النمو السكانى والتنمية الاقتصادية من منظور إسلامي
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Population Growth and Economic Development:

An Islamic Perspective

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1. **INTRODUCTION**

In the years following World War II, most of third world newly independent countries have chosen planning techniques as a mean to achieve economic development. Planners in densely populated countries adopted a variety of strategies aimed against high rates of population growth, allegedly a major barrier to economic development, an argument which received strong support from economic demographers who made use of the simple mathematical form of real per capita income (a common indicator of economic development) in which population appears in the denominator (EGDP/Population) to show that the greater the population size the smaller the real per capita income, and the lower the level of economic development. The weakness of this argument lies in its implicit assumption

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that population growth has no effect on the level of real output, which is a an apparent fallacious thinking. Contemporary economic demographers' views are but a modem formulation of Malthus' pessimistic theory, which states that while world population is increasing according to a geometric series, food production follows a numeric series as a result of decreasing returns to lands. According to his view, this situation will inevitably end up with massive famines and wars on food, Gelbach and Prichett (1995)[1]. Based on his deductions of the Malthus theory, David Ricardo (1815) was the first to formulate the now popular adverse relationship between population growth and economic development. In accordance with his view, population growth put upward pressures on food prices, which eventually leads to higher real wages and greater economic rent to landlords. In the industrial sector, higher demand for food and higher real wages restrain sales, increase costs, lower profits, and consequently reduce the

[1] Dasgubta, Parth, "The Population Problem: Theory and Evidence", Journal of Economic Litterature, 33, Dec. 1995, pp. 1879-1902.

rate of capital accumulation required for economic development, Dasgubta (1995)[1].

Malthus theory received strong criticism from Neoclassical philosophers and economists, the most prominent of whom being Henry George (1996)[2]. In his book "The Population Debate", he argues that poverty, unemployment, and illness among the poor, which characterized the British society at the time Malthus introduced his theory, may not be attributed to population growth, but to the inequality of income and wealth distribution, as well as to the greed and exploitation practices of landlords against their workers. George also believes that population growth should be thought of as an addition to the society's production capacity and potential well-being, and not just as an addition to its demand for food. Malthus' theory is also being criticized by

Gelbach, Jonah & lant H. prichett, "Does More of the Poor Means Less for the Poor: The Politics of Tagging". Policy Research Working Paper 1523. World Bank, 1995, Washington, D.C. ()

George, Henery, "The Population Debate: The Development of Conflicting Theories up to 1990", Houghton Mifflin Co. Boston, pp.3075 1967. ()

contemporary economists like Schults (1981) [1]. In his book he argues that diminishing returns, the major element in Malthus' theory, has lost its importance as a result of technical progress which introduced new substitutes for land (machineries, fertilizers, pesticides, and high yield varieties, etc.) allowing for higher productivity of labor and better standards of living for workers despite the unprecedented growth of world population. Therefore, as a general conclusion. one may say that the weakness of Malthus' Population Theory lies in its reliance on a short analytical horizon, during which technical progress tended to be stagnant, while population growth naturally takes place gradually over a relatively ',onger period of time. Moreover, a new trend among contemporary economists strongly emphasizes theoretically, the possible existence of a positive relationship between population growth and economic development. McNicoll (1984)[2], among others,

Schultz, Paul T., "Economics of Poi)ulation" Addison Wesley Publication Co., Inc. pp. 1-30, 198 1. ()

McNicoll. G., "Consequences of Rapid Population Growth: An Overview and Assessment", Population and Development Review, June 1984, pp. 177-240. ()

went further by statistically testing the nature of this relationship.

In Islam problems of population growth are not supposed to exist. Allah, the creator, has guaranteed sustenance and forbade any means of preventing reproduction on plea of need as He says in The Quraan:

﴿وَلا تَقْتُلُوا أَوْلادَكُمْ خَشْيَةَ إِمْلاق نَحْنُ نَرْزُقُهُمْ وَإِيَّاكُمْ إِنَّ قَتْلَهُمْ كَانَ خِطْئًا كَبِيرًا﴾(*).

"Kill not your children for fear of want: We shall provide, sustenance for them as well as for you verily the killing of them is a great sin" (Al-Israa, verse 31)

So, from an Islamic point of view family planning is not a mean of maintaining family standard of living. At the micro level, the main stream of Muslim scholars like Shallan (1983)[1], advocate family planning in certain cases based on the individualistic conditions of a single family. Controlling number and time spacing of births are lawful

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(*)   سورة الإسراء : الآية ٣١
(١)   شعلان، محمود عبد السميع، "نظام الأسرة بين الإسلام والمسيحية"، دار العلوم للطباعة والنشر، الرياض، ص ٦٧١ـ٧٠٢، ١٩٨٣

whenever they endanger mother's or child's health, or lead to some family related problems. At the macro level, however, Ramadan (1976)[1] argues that Government policies and programs of birth control are forbidden in Islam. Allah the Al-Mighty has given the right to individual families to decide on this matter according to their own reasoning, for which are held accountable in the day of judgment.

Other writers as Amran (1988)[2] justify Government intervention in family planning on the basis of public interest. In conformity with Amran's argument, economic demographers in most Muslim nations have adopted population strategies mainly aimed at family planning through public intervention. From an Islamic standing, according to Ramadan, public intervention in family planning is refutable; birth control is only lawful if a minor portion of the society justiflably adopts it, but unlawful if it

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(١) رمضان، محمد سعدي، **"مسألة تحديد النسل: وقاية وعلاج"**، الطبعة الثانية، مكتبة الفرابي للطباعة والنشر، دمشق، ص١٩ـ٣٧، ١٩٧٦

(٢) عمران، عبد الرحيم، **"سكان العالم العربي حاضراً ومستقبلاً"**، صندوق الأمم المتحدة للأنشطة السكانية، نيويورك، ص٦٥ـ٨٠، ١٩٨٨

becomes a general attitude or a publicly mandated course of action.

The core issue of population growth and economic development has not received due concern by Muslim intellectuals. Therefore, the objective of this paper is to develop an Islamic theoretical framework for the relationship between population growth and economic development. In this regard, a new version of the Neoclassical Model of Economic Growth will be developed which conforms with the Islamic framework of the relationship.

The paper proceeds in the following manner: after this introduction, the second section presents a brief review of previous studies which provide evidence against Malthus' conclusions. The first part of the third section presents a mathematical elaboration on the Neoclassical Growth Model in order to verify some of the important findings of the previous studies. In the second part, the demand side effects of population growth on economic development will be examined. The major contribution of the paper is presented in the fourth section, where an Islamic

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perspective of the population issue is introduced, and a revised form of the Cobb-Douglas production function is incorporated into the Neoclassical Growth Model and used in making predictions about the relationship between population growth and economic development.

2. REVIEW OF PREVIOUS STUDIES

Economists use per capita real consumption as a comprehensive measure of social welfare. Production possibilities on the other hand are bound with the society resource endowment and the level of technology at any specific point of time. as shown by the well known Production Possibility Curve (PPC). In the short-run when resource endowment is assumed constant, and no technical progress exists, if resources are fully and efficiently being used, the maximum production of good A is decided by the desired level of production of good B. The PPC then represents the locus of all possible combinations of maximum and efficient production of goods A and B. The socially optimal production mix is decided according to the social welfare function. In light of this simple analytical model, in the short-run one may conclude that Malthus'

deductions are consistent with the state of the British economy at his time which was characterized by a stagnant level of technical progress prior to the industrial revolution. and a limited endowment of resources prior to Britain's colonial wars and domination of resources in foreign lands. In the long-run, however, technical progress allowed for higher labor productivity in both agriculture and industry. Meanwhile, resource endowments were expanded as Britain's militant arms were stretched over more and more foreign lands. Had Malthus anticipated these breakthroughs, his theory would have yielded completely different and more realistic predictions. Demographers in their analysis provisionally tended to rely on a simple mathematical equality which shows the growth rate of per capita real income (an indicator of development) as a difference between the growth rate of real GNP and the population growth rate. From this simple mathematical relationship demographers have come to their naive conclusion that rapid population growth hinders economic growth and development. In fact, such a pessimistic view would only be acceptable if new participants in the labor force are assumed totally unproductive (MPL = 0). In other words, economic demographers claim that population growth has a positive effect on the demand side with no

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effect on the supply side of the economy, relying on the fact that labor productivity in densely populated traditional sectors is known to be close to zero. However, population growth and low wages in traditional sectors may stimulate labor migration to modem sectors whereby labor productivity is expected to have some positive effect on the growth rate of GNP. This point will be the focus of discussion in the third section of the paper.

In a more logical and comprehensive mode of thinking, modem economists have emphasized the important role of analysing the effect of population growth on economic variables which are directly related to development. In their studies, due attention was focused on savings, as an important determinant of investment and development potentialities. Of these studies, Hagen (1986)[1] presented the following four popular arguments in support of the negative impact of population growth on savings:

1. Population growth leads to a higher dependency ratio and consequently more household consumption spending at the cost of less savings.

2. Population growth means more Govermnent spending on public services specially education and health, so, less Government savings would be left for public investment.

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[1] Hagen, Henery E., **"The Economics of Development"**, Fourth Edition, Irwin Inc., Illnios, pp. 345-349,1986.

3. Greater Government expenditure caused by population growth would finally call for either more taxes or more money supply, and both proved to have negative impacts on private savings.

4. Population growth in the agriculture sector leads to lower wages, and lower savings as a result of diminishing returns to labor.

Despite the logical and economical appeal of these statements, Hagen was able to cite the following counter argument, in a corresponding order:

1. It is true that population growth means more consumption spending by families. However, less savings would only result if family income is assumed to be unchanged even when its labor force grows.

2. It is a weak argument to say that greater Government spending on health and education crowds out public investment. In fact these categories of Government spending become widely recognized as investment spending in human capital.

3. If the additional labor force generated by population growth is to be used productively, higher incomes and profits resulted would increase Government tax returns, thus no need would arise to collect more taxes or to increase the money supply.

4. Finally, diminishing returns to labor in agriculture cannot be assumed to take place in most developing countries, where land is not fully utilized and production management and techniques are still primitive.

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Leibenstein (1975)[1] in his applied statistical study of the impact of family size on the saving rate, concluded that as the number of children within a family rises, the family reallocates its income among various budget items rather than reducing its savings, either because their savings are of a compulsory nature (contributions to a social security program) or do not have any savings to start with. The author also argues that a significant proportion of savings in developing countries is contributed by high income, small size families. Therefore, a population increase is not expected to have any significant impact on savings in such countries. In his conclusion he invited demographers to reevaluate their theories, and to test their alleged adverse relationship between population growth and economic development in light of real data made available today by various statistical surveys of different groups of developing and developed nations.

As noted in the above-mentioned review, it is evident that the relationship between population growth and economic growth is inconclusive, and can not provide any

[1]   Leibnestein, Harvey, "Population Growth and Savings", in Population Growth and Economic Development in the Third World", Edited by leon Tabah, International Union for the Scientific Study of Population pp. 593-618, 1975.

evidence in support of the validity of the Malthusian Theory.

Other studies like Easterlin (1967)[1] tested the direct relationship between population growth and development using cross-country data. Easterlin collected data from 37 developing countries. results are summarized in table (1-1) below, which shows the frequency distribution of countries according to real per capita income and the rate of population growth of each during the period (1957-1963). It was noted that, low per capita income countries have high population growth rates in some of the **cases,** and have low population growth rates in others. The same was true with regard to high per capita income which was observed in countries of low population growth in some cases and in countries of high population growth in other cases. Therefore, the author was not able to draw any definite results from these data. Thus, he concluded that, despite the popular belief that population growth hinders development,

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Easterlin, Richard A., "Effects of Population Growth on the Economic Development of Developing Countries" in the Journal of the American Academy of Political and Social Science, January 1967, pp. 106. **( )**

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it is still difficult to empirically test the validity of this allegation.

Table (1-1)

Rate of Growth of Real Per Capita Income							
Rate of Population Growth	Total	Less than 0	0-0.9	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0 and over
Total	37	3	4	12	12	2	2	2
3.0 and over	2	1	0	0	0	0	1	0
3.0-3.4	10	0	2	3	4	0	1	0
2.5-2.9	11	1	2	5	1	1	0	1
2.0-2.4	8	0	0	3	5	0	0	0
1.5-1.9	4	1	0	0	2	1	0	0

Less than 1.5	2	0	0	1	0	0	0	1

Source: Easterlin (1967) p. 106.

McNicoll lately conducted a study on a sample of 42 developing countries over the period (1960-1980) to test the relationship between population growth and economic development. cnicoll resented he following scatter diagram (figure 1-1) of the two variables upon which he concluded no significant correlation etween opulation rowth nd development.

Isbister (1975)[1] went a step further using data from 73 countries over the period (1963-1968), he regressed the growth rate of income on the rate of population growth and other variables. His empirical results show that population growth has no adverse effects on the growth rate of real per capita income.

Fig.(2 - 1)

Isbister, John, **"Population Growth and the Productivity of Cgpital in the Third World,"** Edited by leon Tabah, International Union for the Scientific Study of Population, pp. 619-648, 1975.   [1]

Population Growth

Other economists believe that population growth may play a positive role in stimulating economic growth. Hirchman (1958)[1] refutes first the contradicting Neo-Malthusian argument that "development efforts in a fast growing society precisely resembles going up a descending escalator" by showing that going up a descending escalator might be the best exercise for one who wants to learn how to run. Hirschman then postulated two hypotheses to explain how population growth is expected to generate socioeconomic pressures which provide individuals with motives for improving their productivity.

Hirschman, Albert A., **"Develoipment and Society: the Dynamics of Economic Changes"**, Edited by David Novack and Robert Lanckachman, pp. 176-18251958.   ()

The first hypothesis is derived from Dousenbury's Relative Income Theory, according to which families allocate their wealth in a way to maintain a previously experienced peak level of consumption. Therefore, in slack periods, families may either spend out of their savings or work more vigorously in order to maintain their previously attained standard of living. Along these lines, the author believes that families should be expected to react in a similar way as they grow in size. Hirschman articulated that such a hypothesis would, at the most, present us with a society maintaining its per capita real income while population is growing, but it nevertheless does not provide for the economic growth issue.

The second hypothesis presented by Hirschman shows that period of recessions force families to struggle in order to keep up with their previously experienced standard of living as mentioned above. During a transitory period, working family members are expected to acquire better skills, means and techniques, which would eventually be reflected on higher labor productivity. One finds the author's belief quite plausible when compared with the

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realities of the rapidly growing administrative metropolitan areas where administrative skills and capabilities are developing so fast in order to cope with the growing demand for public goods and services.

Based on the two theories developed in his paper, the author concluded that the impact of population growth on economic development varies significantly according to the time horizon of the analysis. In an early stage following an increase in population, per capita real income may decline temporarily. Meanwhile, labor productivity will improve under the pressure of growing family sizes. In the following stage, productivity improvement will permit the economy to regain its previously attained level of per capita real income, and may possibly surpass those levels so as to allow for the coexistence of economic development and population growth. In the long run, however, the economy would gain self-momentum and self inducement sufficient to grow steadily even at zero population growth, as the case in most developed countries.

Finally, Isbister in his elegant paper, which is of most relevance to the subject of our study, uses the Solow

$(1956)^{(1)}$ Neoclassical Growth Model to test how population growth may affect economic growth. In this model, the economy is assumed to produce output Y using inputs labor L and capital K, according to a constant return to scale production function, showing diminishing marginal productivity of both L and K. The model also assumes that the society saves a fixed fraction s of its income Y, which
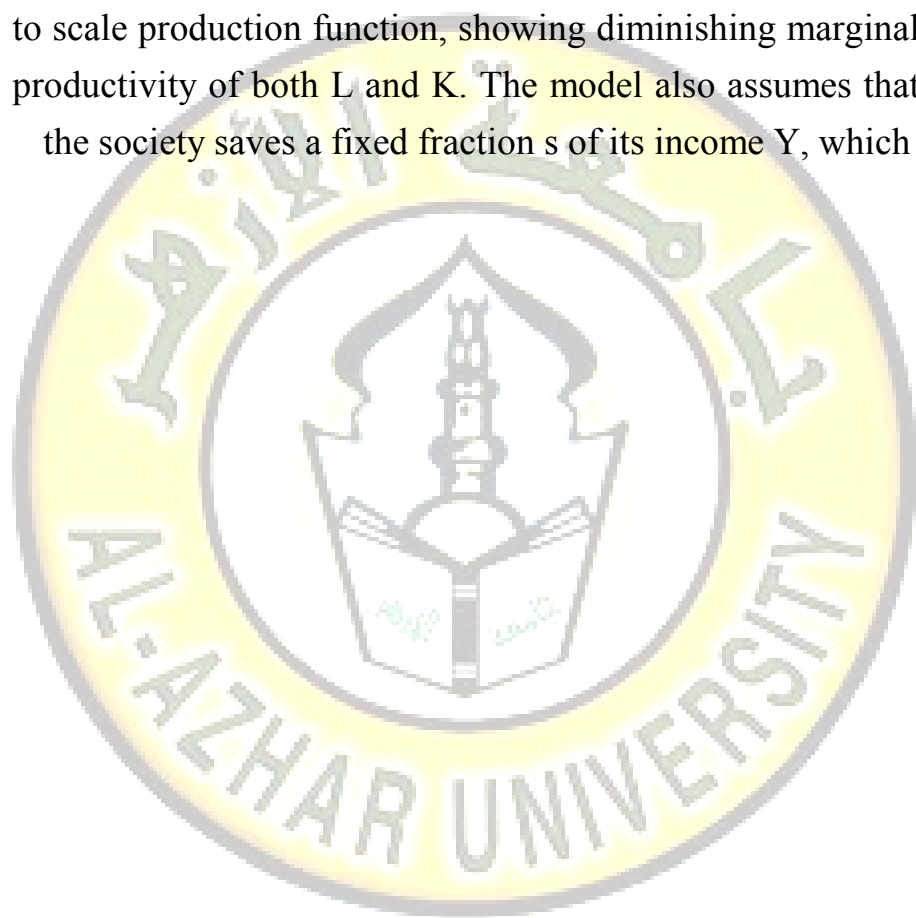
Solow, Robert M., "A contribution to the Theory of Economic Growth", Quarterly Journal of Economics, 1956, pp. 65-94.   ( )

directly goes to net investment, assuming no depreciation. In mathematical form then:

$$(2\text{-}1) \qquad Y = F(k, L)$$

$$y = Y/L = F(K/L, 1) = f(K/L) = f(k) \quad (2\text{-}2)$$

Output per man y is a function of capital per man k only. An equiproportional increase in both K and L will leave q unchanged because the production function exhibits constant returns to scale.

$$(2\text{-}3) \qquad sY = S = 1 = dK/dt$$

At equilibrium, the economy will be growing along a steady state growth path, where all inputs (K,L) will be growing at the same rate as output Y because of the property of constant returns to scale. Therefore, the economic rate of growth may be written as follows:

$$(2\text{-}4) \qquad rY = \frac{\overset{\circ}{Y}}{Y} = \frac{\overset{\circ}{K}}{K} = \frac{(dK/dt)}{Y} * \frac{Y}{K} = \frac{\frac{I}{Y}}{\frac{1}{v}} = \frac{s}{v}$$

Where v = K/Y capital output ratio. **So,** in long-run steady state growth path, output grows at the same rate as the labor force (population growth rate) and rY s/v = rL.

Isbister made use of the graph in figure (2-2) to elaborate this point. In this graph, OF is the production function, its concavity reflects the assumption of diminishing marginal productivity of both labor and capital. The slope of a ray from the origin to a point on OF equals Y/K or 1/v. When the economy grows along a steady state growth path, K and L will be growing at the same rate as Y so that K/L will be constant at its equilibrium level and the following equilibrium condition will hold:

$$rL = s/v = rY \text{ or } rL/s = 1/v$$

The slope of the ray from the origin equals rL/s. Now, if the economy actually works at a point like (A), K/Y = OC/OA will be greater than it was at point B, i.e. s/v at A is greater than s/v at B. Then, if population is still growing at rate = rL, the economic growth rate rY = s/v at A would exceed the population growth rate rL, and K/L is not at its equilibrium level. The economy will keep growing until K/L reaches its equilibrium level at B once again.

Suppose now that population starts to grow at a faster rate rL'> rL. That means that, rY = s/v < rL', i.e. the population growth rate exceeds the economic growth rate.

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So K/L will fall and Y/L too. But because of diminishing marginal productivity, K/L will be falling faster than Y/L, consequently Y/K will rise causing s/v and rY to rise until it catches up with rL' on a new steady state growth path. Isbister thus concluded that an increase in the rate of population growth would stimulate the rate of economic growth, eventually both would grow at the same rate. In such a case, however, the economy may experience a temporary decline in per capita income over a transitory period, during which the economic growth rate lags behind the population growth rate.

Fig.(2 - 2)

The studies reviewed in this section show no evidence in favor of the Malthusian claim that population growth hinders economic development. On the contrary, the last two studies present a quite plausible theoretical framework of the possible role population growth may play in stimulating and improving economic growth and development.

The most important topics which have been left out of the studies reviewed are mainly, first; the impact of population growth on aggregate effective demand and its stimulus effect on investment and economic growth. Second; the Islamic perspective of the issue of population and development. These two topics are the focal points of the following section.

3. MATHEMATICAL ELABORATION

In the first part of this section, Isbister's deductions will be verified explicitly using a constant returns to scale Cobb-Douglas production function.

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In the second part, the demand side effects of population growth on economic development will be investigated.

Verification of Isbister's Deductions 3.1

As a starting point, let us first derive the economic growth rate from the following implicit functional form:

$$(3\text{-}1) \qquad Y = f(k,L)$$

$$(3.2) \qquad \frac{dY}{dt} = \frac{dY}{dK} * \frac{dK}{dt} + \frac{dY}{dL} * \frac{dL}{dt}$$

$$(3.3) \qquad \frac{\overset{o}{Y}}{Y} = \frac{dY}{dK} * \frac{\overset{o}{K}}{Y} + \frac{dY}{dL} * \frac{\overset{o}{L}}{Y}$$

$$(3.4) \qquad \frac{\overset{o}{Y}}{Y} = \frac{dY}{dK} * \frac{\overset{o}{K}}{Y} * \frac{K}{K} + \frac{dY}{dL} * \frac{\overset{o}{L}}{Y} * \frac{L}{L}$$

$$(3\text{-}5) \qquad = rK * eK + rL * eL \quad rY$$

Where rY, rK, and rL are the growth rate of output, capital and labor respectively. While, eK and eL are the elasticities of production with respect to capital and labor respectively. Equation (3-5) expresses the growth rate of output as a weighted sum of the rate of growth of inputs (K and L), weights being the elasticities of output with respect to inputs.

Taking the following Cobb-Douglas function as an example of constant returns to scale production function, then:

$$(3\text{-}6) \qquad Y = K^z * L^{(1-z)}$$

The growth rate of output may then be written as:

$$(3\text{-}7) \qquad rY = zrK + (1 - z)rL$$

In the long-run, when the economy grows along a steady state quilibrium path rK approaches rY then (3-7) may be rewritten as:

$$(3\text{-}8) \qquad rY = zrY + (1 - z)rL$$

$$(3\text{-}9) \qquad \text{or } (1 - z)rY = (1 - z)rL \text{ Then } rY = rL$$

If the population grows at a faster growth rate, per capita income is likely to fall in the short-run. In the long-run however, output ventually would be growing at the same rate as population and per apita income would restore its original level.

Therefore we conclude that while population growth may have some negative impact on economic development in the short-run, no such relation holds in the long-run.

3.2 The Demand Side Impact of Population Growth

As was mentioned before, population growth should be viewed more comprehensively by considering its demand side impact on economic development. In what follows the paper will explore the possible impact of population growth on the aggregate demand, the saving rate and the resultant effects on economic growth. In fact, in light of Isbister's findings and Hirschman's hypotheses, one may expect population growth to stimulate aggregate consumption demand, raising prices and generating high returns on capital. But because the MPS is normally greater for higher income groups, the aggregate rate of savings is expected to rise allowing for more investment and economic growth. In terms of the Neoclassical Growth Model. a rise in the saving rate will cause the rate of capital accumulation to surpass that of population growth, and the capital labor ratio to rise. Thus income grows at a faster rate than labor, but because of the diminishing marginal productivity of capital, consecutive units of capital will generate smaller increments to income, until the growth rate of income again equals the rate of population growth. The economy is once

again growing at a steady state growth path, with higher per capita income as a result of the faster growth rate of income caused by the demand side impacts of population growth. These results are illustrated in Figure (3-1) where the horizontal axis measures time and the vertical axis measures gross national product and aggregate consumption in logarithms. Line AY epresents the equilibrium growth path of income, and AC shows the corresponding path of consumption. The slopes of these lines measure the growth rate of output and consumption respectively. The vertical gap between the two curves at any point of time is the logarithm of savings. Taking ti as a starting point where the economy is at a long-run equilibrium with $rY = rL$, the demand side impact comes into action when population growth stimulates aggregate demand yielding enough profits to the high income groups, so that the aggregate saving rate rises from sl (ED/Dt_l) to

Fig.(3 - 1)

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s_2 (EF/Ft$_l$), causing capital to grow at a faster rate than that of labor, so K/L also starts to rise. Consequently income growth accelerates at a faster rate along EY* at the beginning, to slow down later to its initial level as a result of diminishing returns to capital. In response to the increase in both income and the size of the population, aggregate consumption is going to grow at a faster rate, but still slower than the rate of growth of income resulting in a higher rate of saving. Eventually, income will again grow at a rate precisely corresponding to that of labor, however, the level of income now is higher, implying higher per capita income. In conclusion, one may claim that population growth not only has a positive impact on economic growth and development through its supply side effect, but it also has a positive stimulative demand side impact too.

4. ISLAMIC PERSPECTIVE OF THE PROBLEM

Like many other socioeconomic problems, the population issue has been approached and treated in most of the Muslim countries in just the same ways adopted in non-Muslim countries. Population strategies are most likely based on the erroneous inherited dogma that slower population growth is a prerequisite for sustained economic development. The problem here is the weak Iman (faith) that preoccupies Muslims' hearts and minds in most Muslim societies today. They strongly believe in the Malthusian claim that population growth would inevitably lead to disastrous famines due to shortage of food, while as Muslims they are supposed to have a steady faith and belief in the words of Allah as revealed in Quraan where He the AI-mighty says:

{وَمَا مِنْ دَابَّةٍ فِي الْأَرْضِ إِلَّا عَلَى اللَّهِ رِزْقُهَا وَيَعْلَمُ مُسْتَقَرَّهَا وَمُسْتَوْدَعَهَا كُلٌّ فِي كِتَابٍ مُبِينٍ}(*)

"There is no moving creature on earth but its sustenance dependeth on Allah: He knoweth its

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(*) سورة هود: الآية ٦

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resting place and its temporary deposit: All is in
(Hud, verse 6)   *a clear Record"*

It is a pledge from Allah to grant sustenance for all mankind. A plausible pledge that is, for Allah has inexhaustible stocks of everything, allocated according to some rules stipulated by Him: as Allah says in Surat AI-Higr:

{وَإِنْ مِنْ شَيْءٍ إِلا عِنْدَنَا خَزَائِنُهُ وَمَا نُنَزِّلُهُ إِلا بِقَدَرٍ مَعْلُومٍ}(*)

"And there is not a thing but its (sources and) treasures (Inexhaustible) are with Us; but We only send down thereof in due and ascertainable
(AI-H"r,verse 21)   *measures"*

(*)   سورة الحجر : الآية ٢١

Man was permitted to make use of all the natural laws created and bestowed upon him by Allah so that he may exert efforts in his work and reap their fruits by Allah's will. Then eventhough, sustenance is guaranteed by Allah, it is attainable through a tremendously complicated set of causalities that require man to exert the due efforts. Moreover, the foreseen scarcity of resources, alarming consequences of population growth, and similar allegations are only sensible within the currently available set of information and knowledge related to resource and technology. The short-run rigidity of these constraints, however, has proved to be more flexible in the long-run when enough time is allowed for new resources to be discovered and better technology to be adopted within the prevalent set of natural rules. In an Islamic perspective, one believes in a totally flexible constraint. Allah the Al Mighty, creator of the afore-mentioned natural rules is always willing to relax such rules and constraints for those who show true belief and fear of Him the Al Mighty, as He promisees them in Quraan saying:

{وَلَوْ أَنَّ أَهْلَ الْقُرَى ءَامَنُوا وَاتَّقَوْا لَفَتَحْنَا عَلَيْهِمْ بَرَكَاتٍ مِنَ السَّمَاءِ وَالأَرْضِ وَلَكِنْ كَذَّبُوا فَأَخَذْنَاهُمْ بِمَا كَانُوا يَكْسِبُونَ}(*)

"If the people of the towns had but believed and feared Allah, We should indeed have opened out to them (all Kinds of) blessings from heaven and earth but they rejected (the truth), and We brought them to book for their misdeeds"

(AI-A'raf, verse 96)

This is the spiritual dimension which was overlooked by non-Muslim scholars of population and development. Therefore, an appropriate Islamic approach to this issue is perhaps to examine the scientific factors which determine resource productivity.

(*) سورة الأعراف : الآية ٩٦

In the conventional economic theory, productivity is said to be improved whenever greater output is realized form the same amount of resources. This type of productivity depends entirely on the level of technology and know-how, that is:

$$P = P(T) \quad P_1 > 0 \qquad (4-1)$$

Where P represents productivity and T is the level of technology. Productivity here is positively related to the level of technology. The relationship is obviously a merely materialistic one, in which productivity relies totally on the success man may attain in utilizing available resources within the domain of natural laws controlling the existing system of biological, physiological, ecological and meteorological conditions. From an Islamic perspective, however, this materialistic formulation suffers the major drawback of not being able to reflect changes in the domain of natural laws according to the will of Allah, the creator. In fact, man is merely a particle in a magnificent mechanism that Allah has created and controlled every part in it. Man just provides the causes, but everything thereafter is accomplished within the mechanism in accordance to

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Allah's will. A man and his wife, a farmer and his land, and even the clouds in the sky, all can create nothing on their own, they just provide causes for some sophisticated and totally divinely controlled process to be accomplished. In this regard, Allah says in the Holy Quraan:

{أَفَرَأَيْتُمْ مَا تُمْنُونَ ۞ أَأَنْتُمْ تَخْلُقُونَهُ أَمْ نَحْنُ الْخَالِقُونَ ۞ نَحْنُ قَدَّرْنَا بَيْنَكُمُ الْمَوْتَ وَمَا نَحْنُ بِمَسْبُوقِينَ ۞ عَلَى أَنْ نُبَدِّلَ أَمْثَالَكُمْ وَنُنْشِئَكُمْ فِي مَا لا تَعْلَمُونَ ۞ وَلَقَدْ عَلِمْتُمُ النَّشْأَةَ الْأُولَى فَلَوْلا تَذَكَّرُونَ ۞ أَفَرَأَيْتُمْ مَا تَحْرُثُونَ ۞ أَأَنْتُمْ تَزْرَعُونَهُ أَمْ نَحْنُ الزَّارِعُونَ ۞ لَوْ نَشَاءُ لَجَعَلْنَاهُ حُطَامًا فَظَلْتُمْ تَفَكَّهُونَ ۞ إِنَّا لَمُغْرَمُونَ ۞ بَلْ نَحْنُ مَحْرُومُونَ ۞ أَفَرَأَيْتُمُ الْمَاءَ الَّذِي تَشْرَبُونَ ۞ أَأَنْتُمْ أَنْزَلْتُمُوهُ مِنَ الْمُزْنِ أَمْ نَحْنُ الْمُنْزِلُونَ ۞ لَوْ نَشَاءُ جَعَلْنَاهُ أُجَاجًا فَلَوْلا تَشْكُرُونَ}(*)

"Do ye then see? The (human seed) that ye emit" (v.58) *"Is it ye who create it. or are we the Creators?"(v.59) "See ye the seed that ye sow in the ground?" (v.63) "is it ye that   cause it to grow. or are We the cause" (v.64) "Were it Our Will, We could make it broke orts and ye would be left in wonderment"* (v.65) *" (Saying), We are indeed left with debts (for nothing)"(v.66) "Indeed We are deprived" (v.67) " See ye the water which ye drink?" (v.68) "Do ye bring it down (In rain) from the cloud or do We?" (v.69) "Were it our Will, We could make it saltish (and*

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(*) سورة الواقعة : الآيات ٥٨ ـ ٧٠

unpalatable) then why do ye not give hanks?" (v. 70).

With regards to the above-mentioned discussion.

Muslims ought to redefine productivity in a way that maintains consistency between science and their Holy Islamic beliefs. Thus, productivity may be redefined as a function of technical progress and whatever blessings Allah may bestow on the actions of his believers. In mathematical form then:

$$p' = P'(T,B) \quad P'_1 > 0 \quad P'_2 > 0 \qquad (4\text{-}2)$$

Where; P' is productivity Islamicly defined, T is technical progress, and B is blessings. The relationship between resource productivity and each of T and B is positive. In other words, an Islamic society which attains all possible technical means and which observes and fears Allah in all aspects of life, may receive blessings from Allah that raise resource productivity to unprecedented levels.

The effect of blessing may be measured mathematically by the difference between productivity changes in Muslim

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and non-Muslim societies. By taking the total derivative of equation (4-1) of resource productivity in a non-Muslim society we get:

$$dP' = \frac{\partial P}{\partial T} dT *$$

(4-3)

and by totally differentiating equation (4-2) of resource productivity in a Muslim society we get:

$$dP' = \frac{\partial P'}{\partial T} * dT + \frac{\partial P'}{\partial B} * dB$$

(4-4)

For two societies of the same level of technology (P/T=P'/T), resource productivity may be greater in the Muslim society by a positive amount equal to the difference between (4-4) & (4-3) P/B * dB, or the change in productivity due to Allah blessings.

In light of the above discussion, the previously mentioned Cobb-Douglas production function may now be rewritten in a revised form that reflects the Islamic dimension as:

$$Y = e^{(T+B)t} * K^z * L^{(1-z)}$$

(4-5)

Where $e^{(T+B)t}$, the new term in the function, is nothing but the familiar shifter of the Neoclassical Model revised in

such a way so as to react not only to technical progress (T) but also to blessings from Allah. In logarithmic form (4-5) may be written as:

(4-6) $d\ln Y = (T + B) + z\, d\ln K + (1 - z)\, d\ln L$

(4-7) $rY = (T + B) + zrK + (1 - z)rL$ or

In the long-run when the economy grows along a steady state growth path, the growth rate of output approaches the growth rate of capital and (4-6) may be written as:

(4-8) $rY = rL + \dfrac{(T + B)}{(1 - z)}$

Therefore, in a non-Muslim society where B = 0, i.e., receiving no blessing at all, in such a case, per capita income can only be improved through a sustained technical progress over time. In the absence of any technical progress population growth will lead to an equal growth in output with no improvement in per capita income, as indicated above.

By contrast, in a Muslim society economic development expressed as an improvement in per capita real income, besides being an outcome of man's efforts in attaining technical progress, is primarily associated with

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and conditioned upon the blessing Allah the AI Mighty may
bestows upon his believers.

In such blessed societies. population growth would
then stimulate growth of output at an even faster rate, the
difference being equal to $(T + B)/(1 - z)$ which is a positive
amount.

So far, the idea as presented is quite simple and
acceptable, however, it is essential at this stage to develop
some theoretical relationship between population and other
newly introduced variables in the model. As a starting
point, blessings are related positively to both faith and
fearness of Allah and the population size, or:

$$(4\text{-}9) \qquad B_1 > 0, B_2 > 0 \quad B = B(F,N)$$

Where B is the amount of blessings, F is faith and fear
of Allah and N is the size of population. The first
derivative of B with respect to F is expected to be positive
in accordance with the above-mentioned verse 96 of AL-
Aaraf sura. B. is also expected to be positively related to N,
i.e., blessings are bestowed in proportion to the size of the
population, as Allah says:

{مَنْ عَمِلَ صَالِحًا مِنْ ذَكَرٍ أَوْ أُنْثَى وَهُوَ مُؤْمِنٌ فَلَنُحْيِيَنَّهُ حَيَاةً طَيِّبَةً وَلَنَجْزِيَنَّهُمْ أَجْرَهُمْ بِأَحْسَنِ مَا كَانُوا يَعْمَلُونَ}(*)

(*) سورة النحل : الآية ٩٧.

*"Wlhoever works righteousness, man or woman,
and has Faith, verily to him will We give a life
that is good and pure, and We will bestow on
such their reward according to the best of thier
actions"* (An-Nahl, verse 97)

One may deduce from this verse, Allah's blessings are conferred on people each according to his own deeds, implying that under certain levels of faith, the larger the size of the society the greater are the blessings it may receive. Given this Islamic theoretical setting, we may turn now to its practical implications. Using the Neoclassical Growth Model with the Cobb-Douglas production in its revised form (equation 4-5), and by taking the derivative of rY in equation (4-8) with respect to rL (the same as rN the population growth rate) we get:

$$(4\text{-}10) \qquad \frac{\partial Ry}{\partial Rl} = 1 + \frac{(T+B)}{(1-z)} * \frac{\partial B}{\partial rL}$$

Since $(T+B) > 0, z < 1$, and $\frac{\partial B}{\partial L} > 0$ then the left hand side of (4-10) is greater than one, which means that an increase in the growth rate of population would lead to a greater increase in the growth rate of output, i.e., rY will always be ahead of rL. In other words, Allah has

guaranteed societies of good believers an ever growing per capita real income, and a sustained economic development regardless of its rate of population growth.

In conclusion, one may say that Islam does not encourage people to take a passive attitude toward the issue of population growth and economic development. Instead, Islam urges Muslim societies to strive at making an efficient use of their endowed resources by acquiring the most developed science and technology base. Meanwhile, Muslim societies are urged to maintain their eligibility for Allah's blessings through a steady faith, fear of Allah and a true repentance to Allah.