the rate of capital accummulation at first approximation it appears clearly desirable that the new investments should be so distributed among the various branches of the economy and assume such technical forms as to insure full employment of labor, or at any rate to minimize the extent of unemployment. The same considerations apply to the use of the existing capital stock. It follows that projects and techniques that absorb a large amount of labor for a unit of capital should be preferred; since the social cost of labor that would otherwise remain unemployed is small, maximization of employment would also maximize output. In the case of a given product this proposition need not hold: technical rigidities may preclude the employment of a more labor intensive method or the labor intensive method may be so inefficient that both output per labor and output per capital are lower than they are with more advanced methods. But presumably such situations are not ubiquitous and shift in emphasis toward higher labor intensity by changing the product mix is always possible. It is to be remembered, however, that a quantitative expression for the total national product is a matter of social valuation; the purpose of production is not merely output but output that is desired. The marginal value contribution of increased production in certain pursuits that are labor intensive may not far exceed the marginal disutility of the labor expended. Nevertheless insofar as the market price of labor is clearly out of line from its social cost some correction for this fact would undoubtedly lead to a higher level of employment. However, if output and employment are to be maximized over time, the crux of the problem is not merely to increase employment and output in the current period but to accomplish this without permitting total consumption to increase more than the increase in total output. Unless the latter condition is satisfied the investible surplus will fall depressing output and employment over time. Therefore once dynamic considerations are introduced higher labor intensity -- fuller employment -- is preferable only if wages can be controlled, i.e. if methods are found that would

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121 For a full discussion see W. Arthur Lewis, "Unemployment in the Developing Areas," in Proceedings of the Third Biennial Midwest Research Conference on Underdeveloped Areas, Chicago, 1965. Cf. also Idem, "Employment Policy in an Underdeveloped Area," Social and Economic Studies, Vol. 7 (September 1958), pp. 42-54; International Labor Office, Employment and Economic Growth, Geneva, 1964, Chapter 6; Harry T. Oshima, "A Strategy for Asian Development," Economic Development and Cultural Change, Vol. X (April, 1962), pp. 294-301; and Samir Dasgupta, "Underdevelopment and Dualism -- A Note," Economic Development and Cultural Change, Vol. XII (January, 1964), pp. 179-185.

redistribute the given wage fund among a higher number of workers without a fully compensating loss of the quantity and quality of the labor supplied by the average worker.[122]

72. When the choice of the degree of capital intensity is considered in the wider context of development the case for applying highly capital intensive technology is further strengthened. On the basis of historical experience it has been suggested that for a technically backward country adoption of the most modern and efficient techniques and in particular concentration on economic activities in which recent technological progress has been most rapid offer the best hope to successfully compete with the more advanced nations.[123] Such techniques are as a rule capital intensive. Considerations related to the educative and psychological effects of examples of modernity and superior efficiency point in the same direction: emphasis on labor intensive methods may tend to perpetuate traditional attitudes and work habits that hinder industrial development. It has been also argued that lines of investment that should be emphasized in development strategy because of their superior linkage effects happen to be relatively capital intensive. Similarly lack of training and work experience of the labor force may suggest a preference for machine-paced as opposed to operator-paced operations since the disadvantage of unskilled labor is minimized in the former - but machine-paced operations are typically more capital intensive than operator-paced ones.[124] Naturally it is to be remembered that capital intensity for the economy as a whole is an average value and advocacy of maximizing employment does not preclude the acceptance of the recommendation just outlined: in principle a highly capital intensive sector of the economy could be complemented with a sector at the opposite extreme. However, for such a solution to be successful a high degree of control over internal migration, as well as over the wage level seems indispensable. The social cost of a policy that would satisfy these conditions may be prohibitive. Nevertheless it appears inevitable that employment considerations will play an increasing role in shaping development policies in labor surplus economies. It is well established that in such economies a lower rate of growth of the working age population would permit a reduction of the tension in the labor market and would favor the adoption of investment policies that are more nearly optimal from the point of view of long run per capita income growth.

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122 Cf. Walter Galenson and Harvey Leibenstein, "Investment Criteria, Productivity and Economic Development," Quarterly Journal of Economics, Vol. 69 (August 1955), pp. 343-370; Jan Tinbergen, The Design of Development, Baltimore, 1958; Sen, Choice of Techniques, Chapter 5. For further references, see footnote 109 above.

123 Alexander Gerschenkron, Economic Backwardness in Historical Perspective, Harvard University Press, Cambridge 1962, pp. 8-11.

124 Albert O. Hirschman, The Strategy of Economic Development, Yale University Press, New Haven, 1958, pp. 145-152.

73. Finally in the context of the foregoing discussion an argument should be mentioned that is based on the effects of investment policies on the sectoral distribution of the labor force, and of population in general. Given the fact that there exist significant differences among the demographic characteristics of various segments of the population which can be associated with various sectors such as agriculture and industry, and assuming that demographic patterns differ as to their effects on the economy, it follows that in allocating investments the implied effect on the sectoral distribution of the population, hence on changes in demographic characteristics and their ultimate economic effects should be taken into account. On the basis of this proposition particular policies - e.g. speeded up industrialization or urbanization - were sometimes advocated or at least the presence of these indirect population effects was invoked as an additional supporting argument for policies considered desirable on other grounds.[125] The logic of the proposition that in selecting the most desirable development policy all indirect effects should be taken into account is incontestable. However in the given instance the practical significance of the argument is subject to doubt. It is unlikely that the optimum patterns of investment selected with and without reference to the population effects would differ substantially in view of the relative rigidity of any economic structure even if the induced demographic differentials would be large and speedily forthcoming. In reality neither of the latter conditions is likely to obtain. On the other hand, the argument obviously lends itself to generalization since similar principles are applicable to the evaluation of the economic case for any material sacrifice capable of inducing a desired modification of an existing demographic pattern.[126]

74. Turning to the problems of developed economies it appears that demographic aspects of employment in the sense used in the above discussion, i.e. as distinct from the problem of capital accumulation and per capita income growth, have attracted little attention presumably indicating that the relationship is considered remote or unimportant. While no precise line can be drawn which separates developed economies from the rest of the world in this

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125 For an early statement see Frank W. Notestein, "Problems of Policy in Relation to Areas of Heavy Population Pressure," The Milbank Memorial Fund Quarterly, Vol. 22 (October 1944), pp. 424-444; the formal introduction as an investment criterion is associated with Galenson and Leibenstein, "Investment Criteria ...," especially pp. 363-367; see also Joseph J. Spengler, "Capital Requirements and Population Growth in Underdeveloped Countries: Their Interrelations," Economic Development and Cultural Change, Vol. IV (July 1956), p. 321; A. J. Jaffe and K. Azumi, "The Birth Rate and Cottage Industries in Underdeveloped Countries," Economic Development and Cultural Change, Vol. IX (October 1960), especially pp. 61-63.

126 E.g. Stephen Enke, "Speculations on Population Growth and Economic Development," Quarterly Journal of Economics, Vol. 71 (February 1957), pp. 19-35; Paul Demeny, "Investment Allocation and Population Growth," Demography, Vol. 2, 1965.

respect the causes of unemployment may provide an approximate definition. In a developed economy scarcity of capital is no longer an appreciable factor in determining unemployment; rather the latter is caused by deficiencies, lagged adjustments, cyclical variations, and shifts of demand. These phenomena may have a close relation to demographic factors, however employment is manipulable even in the short run without the necessity of changing any of these relations. In popular discussions it is occasionally suggested that rapid technological change at least qualifies the above statement. Yet insofar as the unemployment resulting from technological change is temporary it can be handled by suitable compensation schemes -- including the device of not permitting the discharge of workers if and when they become redundant. With high levels of income per capita naturally it is possible that due to technological progress production eventually will expand faster than will private demand plus the desirable demand on the public account and, furthermore, that the amount of needed total labor input will become less than the amount of labor offered. But it would be relatively simple to remedy such a situation by changing the distribution of income so as to increase the attractiveness of leisure relative to labor e.g. by distributing an increasing part of the total product without reference to the work performed.[127] Demographic considerations are relevant in such context only through their influence on income per capita. Naturally it would be consistent with this argument to assume that the economic conditions just outlined might yet exercise a strong influence on society's judgment concerning the relative desirability of various patterns of demographic behavior. With output once again unrelated to the size of population -- reminiscent of situations found in some underdeveloped economies -- populationist sentiments may well reach an historic low ebb. But these considerations are hardly timely, even with respect to the most advanced countries of the present day world.

V. Demographic Aspects of Productivity

75. As was pointed out earlier the volume or the rate of change in output over time cannot be adequately explained in terms of quantities or changes of labor-, capital-, and resource-inputs utilized in the process of production. Accordingly in discussing demographic influences on saving, investment, and employment references were made to changes in the quality and mode of interaction of these variables whenever the surveyed literature seemed to indicate a consensus that such changes occur pari passu with changes

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127 International Labor Office, Employment and Economic Growth, p. 40 and Chapters 4 and 5; cf. also Alfred Sauvy, "Progrès technique, emploi et chômage," in Lectures on Economic Development, Istanbul, pp. 39-59.

in quantity -- as for example a decline of fertility by permitting an increase in an originally low level of per capita consumption presumably increases the health and vigor of the labor force. The present section surveys views concerning some more elusive influences demographic variables may also exert on the volume or growth of output, i.e. on productivity with respect to population. The difficulty of quantifying the importance of such influences probably explains the relatively small volume of writings addressed to the clarification of the problems involved, although the general recognition of the existence of such influences is indicated by the great number of obiter dicta on the subject. They may be classified under three headings according to the medium through which demographic factors are thought to influence output. First, demographic variables may affect the flexibility of the population in some economically meaningful sense and in general may increase the adaptability of the economy to change; second, they may affect the nature of innovations hence the character and speed of technological progress; and finally they may exert an influence on economic performance through some general stimulus - response mechanism.

76. The flexibility of the economy is first of all believed to be affected by the age distribution of the population within the working ages. Given the differences among various adult age groups with respect to physical strength and to various characteristics of the psychic make-up such as attitudes toward risk-taking, receptiveness to new ideas, ability to absorb new knowledge, creativeness of imagination and similar factors it is sometimes noted that the productivity of an old population, such as associated with a very low growth rate (when resulting from both low mortality and fertility) is likely to be less productive than a younger population. The effect may be particularly strong when knowledge is expanding rapidly thereby making earlier acquired knowledge quickly obsolete. Such a situation will obviously be further aggravated if combined with a rigid system of seniority in which - partly again because of the character of the age distribution - the majority of commanding posts is occupied by persons of advanced age.[128] Since high mortality is recognized as inimical to the values in which a young population is supposed to excel[129] the argument is essentially one favoring relatively high fertility.

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128 Cf. for example, Gunnar Myrdal, Population, A Problem for Democracy, Harvard University Press, Cambridge, Mass., 1940, pp. 160 ff.; United Nations, The Aging of Populations ..., pp. 60-61; Kuznets, "Population Change ...," p. 336; Correa, The Economics ..., pp. 19, 48, and passim. For a critical discussion of the argument see Joseph J. Spengler, "Aging Populations: Mechanics, Historical Emergence, Impact," in Juanita M. Kreps (ed.), Employment, Income, and Retirement Problems of the Aged, Duke University Press, Durham, N. C., 1963, especially pp. 44-45.

129 See Jean Fourastié, "De la vie traditionelle à la vie tertiaire," Population, Vol. 14 (July-September 1959), pp. 417-432.

77. Given the level of mortality the contrast between an old and a young population may also be posed in terms of the respective rates of population growth. This viewpoint highlights the differences as to the extent in which a labor force may adjust itself to a changing sectoral or occupational structure merely by directing its newly entering elements towards the expanding sectors and occupations. A change in structure may be the necessary concomitant of the application of superior techniques of production; differences in the ability to adjust to structural changes may in turn have an effect on the speed at which the new techniques are in fact adopted. A decline in demand per capita for a given good due to whatever reason implies a reduction in the absolute volume of demand when a population is stationary while in a growing population the need for such a reduction will be partly or entirely compensated by an increase in the number of customers. Analagous arguments can be applied to the utilization of the economy's capital stock. Growth of population may eliminate or lessen the losses due to unutilized equipment resulting from a shift of tastes, mistakes of overinvestment in certain lines are corrected by growth. Since the aggregate stock of capital will usually grow faster when the rate of population growth is higher due to this factor alone the average age of capital will be lower and a larger fraction of it will incorporate recent knowledge.[130]

78. It can be readily seen that the argument according to which higher population growth increases the flexibility of an economy and increases productivity is limited to developed economies. This is so not because underdevelopment is typically associated with rates of population growth that are higher than some level at which the disadvantages and advantages of growth are presumably optimally balanced. Rather the arguments linking flexibility and population growth are irrelevant in a setting where the modern segment of the economy coexists with a large subsistence sector hence the speed of expansion in the former is limited only by its ability to absorb the latter. For a developed

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130 See J. M. Keynes, "Some Economic Consequences of a Declining Population," The Eugenics Review, Vol. 29 (April, 1937) pp. 13-17; Sauvy, Théorie Générale..., Vol. I, Chapter 20; Buquet, L'optimum ..., p. 245; Joseph J. Spengler, "Population Change: Cause, Effect, Indicator," Economic Development and Cultural Change, Vol. IX (April, 1961), pp. 256-257; Alfred Sauvy, "Croissance de la population et productivité," in Union internationale, International Population Conference 1961, Vol. II, pp. 517-525; Colin Clark, "The Fundamental Problems of Economic Growth," Weltwirtschaftliches Archiv, Vol. 94, No. 1, 1965, pp. 1-8.

economy the arguments are undoubtedly valid, but their economic importance is not sufficiently clear. It appears that the actual level of gross interoccupational and intersectoral mobility of labor in a dynamic economy dwarfs the contribution, if any, of a faster as opposed to a slower demographic growth to the "solution" of the problems associated with structural and occupational adjustments. Even net changes in the occupational structure can illustrate this. To cite an extreme example, employment in coal mining in 1947 in the United States exceeded half a million. During the next twelve years - a period in which the growth of the working age population was not as fast as the growth of the total population, but employment nevertheless rose from 58 to 65 million - employment in the coal mines fell by over 60 per cent to less than 200,000. Similar changes in the structure of demand can easily be quoted. Changes in aggregate income can be brought about much faster than changes in total population: the ability of growing population numbers to maintain demand for goods that come into disfavor or are replaced by new products is rather limited. Similarly doubts may arise concerning the supposedly unfavorable implications of a relatively old age structure. Any society where the expectation of life is high would develop arrangements for coping with the problems arising from obsolescence of knowledge or the fact that past merit is not a sufficient criterion for retaining positions of leadership. Neither is there any need to suffer any disadvantage from a slower replacement of capital when the population is growing less rapidly since machines may be replaced due to obsolescence rather than wear-out. Experience shows that it is not overly difficult to persuade an elderly couple to move into a new and better house. With equal ease necessity can induce two young couples to share one old apartment. The argument concerning the advantages of flexibility as derived from differences in age structure and growth naturally must be carried out with reference to specific economic and demographic conditions. In a technologically advanced society a stationary population appears to be perfectly consistent with a high degree of dynamism, flexibility and adaptability to change.[131]

79. It is a generally accepted proposition that the direction and extent of inventive activity is influenced by relative factor scarcities -- both as given and as they are expected to evolve in the future by entrepreneurs -- hence indirectly by demographic characteristics, in particular by the size and the rate of growth of the labor force relative to land and to capital. Scarcity of labor presumably induces entrepreneurs to adopt and develop techniques that are labor-saving. Such a bias in some historical cases, notably in the 19th century United States is thought to have deeply influenced the course of economic development. On

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131 Cf. Joseph J. Spengler, "The Economic Effects of Changes in Age Composition," in Spengler and Duncan, Demographic Analysis, pp. 497-517; also Idem, "The Economics of Population Growth," pp. 92-93.

this analogy it is sometimes suggested that abundance of labor in underdeveloped countries may have a negative influence on economic progress because due to cheapness of labor labor-intensive techniques will be preferred, but such techniques are the least likely to develop in the future.[132] But generalizations in this respect that are valid independently of the socio-economic setting are not possible. In some cases it is argued with equal persuasiveness that abundance of unskilled labor and the consequent ease by which capital can be widened increases the opportunity of trying out any new methods which might be independently available, leads to a more rapid absorption of existing technical knowledge and, therefore, increases the chances of making further technical progress.[133]

80. It is possible to describe the process of economic development as the antithesis of balanced growth: as a series of disequilibria subject to a multitude of pressures and tensions. Going beyond mere description it has been convincingly argued that such disequilibria are in fact desirable since they are instrumental in creating a reaction pattern of induced decision making thus stimulating growth envisaged as a series of problem solvings. It has been also argued[134] that population pressure is among the mechanisms capable of creating favorable linkage effects and other stimuli. Even if the general validity of this theory is accepted it appears that under the conditions typical in developing countries it is irrelevant since it fails to appreciate the magnitudes of the demographic parameters involved. If some population pressure is useful it does not follow that more population pressure is more useful; the problem must be posed as one of optimization. High fertility countries have a built-in potential for population growth: even with a rapid reduction of fertility to levels that in the long run imply mere reproduction of constant numbers the inherited age distribution is "forgotten" but slowly and growth continues for some time. It is difficult to see what extra stimulus a country may gain by doubling its numbers in 25 years from a given date instead of achieving the same result in 40 years.

81. The arguments surveyed in this section do not appear to modify the conclusions on the economic implication of demographic phenomena that can be reached on the basis of the discussion in the previous sections. In underdeveloped countries the single most important aspect of the demographic influences on the economy is undoubtedly the effect of population growth and the related demographic characteristics on the joint problem of capital requirements and capital accumulation. For developed economies this problem is important but, given the typical range of their demographic parameters, its urgency is limited, since it is posed as a choice between two paths, both characterized by rising per capita incomes from a level that is already tolerable. In such countries formulation of population

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132 See H. J. Habakkuk, American and British Technology in the Nineteenth Century, Cambridge, 1962; Idem, "Population Growth ...," pp. 34-35. See also Streissler, "Population Change ...," pp. 337-339; Gaston Bouthoul, La surpopulation dans le monde,

policy requires a view focused on the long run not discussed in this paper. It is likely that for many years to come advanced societies may provide for rising numbers rising material standards of living, narrowly defined, transforming their physical environment in the service of this purpose, operating on a ratchet principle, as it were. The view on the long run should go beyond problems of economics.

Payot, Paris, 1958, Chapter 4; Kuznets, "Population Change ...," p. 334; and William Fellner, "Two Propositions in the Theory of Induced Innovations," Economic Journal, Vol. 71 (June 1961), pp. 305-308.

133 John Habakkuk, "Population Problems and European Economic Development," American Economic Review, Vol. 53 (May, 1963), p. 614.

134 Albert O. Hirschman, The Strategy of Economic Development, pp. 176-182.