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RESEARCH

AN ANALYSIS OF POPULATION PROBLEMS

AS THEY AFFECT ECONOMIC GROWTH IN

SELECTED LATIN AMERICAN COUNTRIES

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Gerald B. Griffin

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by

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Leiutenant, United States Navy

Submitted in parital fulfillment of
the requirements for the degree of

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This work is accepted as fulfilling

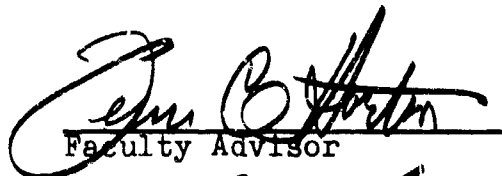the research paper requirements for the degree of

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ABSTRACT

In an era of unprecedented population expansion,
economically underdeveloped countries have the seemingly
insuperable task of raising their standard of living
while trying to stay abreast of astonishing increases in
population. Simply stated, the problem of economic de-
velopment in these countries is to increase production
at a rate in excess of man's reproduction.

This study was made to learn in what manner the
demographic variables of total population size, rate of
population growth, and composition of the population in-
fluence economic variables, particularly in Latin Amer-
ican areas, where population growth in certain countries
is the highest of the major cultural regions of the world.

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

I.   THE PROBLEM

Since primitive times man has been able to increase
his production of food and other necessities sufficiently
to allow an enormous expansion of his numbers. At times,
production has increased much faster than populations have
grown; in fact, the advance of civilization has depended
upon man's ability to expand production so that an excess
was created beyond that minimum necessary for the mainte-
nance of a growing population. However, it has been only
in certain parts of the earth and during certain periods
of time that production has kept ahead of man's reproduc-
tion and the level of living for people has been raised.[1]

This problem has become especially acute during re-
cent decades. Modern preventive medicines have reduced
the death rates of many parts of the world while high
rates of birth have continued. Economically underdevelop-
ed countries have the seemingly insuperable economic task
of raising their standard of living while trying to stay
abreast the astounding increases in population. Simply
stated, the problem of economic development in these coun-

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[1]United Nations, The Determinants and Consequences
of Population Trends, Population Studies, No. 17 (New
York: United Nations, 1963), p. 181.

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tries is to increase production at a rate in excess of the rate of population growth.

Observers are often impressed with the fact that certain countries in Latin America have the highest rates of population increases of the major cultural areas of the world.[2] At the same time, these countries are faced with the fact that most of their peoples live in conditions of abject poverty.

This study, using conventional economic concepts, will seek to discover, first, if any meaningful correlation between recent series of demographic statistics and recent series of economic statistics can be established for selected countries in Latin America. Secondly, influences of population variables on economic variables in general will be investigated. Thirdly, using a bisectoral economic development or growth model constructed by W. A. Lewis, an attempt will be made to predict if these countries will reach a state of economic development where they are self-sustaining and from which rapid

[2] "Facts and Figures," Americas, XVI (July, 1964), p. 46. The rate of natural increase in many countries in Latin America is nearly thirty per thousand, a rate which if maintained would double the population in less than twenty years.

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progress is possible.[3]

The demographic variables to be investigated are:
(1) total population; (2) rate of population growth; and
(3) composition of the population. These variables are
those often cited as exerting the most influence on eco-
nomic variables.[4]

Theoretical background: Population theory crosses
the lines of many disciplines including geography, soci-
ology, anthropology, economic, ecology, even genetics and
medicine which have investigated methods of birth control
and developed many preventive medicines.

Economists are concerned with population factors as
they affect the ability of the economic system of a coun-
try to satisfy human wants. The number of people to be
supplied directly conditions the success of an economic
system to produce the goods and services necessary. One
of the essential factors of production is labor which is
directly influenced by population factors. Not only are
the numbers of the labor force important, but also their

[3]See page ▓▓, for a more detailed ▓▓▓▓▓▓▓▓.

[4]A. J. Coale and E. M. Hoover, Population Growth
and Economic Development in Low-Income Countries (Prince
ton New Jersey: Princeton University Press, 1958), p. 18;
P. M. Hauser and O. T. Duncan, The Study of Population An
Inventory and Appraisal (Chicago: The University of Chicago
Press 1950), p. 804.

age, sex, and the skills they possess; important also is the ratio of other factors of production available for combining with the labor force.

Economist's interest in the role of population grew greatly as a result of the publication of Malthus' Essay On Population at the end of the eighteenth century.[5] This essay aroused a storm of controversy that still continues, and made the need for adequate empirical information apparent, if theories were to be tested.

During much of the twentieth century, economists paid relatively little attention to population phenomena, treating it as only one of many inter-dependent variables which interact within the matrix of variables that comprise an economy.

More recently, economists have renewed their interest in population as a factor important in economic development, particularly in less advance cultures.

Empirical studies of the effect of population variables on economic variables have not been wide-spread, at least in underdeveloped countries for two reasons. First, reliable economic and demographic data from underdeveloped nation has been generally hard to come by. Secondly, population variables are only one of the many at work within

[5]T. H. Malthus, Essay On Population, ed. Gertrude Himmelfarb (New York: The Modern Library, 1960).

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an economy and knowledge of the effects of changes is not well known.

II. DEFINITION OF TERMS USED

Demography. There is no single standard of what demography is even among demographic experts; the definition varies from time to time and place to place. For purposes of this paper, the following definition is given: Demography is the science which deals with the statistics of human population such as size, density, growth, distribution, the changes therein, and the components of such changes.

Gross national product. A term used by the United Nations when speaking of national accounting aggregates which is defined as:

> . . . value of the product before deduction of provisions for consumption of fixed capital, attributable to the factors of production supplied by normal residents of the given country. It is identically equal to the sum of consumption expenditures and gross domestic capital formation, private and public, and the net export of goods and services plus the net factor incomes received from abroad.[6]

National income. As defined by the United Nations,

[6]United Nations, Yearbook of National Account Statistics 1963 (New York: United Nations, 1964), p. xl.

5

"National income is the sum of incomes accuring to factors of production supplied by normal residents of a given country before deduction of direct taxes."[7]

Population. Population as a concept refers to the actual aggregations of humans, and is a far wider concept than demography. Population studies are concerned not only with population variables, but also with the relationships between population changes and other variables -- social, political, economic, biological, genetic and so on.

Underdeveloped country. This term is used by the United Nations to replace "backward country", or one whose economy is not well advanced, who lacks sufficient industrailization, market structure and economic institutions to provide an adequate standard of living for its people.

[7]Ibid.

CHAPTER II

REVIEW OF THE LITERATURE

Standards of selection. Because population theory
touches or overlaps many disciplines, any effort to re-
view completely all literature bearing on population prob-
lems would be a staggering task. In order to reduce the
task to managable proportions, review was limited largely
to the literature of demography and that area of economics
concerned with problems caused by population growth. The
portion of economics which is concerned with economic pro-
blems in underdeveloped countries and particularly the
problems of economic growth in these countries received
stress.

One further standard of selection was necessary in
order to limit the literature reviewed to acceptable a-
mounts. With one or two exceptions made necessary by their
extreme importance to the subject, only that written within
the last twenty years was included.

The sources searched. The sources were limited to
those found in the library at the United States Naval Post-
graduate School, Monterey, California. Information from
various United Nations publications and the American Eco-
nomic Review were particularly useful.

General statement. The points of convergence be-
tween economics and demography may be indicated in terms of
demographic variables, changes in which may affect econom-
ic variables. It is ▓▓▓▓▓▓ (1) that the two sets of
variables may be complexly interrelated; (2) that the re-
lation between economic and demographic variables may be
▓▓▓▓▓ by the presence or absence of other non-identi-
fied variables: (3) that short-run effects of demographic
or economic change may differ from long-run effects; and
(4) while it may not be difficult to determine the direc-
tion of economic effect accompanying some change in popu-
lation, it frequently is not easy to determine the magni-
tude of such an effect.[1] These problems are listed to
indicate that study of relationships between these two
subjects is not an easy task. One further difficulty
which should be mentioned is that empirical information
concerning the impact of demographic change upon economic
change is not plentiful. There is, of course, consider-
able information on wage and income movements and struc-
tures, levels of employment, variation in savings and
investment, but this data does not readily permit
analysis of population effects on economic change. Ac-

[1]Douglas S. Paauw, "Some Frontiers of Empirical
Research in Economic Development," Economic Development
and Cultural Change, IX (January, 1961), pp. 180-190.

quiring either economic or demographic data for use in the
study of many underdeveloped countries is especially dif-
ficult because facilities generally do not exist (or have
existed for a short time only) for collection of such in-
formation.

While theoretically many demographic variables are
viewed as exerting an influence on economic variables,
empirical studies in specific areas of the world have been
forced to greatly simplify the number of variables both
demographic and economic that can be used.[2]

The three demographic variables generally studied
are total population, rate of population growth, and com-
position of population.[3]

Total population. Many economists and demogra-
phers subscribe to the theory of optimum population which
holds that for a given country and under given conditions,
a certain size total population enables the greatest per
capita income possible to be realized. The relationship
that is said to exist between total population and per
capita income can be shown graphically as in Figure 1.

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[2]Ibid.

[3]A. J. Coale and E. M. Hoover, Population Growth
and Economic Development in Low-Income Countries (Prince-
ton, New Jersey; Princeton University Press, 1958), p. 18.

The horizontal axis measures population (P), while the
vertical relates to average income (Y). The curve YP
depicts the dependence of the economic variable, income,
on the demographic variable, population. Point P_1, at
which per capita income is maximum represents the opti-
mum population. Population beyond P_1 indicates over-
crowded conditions; at values smaller that P_1, the eco-
nomy is said to be under-populated.
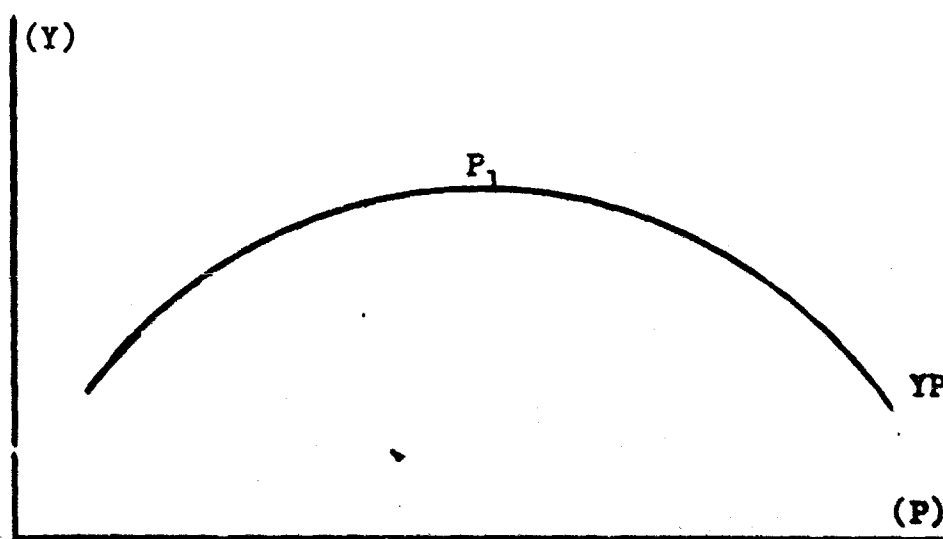
FIGURE 1

RELATIONSHIP OF INCOME TO POPULATION

Population size is thought to influence economic variables through the returns to scale principle.[5] Speaking on economies of scale, United Nations writers have said,

> The improvements in economic organization to which an increase in the size or density of population may lead are of two types: (a) extension of the division of labour, and (b) adoption of more efficient scales of production. Each of these influences result in economies of production, and hence increases output per unit of cost.[6]

A few paragraphs later is stated,

> The size and density of population necessary to permit maximum economies of scale must be considered not only with regard to what is needed to provide a sufficiently large market for a single firm or other economic unit, but also with regard to the number of units engaged in each type of economic activity and their interrelations with one another.[7]

To the left of point P_1 on the YP curve in Figure 2, economies of scale serve to increase per capita income as population increases. To the right of this point diseconomies of scale come into operation.

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[5] Many writers in discussing the effects of total population on the economy speak not only of the economies of scale, but also of diminishing returns at the same time. Since by definition both do not occur together, it is assumed that diseconomies of scale are meant rather than diminishing returns.

[6] United Nations, The Determainants and Consequences of Population Trends, p. 229.

[7] Ibid., p. 230.

Quoting from United Nations writers again,

> The productivity of human labour depends, other
> conditions being given, upon the amount of resources
> in use at its disposal. More specifically, physical
> output per worker per time period in any employment
> is governed mainly by the amount of resources and
> equipment used. Consequently, if all things remain-
> ed equal, the growth of population and the labour
> force would tend to reduce per capita output by re-
> ducing the amount of resources and equipment per
> worker involved in production. This principle is the
> main foundation of the thesis which has been express-
> ed since the days of Malthus and even earlier, that
> population growth tends to reduce the level of liv-
> ing or else check its rise. Its simplest illustra-
> tion is in the so called "law of diminishing returns"
> as applied to agricultural labour and land. Given
> a certain amount of land which can be cultivated and
> assuming the methods and equipment to be constant,
> an increase in the number of units of labour employ-
> ed beyond a certain point brings reduction in the
> product per unit labour.[8]

Spengler writing on the relationships between pop-

ulation and economics said essentially the same,

> Within limits, increase in T /total population7 may
> operate to increase y /per capita income7 (given as
> constants all conditions except those affected by
> increases in T) and thereafter serve to reduce y.
> For up to a point increases in T give rise to im-
> provements in organization and other soucres of in-
> creasing return, and these improvements more than
> offset such adverse effects as eventually accompany
> decreases in the amount of land and other resources
> available per head. Eventually, the decline in l
> /land and other resources per capita7 constitutes
> a drag on the upward movement of y. . . . further
> increases in T operate to make y lower than it other-
> wise would have been, and this tendency is accentu-
> ated when population growth serves to slow down the

---

[8]Ibid., p. 224.

rate at which capital per head is formed . . . .[9]

Critics of this theory have indicated that the optimum population concept, while providing a convenient framework for theorizing, is subject to so many limitations and uncertainties as to be of limited use as an analytic tool. The question of whether a given population is smaller or larger than one yielding maximum per capita income is very difficult to answer in any given situation. The difficulty lies in trying to quantify various indices of over-population or under-population. Examples of indices that have been suggested include: (1) migration; (2) the pattern of consumption; (3) the amount of unemployment; (4) the length of life; (5) the presence or absence of "diminishing returns"; (6) the terms of international trade; (7) the density of population measured in various ways.[10]

While it is true that many countries do not possess adequate land or other natural resources, in general, the factor of production most often leading to eco-

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[9]J. J. Spengler, The Study of Population An Inventory and Appraisal, ed. P. M. Hauser and O. D. Duncan (Chicago: The University of Chicago Press, 1959), p. 805.

[10]United Nations, The Determinents and Consequences of Population Trends, p. 235.

nomic growth problems in Latin America is not land, but limited quantities of capital available relative to the size of the labor force.

Increases in total population may affect the distribution of income. If, in fact, growing population does slow down the rate at which capital per head can be formed and reduces the value of resources available per capita, and labor become more plentiful, compared with other factors, then the rate at which the human agent is productive and renumerated compared with the rate at which capital and land are productive and renumerated, becomes lower. This, of course, will depend on the elasticity of the substitution of labor. Elasticity, in turn, will depend on the technical conditions of productivity, and the substitutability of labor for other factors. The assumption is generally made, however, that labor will comparatively receive less compensation.

Increases in total population may affect the level of employment in a given country if the proportions with which capital and labor can be combined are not sufficiently variable. This condition is likely to occur in underdeveloped countries where technological change and redistribution of workers among employments does not occur

rapidly enough to permit all increases in the labor force
to be combined properly, if at all, with other productive
factors.[11]

It is possible that increase in total population will
cause an increase in consumption at the expense of saving,
if per capita income falls. The ratio of savings to
national income would therefore decline. Composition of
consumption could also be expected to change in this case
as shifts were made to cheaper commodities and inferior
goods.

Rate of population growth. The second factor that
must be considered in analyzing the effects of population
variables on economic variables is rate of population
growth.

The most significant feature of population growth
rate is that high rates of growth require higher levels of
needed investment if per capita income is to be maintain-
ed, yet there is nothing about faster growth that gener-
ates a greater supply of investible resources.

All underdeveloped countries lack an adequate supply

[11]Masao Fukuoka, "Full Employment and Constant Co-
effecients of Production," Quarterly Journal of Economics,
LXIX, pp. 23-44.

of equipment and other means of productivity which are
of good quality. This fact coupled with the generally
low productivity of labor and low per capita income makes
it extremely difficult to form capital at a sufficient
rate. Quoting United Nations experts, "It is as if the
hoe were asked to produce enough to feed its owner and
also leave a surplus for purchase of a tractor".[12]

Furthermore, a distinction has been made between
"demographic" investments, which are necessary to support
the growing population, and "economic" investments which
raise the standard of living. It is obvious that the
size of the demographic investment depends directly on
the rate of population increase. In underdeveloped
nations, it is feared by experts that demographic in-
vestments may use up all available capital, thus retard-
ing economic development indefinitely.[13] To provide the
capital for a two and one-half percent annual population
increase, United Nations experts have estimated that up
to twelve and one-half percent of national income is
required for demographic investment if per capita income

[12]United Nation, The Determinants and Consequences
of Population Trends, p. 278.

[13]United N.   , Measures For Economic Development
In Underdeveloped Countries (New York: United Nations,
1951), p. 47.

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is to be maintained, with no rise in standard of living.[14]

Because the typical age structure in underdeveloped countries generally places a heavy burden of dependency on each family, the possibilities of saving are further reduced as the entire income is absorbed.

Efforts are often made to secure foreign capital, but some economists have rejected the idea that foreign loans can compensate fully for major deficiencies in domestic rate of saving for these reasons: (1) a nation can obtain large amounts of capital only if its internal economic conditions are favorably inclined, and such is not likely to be the case when low per capita income is creating social disorganization and political instability. (2) because a complementary relationship exists between different kinds of capital at different stages in a country's development, a nation's internal rate of capital formation determines, in part, the amount of capital from abroad which can economically be absorbed at any one time, even when easy credit terms are to be had; (3) the underdeveloped nation must repay the loan within a reasonable time, out of savings, if it is to avoid excess debt and maintain a good cretit rating.[15]

[14]Ibid.

[15]B. Okum and R. W. Richardson, Studies in Economic Development (New York: Holt, Rinehart and Winston, 1961), p. 258.

Many authorities, therefore, consider the rate of population growth to be the demographic variable most responsible for limiting economic growth in underdeveloped countries.[16]

Composition of population. The third factor which enters into an analysis of the effect of population change on economic variables is composition of the population in age, sex, and qualitatively.

One of the chief obstacles to economic development is the manpower shortage which exists even in the so-called over-populated countries. The reduction of mortality, paricualarly among children, coupled with a persistently high birth rate causes the ratio of persons who are in a dependent status because of their age (either too young, or too old to work) to persons eligible for productive work to be relatively high. In short, economies with high birth rates must "waste" more of their productive substance on non-productive persons than would be required if a lower birth rate existed.

Changes in age composition, other factors being given, are usually associated with changes in per capita

[16]J. J. Spengler, "The Population Obstacle to Human Betterment," American Economic Review, XLI No. 2 (May, 1951) p. 352; S. Enke, Economics For Development (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 370.

income, per capita capital, and savings, each of which
tends to vary positively with the ratio of the labor force
to population.[17]

Qualitative factors of the productive members of
a population also bear on output. Worker's health, for
example, affects directly the number of workers as well
as the capabilities of workers. Poor health is empha-
sized as a major cause of low productivity of a labor
force, particularly in underdeveloped countries.[18]

Lack of vocational skills and aptitudes contributes
to low productivity. This becomes most apparent as work-
ers move from rural, agricultural vocations to jobs em-
ploying new equipments and methods. In the long run, the
development of a well qualified labor force requires a
certain minimum of fundamental education for the mass
population as well as institutions for higher learning
and for research.

Population composition by sex is important in the
short run as the numbers of productive members of a pop-
ulation are influenced. Female members generally are
considered to be not as economically productive as male
members. However, since major divergencies from the nor-

[17]A. Berman, "Economic Implications
lation," American Economic Review, XLIV, pp. 54-79.

[18]United Nations, The Determinants and Consequences
of Population Trends, p. 266.

mal sex composition of a population are transitory, in the long run, sex composition is not economically important.

Bi〄〄〄〄 model. Population theory as it affects economic growth is only one part of the overall theory needed to build a useful economic model. Other factors requiring consideration in constructing a satisfactory growth or development model include the state of the technology, accumulation of capital, dualism of the economy, consumption, foreign trade, and government developmental plans, among others.[19] Of the factors listed, population growth, capital accumulation, and technology are viewed by many economists as being of major importance and hence are intensively studied.

Lack of an adequate supply of capital equipment and other means of production are characteristic of all underdeveloped countries.[20] Yet, capital is urgently needed to combine with other productive factors if output per capita is to be increased. Technological aspects are important in that they permit vast increases in output per capita and have been responsible for much of

[19]〄〄〄, 〄〄 〄〄., pp. 187-188.

[20]Ibid., p. 168.

man's economic development, particularly in recent cen-
turies.

As the result of renewed interest in economic
development theory, economists have attempted for at least
a decade and a half to formulate a satisfactory growth
model which when applied to underdeveloped economies
would permit useful decisions as to needs and subsequent
allocations of capital investments.[21]

Although criticized by some, the work of W. Arthur
Lewis is said by many economists to hold promise in pro-
viding a more satisfactory, more useful model for under-
developed countries.[22]

Lewis argues that the problem of capital accumula-
tion in economically backward countries is further compli-
cated by the existence of two economic sectors.

The subsistence sector which is largely agricul-
tural in nature is one in which output is shared by each
family among its members. The "wage" in this sector is
sometimes said to be average product and sometimes viewed
as output per head. In either case, it is extremely low --
at the subsistence level -- because labor has very little
capital investment to assist productivity. Saving, of
course, is negligible.

[21]G. Ranis, "The Population Problem," American Eco-
nomic Review, LIII No. 2 (May, 1963), p. 622.

[22]W. A. Lewis, "Development With Unlimited Supplies
of Labour," T. Manchester School, 1954.

In the adjoining capitalistic sector, usually in-
dustrial in nature although commercial agriculture may be
included, there is enough investment from either savings
or foreign loans to give each member a minimum invest-
ment which helps him achieve a considerably higher out-
put when compared with the output for workers in the sub-
sistence sector. However, labor in the capitalistic sec-
tor will not receive the wages equal to their marginal
productivity. Instead, all additional output is returned
to the capitalist rather than distributed as wages because
an "unlimited" competitive supply of labor is available
from the subsistence sector to replace the industrial
worker, should he demand higher wages.

This can be seen in Figure 2, page 23, where the
wage rate is shown on the vertical axis and the supply of
labor is depicted on the horizontal axis. The Marginal-
Product-of-Labor-Curve is the demand curve for all em-
ployers. In a market where the supply of labor is fixed,
as at L_1, an employer would pay a wage to all his employees
equal to the marginal-product of the last man hired, re-
taining for himself that quantity of the marginal-product
produced in excess of the wage level by all previously
hired workers. The return to the employer is depicted as
the area beneath the Marginal-Product-of-Labor Curve, but
above the wage level (W_1) that he must pay in order to
attract workers.
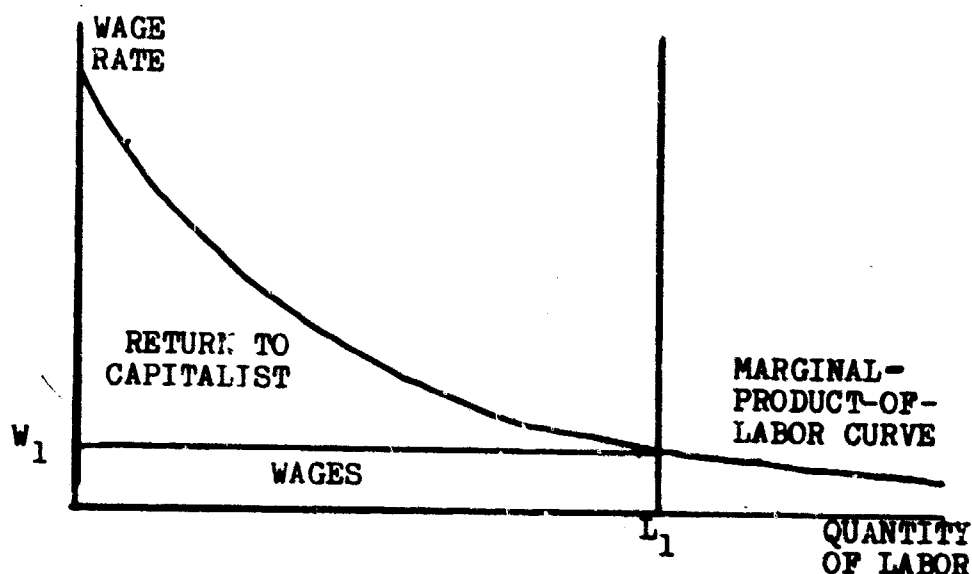
FIGURE 2

MARGINAL-PRODUCT OF LABOR

In the Lewis model, however, the supply of labor is "unlimited", so the employer need only pay a wage high enough above the average "wage" in the subsistence sector to draw workers into the industrial sector, retaining for himself all the productivity of each worker above the wage he must pay. Worker productivity increases in the capitalistic sector because each now has some capital to aid his output. A worker cannot demand wages equal to his marginal-productivity because there is an "inexhaustable" supply of workers waiting to replace him.

The problem seen facing such an economy is that of

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smoothly moving surplus agricultural labor to more productive employment in the industrial sector.

The foregoing describes what is called the first phase of a country's development which will continue as long as incomes in the agricultural sector remain at the subsistence level. Capital and technology become important as twin forces which determine the rate of labor reallocation from the subsistence sector to the capitalistic sector. Population growth, on the other hand, continiously adds to the pool of labor that must be absorbed.

Eventually, if an economy can obtain more and more capital, the surplus of labor may be transferred to the industrial sector and the subsistence sector will no longer exist. Graphically, this can be shown as in Figure 3, on page 25, where labor (L) is shown on the horizontal axis and capital (K) on the vertical axis. The first state of economic development as described above is shown as the economy moves from point A to point B. The isoquants refer to output in the capitalistic sector, while L_1 is the limit of labor available. Factor prices are constant, as are the capital/labor ratios. Wages during this stage are determined for the whole economy by the average product of labor in the subsistence sector, and not by the marginal labor productivity in the capitalistic sector. Eventually, if the economy can obtain more and
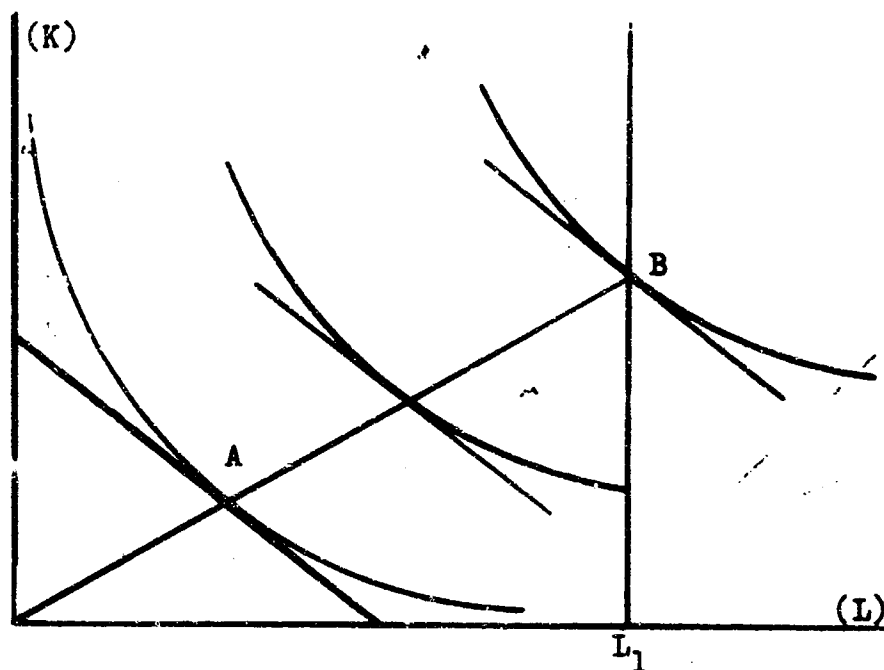
FIGURE 3

ECONOMIC GROWTH IN THE BISECTOR MODEL

more capital, it will reach point B. The labor supply
then becomes virtually inelastic and wages must be based
on the marginal productivity of labor in the capitalistic
sector. The economy will then have reached the self-
sustaining stage, capable of making rapid economic growth.

In the Lewis model, capital accumulation and the
state of technology determine the rate at which to be
be transferred to the industrial sector. If population
growth adds additional labor faster than capital and inno-
vation permit its absorption, economic progress will be

limited.

The problem of acquiring more and more capital in order to move labor from the subsistence sector is complicated in underdeveloped countries by several factors, among which are: (1) entrepreneurs are typically poorly educated in any except local business practices and have neither the knowledge nor the inclination to expand beyond the point where they are capable of hiring more than a handful of workers; (2) while it is true that in all backward countries there are a few extremely wealthy families engaged in major enterprises, they often prefer investments where a quick profit can be taken before the government can impose tax burdens, becoming in effect an unwelcome partner sharing the profits, but not the risk. Businesses with considerable fixed assets are often subject to heavy licenses, pressure to financially support the political party in power, extensive governmental control, and so on. Investors capable of making long term investments are therefore reluctant to undertake them; (3) there is a greater tendency for the establishment of service concerns rather than more productive enterprises such as manufacturing. Not only is potential productivity reduced when this is done, but growth becomes seriously unbalanced; (4) underdeveloped countries erect nationalistic barriers to importing capital on terms that would

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be acceptable to investors.

Samuelson aptly stated the problem of capital short-

ages in underdeveloped countries when he said,

> The fingers and brains of men in the underdeveloped
> countries are much like the fingers and brains of
> their more prosperous brethren; but men in advanced
> nations work with a plentiful supply of capital goods
> built up over the years. /Italics not in the orig-
> inal/ To pile up net capital formation requires
> . . . a sacrifice of current consumption. But there's
> the rub: underdeveloped countries are already to poor
> as to be near the minimum of subsistence; they feel
> that they cannot -- in fact, they do not -- save a
> very large share of their current national incomes.[23]

The criterion of success in the development efforts

of an economy may be stated as the rate of industrial ab-

sorption in excess of the rate of population growth. In

order to make an empirical test of this model, Ranis and

Fei compared the rate of population growth for the indus-

trail labor force with the overall rate of population

growth for Japan over a time series from 1888 to 1930.[24]

The results of their study indicated that the labor force

in the industrial sector had grown at a faster rate than

population growth over a period of many years. They

concluded that the subsistence sector no longer existed,

thus permitting rapid economic development.

[23]P. A. Samuelson, Economics An Introductory Anal-
ysis (New York: McGraw-Hill Book Co., 1964), p. 768.

[24]G. Ranis and J. C. H. Fei, "Innovation, Capital
Accumulation and Economic De elopment," American Economic
Review, LIII (June, 1963), p 631.

CHAPTER III

THE STUDY

The study, first, was an effort to learn what meaningful relationships could be established between economic variables and population variables using statistical data, principally obtained from United Nations publications. Secondly, probably the more important part of the study was concerned with comparing the rate of industrial absorption of the labor force to population growth for each country studied.

Basis of selection of countries. Countries in Latin America differ in many ways, with some being vastly large in geographical size, some quite small. The current state of economic development differs widely, the size of population, the ethnic backgrounds also vary radically.

The primary consideration in making selections was the availability of economic data. While population statistics are commonly available, many countries do not accumulate sufficient economic data to permit empirical studies.

Some effort was made to select a variety in terms of geogrpahical size, population totals, and state

of economic development. Table I is given to indicate some of the characteristics of each country. It should be noted that the property common to each country is the rate of population increase, exceeding two percent per year in each case.

TABLE I

SELECTED CHARACTERISTS OF COUNTRIES STUDIED

	Chile	Ecuador	Honduras	Paraguay
Geographical Area*	286.4	104.5	59.2	157.0
Average Annual Rate of Population Growth 1953-62**	2.2%	3.2%	3.0%	2.5%
Total Population 1962 (mid-year)ᵍ	8,029	4,581	1,950	1,863
Per Capita Gross National Product 1962ᵍᵍ	422	188	194	173

*Source: National Geographic Society, National Geographic Atlas of the World:(National Geographic Society, Washington, D. C., 1963). Given in thousands of square miles.
**Source: United Nations, Demographic Yearbook 1963 (United Nations, New York, 1964).
ᵍSource: Ibid. Given in thousands.
ᵍᵍSource: United Nations, Yearbook of National Accounts 1963 (United Nations, New York, 1964).

Relationship between economic and demographic variables. The time period selected for this part of the study ran from 1953 to 1962 for these reasons: (1) the most current information available was desired in order to make the study as meaningful as possible. Figures for 1962 are the latest available; (2) adjustments for inflation would have been very difficult for a longer period; (3) the last decade has been one of extremely rapid population growth and the desire to test this influence on economic progress was paramount.

The first demographic variable investigated was total population. While it is recognized that the determination of an optimal population for a given country is impossible under the current state of economic art, the following tests were made in hopes of realizing some indication, however slight, of the present situation. Total population was correlated with gross national product, consumption, and gross domestic fixed capital formation data from each country.[1] A population density for land now devoted to agriculture, plus land unused but consid-

[1]Computation for all correlations were made using a University of California at Los Angles correlation program -- BIMED 6 -- on a Control Data 1604 Computer located at the United States Naval Postgraduate School, Monterey, California.

ered potentially productive, was computed for the countries under study. Several other countries throughout the world were included for comparison.

In order to study the effects of the population growth rate on per capita income, calculations were first made to determine the actual rate of growth.[2] Yearly per capita gross national product was also computed along with the yearly percentage change in per capita product. The yearly changes were averaged to obtain one growth rate for the ten year period. Modest changes in yearly population growth rates were then introduced through this same series of computations to demonstrate what per capita gross national product might have been, given lower birth rates.

To study changes in age composition, the percentage of population over fifteen years of age, but not yet sixty-five for the 1950 census as compared with like data from the 1960 census to see what shift, if any, in the number of productive persons had taken place. Like

[2]Rate of increase in population was computed using the following formula: $r = (\sqrt[t]{P_1/P_0} - 1) \times 100$, where t = the number of years between P_1 and P_0; P_0 is the population at the start of the period and P_1 is the population at the end of the period. r = rate of population growth. This is the formula used by the United Nations in making population calculations.

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computations were made for other selected countries throughout the world to provide comparisons. Definiton of productive persons as those fifteen years of age or older, but not over sixty-five, was made because United Nations data is arranged in this manner. Unfortunately, year to year data was not available to provide better trend indication.

Using the Lewis criterion of successful economic development efforts -- that of transferring labor from the relatively low productive agricultural sector to more productive employment in the capitalistic sector -- a study was made of Chile using University of Chicago data and also of Honduras employing United Nations data. (Data was not available for Ecuador or Paraguay.) United Nations data is not arranged to show the total number of industrially employed, but rat'..e shows the number employed in the specific categories of mining, manufacturing, construction, and power production. These were added to obtain totals, then arranged as percentages of the total economically active population. Data from the University of Chicago was arranged to indicate the number employed in the same general categories listed above, also as percentages of the total economically active population.

CHAPTER IV

RESULTS AND CONCLUSIONS

Throughout this chapter the results obtained from the study of empirical data for the countries of Chile, Ecuador, Honduras, and Paraguay will be listed. Whenever possible, evaluations will then be made

Total population. Table II, on page 34, gives the results of correlations where the level of significance was .05 or less.[1] The majority of correlation results obtained had to be rejected because the level of significance was so high as to warrant no confidence in them. These spaces have been left blank in Table II.

For Chile, Ecuador, and Honduras, it appears that gross national product and consumption have been significantly related to population. Two facts should be noted: (1) Paraguay, for whom the level of significance on all correlations was so high as to warrant rejection had the lowest gross national product per capita (express in U. S. dollars) of the four countries; (2) Ecuador was the only country exhibiting a high correlation between population trends and capital formation trends. Whether a definite

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[1] Appendix A contains the correlation formula used as well as graphical plots of data for Honduras. The data used in the correlations for each country is also given.

TABLE II

CORRLEATIONS BETWEEN DEMOGRAPHIC
AND ECONOMIC DATA

Variables Correlated	Chile	Ecuador	Honduras	Paraguay
Population on Gross National Product	.93	1.00	.97	
Population on Consumption	.94	.99	.91	
Population on Capital Formation		.93		
Yearly Population Growth on Capital Formation				
Yearly Population Growth on Gross National Product				

cause and effect relationship between demographic and
economic variables can be established for the results
seen seems doubtful, however.

Table III, on page 36, supplies the population
density data of land used for agriculture, plus land pres-
ently unused but considered potentially productive. Al-
though the population density for these countries is not
as high as that in parts of Asia, it is high relative to
many developed nations. Fast rates of population growth
coupled with primary dependence on an agricultural eco-
nomy indicates serious problems could be expected.

While the foregoing study was conducted to deter-
mine the influence of total population on economic var-
iables, it appears that economic variables might them-
selves exert considerable influence not only on total
population, but on other demographic variables as well if
the matrix of variables with their complex inter-depend-
encies could be sorted out.

Rate of population growth. Tables IV, V, VI, and
VII, on page 37 through 40, have been constructed to
indicate the actual population growth rate for each coun-
try as well as the per capita gross national product per
capita for each year during the period of the study. As

TABLE III

AGRICULTURAL LAND USED OR POTENTIALLY PRODUCTIVE
(Millions of Acres)

Country	In Use (arable plus pasture)	Unused but potentially productive	Total	Population per acre
Chile	31.1	0	31.1	.26
Ecuador	1.9	0	1.9	.97
Honduras	7.7	13.1	20.8	.59
Paraguay	3.8	0	3.8	.49
United States	1116.9	45.0	1161.9	.16
India	305.9	41.	306.0	1.50
Japan	16.0	0	16.0	6.00
Mexico	271.8	24.7	295.8	.12

Sources: W. S. Woytinsky and E. S. Woytinsky, World Population and Production (New York: The Twentieth Century Fund, 1953), pp. 472-493; United Nations, Demographic Yearbook 1963 (United Nations, New York, 1964)

TABL IV

EFFECTS OF LOWER POPULATION GROWTH RATES ON
PER CAPITA GROSS NATIONAL PRODUCT IN CHILE

	With Actual Growth Rate			With Constant 2% Growth			With Constant 1.75% Growth		
Year	Actual Population**	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP
1952	6.295	526	2.07%	6.295	526		6.295	626	
1953	6.437	535	2.39	6.420	639	2.07%	6.405	640	2.24%
1954	6.597	552	4.15	6.548	657	2.82	6.517	655	2.34
1955	6.761	554	0.30	6.676	657	1.52	6.631	671	2.44
1956	6.944	601	-8.21	6.809	509	-9.52	6.747	614	-9.29
1957	7.121	583	3.66	6.945	637	4.59	6.865	645	5.05
1958	7.303	610	-2.13	7.094	557	3.13	6.985	555	3.25
1959	7.477	633	3.77	7.225	543	-1.39	7.102	659	-1.01
1960	7.637	609	-0.54	7.371	548	0	7.299	655	-0.61
1961	7.825	543	2.22	7.519	558	3.09	7.427	676	3.21
1962	8.009	572	4.51	7.668	701	4.94	7.557	711	5.18
Average		638.5	0.46%		64.7	1.16%		661.8	1.33%

* Figures given in millions.
** Figures given in Escudos.

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TABLE V

EFFECT OF LOWER POPULATION GROWTH RATES ON PER CAPITA GROSS NATIONAL PRODUCT IN ECUADOR

Year	With Actual Growth Rate			With Constant 2% Growth			With Constant 1.75% Growth		
	Actual Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP
1952	3.350	2336		3.350	2336		3.350	2336	
1953	3.464	2376	1.71%	3.417	2409	3.12%	3.409	2414	3.33%
1954	3.567	2505	5.47	3.485	2565	6.47	3.467	2573	6.79
1955	3.691	2483	-0.92	3.555	2578	0.50	3.526	2599	0.91
1956	3.800	2485	0.08	3.624	2553	0.97	3.588	2596	0.50
1957	3.929	2532	1.99	3.529	2689	5.32	3.451	2725	5.37
1958	4.049	2531	0.03	3.773	2716	1.00	3.715	2758	1.21
1959	4.181	2565	1.34	3.848	2787	2.61	3.780	2837	2.85
1960	4.317	2637	2.80	3.925	2900	4.05	3.846	2960	4.33
1961	4.455	2550	-3.41	4.004	2917	0.59	3.913	2984	0.81
1962	4.581	2541	3.56	4.084	2962	1.54	3.981	3039	1.84
Average		2764.2	1.26%		2941.2	2.52%		3081.6	2.80%

* Figures given in millions.
** Figures given in Sucres.

TABLE VI

EFFECTS OF LOWER POPULATION GROWTH RATES ON PER CAPITA GROSS NATIONAL PRODUCT IN HONDURAS

Year	With Actual Growth Rate			With Constant 2% Growth			With Constant 1.75% Growth		
	Actual Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP
1952	1.452	300		1.452	300		1.452	300	
1953	1.495	310	3.33%	1.481	313	4.33%	1.477	314	4.67%
1954	1.540	282	-9.92	1.511	288	-8.68	1.503	289	-8.65
1955	1.586	284	0.70	1.541	293	1.74	1.529	295	2.72
1956	1.633	302	6.53	1.572	313	6.58	1.566	317	7.46
1957	1.682	253	-19.36	1.603	328	4.79	1.583	332	4.73
1958	1.733	311	12.29	1.635	329	0.30	1.611	334	0.60
1959	1.785	314	0.96	1.668	336	2.22	1.639	342	2.39
1960	1.858	510	-1.29	1.701	335	-0.30	1.668	342	0
1961	1.893	512	0.64	1.735	345	2.99	1.697	348	1.76
1962	1.950	321	2.88	1.770	354	2.61	1.726	363	4.31
Average		299.9	0.34%		323.4	1.68%		327.6	2.01%

* Figures given in millions.
** Figures given in Lempiras.

TABLE VII

EFFECTS OF LOWER POPULATION GROWTH RATES ON PER CAPITA GROSS NATIONAL PRODUCT IN PARAGUAY

Year	With Actual Growth Rate			With Constant 2% Growth			With Constant 1.75% Growth		
	Actual Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP	Adjusted Total Population*	Per Capita GNP**	Growth in Per Capita GNP
1952	1.462	1025		1.462	1025		1.462	1025	
1953	1.496	1016	-0.88%	1.491	1019	-0.59%	1.488	1021	-0.39%
1954	1.530	1010	-0.59	1.521	1016	-0.30	1.514	1020	0
1955	1.565	1067	5.64	1.551	1077	6.00	1.540	1035	6.27
1956	1.613	927	-9.77	1.582	992	-8.57	1.567	1002	-8.28
1957	1.648	986	1.44	1.614	1007	1.51	1.594	1020	1.80
1958	1.687	995	0.91	1.646	1020	1.29	1.622	1035	1.47
1959	1.728	868	-14.63	1.679	894	-14.09	1.650	910	-15.74
1960	1.768	855	-1.52	1.713	883	-1.25	1.679	900	-1.11
1961	1.812	855	0	1.747	886	0.34	1.708	906	0.67
1962	1.863	848	-0.82	1.782	887	0.11	1.738	909	0.33
Average		947.2	-1.82%		968.1	-1.56%		1083.4	-1.50%

* Figures given in millions.
** Figures given in Guaranies.

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observed in Chapter III, population in each of these countries is considered to be growing extremely rapidly with rates in excess of three percent for Ecuador, and in excess of two percent per year for each of the others.[2] In order to demonstrate the effects of a lower rate of population growth on per capita gross national product, calculations were made for each country using a constant two percent growth and again using a constant one and three-quarters percent growth rate. These results are also given in Tables IV, V, VI, and VII. The advantages of reduced population growth rate can probably best be seen in the example of Ecuador. By reducing population growth rate from an average 3.2 percent to a constant two percent, average per capita gross national product increased from 2764.2 to 2941.2 Sucres, or an increase of 6.4 percent.[3] Similiar increases exist for the other countries. Coale and Hoover have estimated that a fifty percent linear reduction for three decades would provide an income thirty-eight to fifty percent higher than would occur with a

[2]See Table I, page 29.

[3]The calculations are correct if the commonly made assumption is accepted that decrease in population growth rates does not negatively affect gross national product. It should also be noted that this hypothesis is applicable only to underdeveloped countries. The implications of population trends in highly industrialized countries are quite different.

sustained growth rate; in fifty years, they estimate, income would double.[4]

It seems clear that with lower growth rates in population, non-productive investments which must be made to ▓▓▓▓ public facilities to meet the demands of an expanding population could be devoted to productive capitalization and thus raise per capita income even higher. This in turn would probably occasion higher rates of saving and investment.

Of course with a lower rate of population growth fewer dependent, non-productive persons would burden the economy, hence reduction in consumption to the benefit of savings would be realized.

Composition of population. Population by age composition is important in a country as it influences the ratio of dependent persons to productive persons. Hence, study was made of this ratio for each of the four countries. The percentages of each population fifteen years or older, but less than sixty-five was computed for the 1950 census and again for the 1960 census to indicate the trend in each country. As seen in Table VIII, page 43, the ratio has changed adversely

[4]Coale and Hoover, op. cit., p. 334.

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TABLE VIII

NON-PRODUCTIVE POPULATION RATIOS
(In millions)

Country	Total 1950 Population	No. Under 14 plus Over 64	Total 1960 Population	No. Under 14 plus Over 64	1950 Ratio	1960 Ratio
Chile*	5.933	2.209	7.375	2.934	37.9	40.0
Ecuador**	3.202	1.369	4.515	2.037	42.7	45.1
Honduras#	1.358	.556	1.866	.897	40.6	48.0
Paraguay	1.328	.581	1.768	.843	43.7	46.5
United States	150.697	40.483	179.323	55.786	26.8	31.1
India *#	356.799	133.622	438.271	180.070	37.4	41.1
Japan	83.199	31.427	93.347	28.024	37.7	30.0

Source: United Nations, Demographic Yearbook (New York: United Nations)

∮ 1952 vice 1950 census data given.
∮∮ 1962 vice 1960 census data given.
1961 vice 1950 census data given.
* 1951 vice 1950 census data given.

for each of the four countries. The ratio of dependent to productive persons in the Latin American countries shown is substantially higher in some cases than Asian countries and much higher than the ratio in the United States, with no prospects for improvement as long as the rapid rates of population growth continue. It should be noted that the statistics hide the fact that, because many members of the labor force in the United States (and other industrially advanced nations) do not actually enter the labor force until after they are twenty years old, the ratios are not as adverse as they appear on the surface.

Lewis developmental model. Assuming the Lewis developmental model to be correct (an economy in order to progress must shift workers from the relatively unproductive agricultural sector to the industrial sector where each worker has some capital to help him increase his output) study was made of the percentage increases of labor in the non-agricultural sector.

The results for Chile, as seen in Table IX, on page 45, indicate a lack of progress toward getting the industrial worker's wage based upon his marginal productivity.

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TABLE IX

PERCENTAGE OF TOTAL ECONOMICALLY ACTIVE POPULATION
ENGAGED IN NON-AGRICULTURAL ACTIVITY IN CHILE

Year	Percentage
1907	62.3
1920	63.8
1930	65.7
1952	57.8
1957	6.9

Source: M. A. Ballesteros and T. E. Davis, "The Growth of
Output and Employment in Basic Sectors of the Chilean E-
conomy, 1907-1957," Economic Development and Cultural
Change, XI (January, 1963), p. 176.

TABLE X

PERCENTAGE OF TOTAL ECONOMICALLY ACTIVE POPULATION
ENGAGED IN NON-AGRICULTURAL ACTIVITY IN HONDURAS

Year	Percentage
1940	48.6
1950	52.9
1953	51.6
1956	50.1
1960	51.7

Source: United Nations, Demographic Yearbook (United
Nations, New York)

<u>Summary of conclusions</u>. One of the chief diffi-
culties in the study of Latin America is the lack of
reliable data about economic performance, and to a less-
er extent, lack of sufficient population data. While the
tools used in economic analysis are often not as good as
those desired, their usefulness here is impaired by lack
of reliable data.

It appears that no valid conclusion can be reached
as to whether the four countries have yet passed or even
reached their optimum total population. Moreover, it is
felt that certain dangers lie in the employment of com-
parative statics which optimum population theory requires.
In this era of rapid change, technical or other innova-
tion may make today's theoretically optimal population
not optimal tomorrow, or the reverse, and the further
into the future theories project, the greater the risk
of error.

For the reasons indicated above, it is felt that
attempts to determine relationships between demographic
and economic variables through correlation analysis must
proceed carefully if acceptable results are to be a-
chieved. It is quite possible that relationships might
be bi-directional, that economic variables will influence
demographic variables at the same time demographic vari-

e__es are exerting influences, and it may at times be
difficult to establish generally acceptable interpreta-
tion of results through economic theory.

The rate of population growth in much of Latin
America is one which if continued will double the popula-
tion every thirty years. This fact places great strain on
the economic systems of these countries as they struggle
to improve or even maintain their per capita incomes, which
are already so low as to result in widespread poverty.

If the assumption is accepted that negative effects
on gross national product do not occur with reductions in
population growth rates, it has been seen that modest re-
ductions in growth rate can directly affect per capita
income substantially.

High rates of population growth also affect the
age composition of the population. Greater numbers are
added to the body of unproductive workers which adversely
affects the ratio of productive to non-productive persons.
In this respect, the ratios in Latin America are trending
adversely at present while the prospect of improvement
appears hopeless with the continuing high rate of births.

The results seen from application of the Lewis model
indicate lack of progress in moving the labor force from
agriculture to more productive employment.

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APPENDIX A

CORRELATION APPENDIX

As stated in footnote 1, on page 30, all correlations were made using a University of California at Los Angles correlation program -- BIMED 6 -- on a Control Data 1604 Computer. The mathematical formula used in this program is given as:

$$r_{ij} = \frac{\sum (x_i - \bar{x}_i)(x_j - \bar{x}_j)}{\sqrt{\sum (x_i - \bar{x}_i)^2} \sqrt{\sum (x_j - \bar{x}_j)^2}}$$

where r_{ij} is the correlation coefficient.

Tests of significance were then made using t values (also supplied by the same program) which had been computed using "Student's" t distribution. Levels of significance were determined by entering a table of Percentile Values of "Student's" t distribution.[1]

Figures 4 and 5, on pages 51, and 52, are plots of the data correlated for the country of Honduras.

Tables XI through XIV, on pages 53 to 56, contain the basic data that was used for correlation.

[1] M. R. Spiegel, Schaum's Outline of Theory and Problems of Statistics (New York: Schaum Publishing Co., 1961), p. 344.
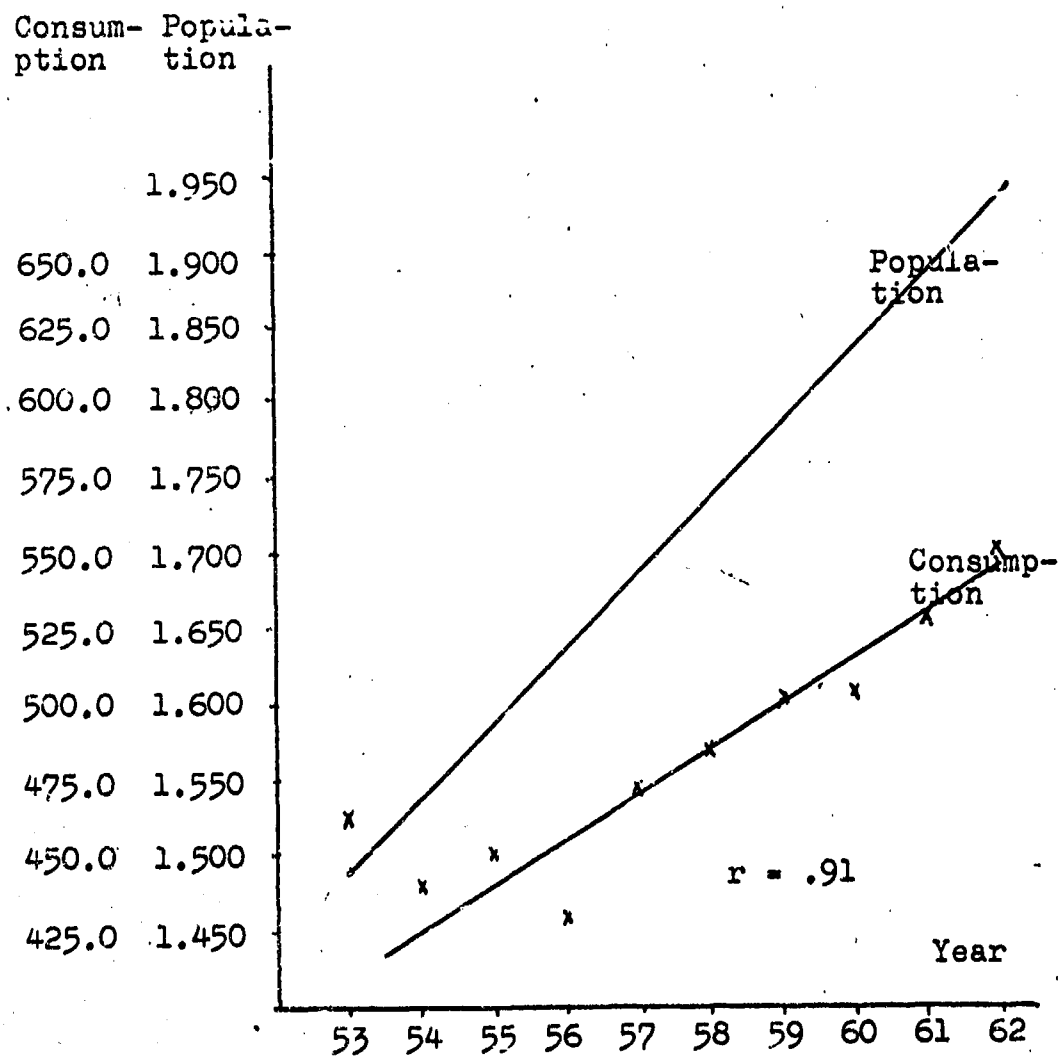
FIGURE 5

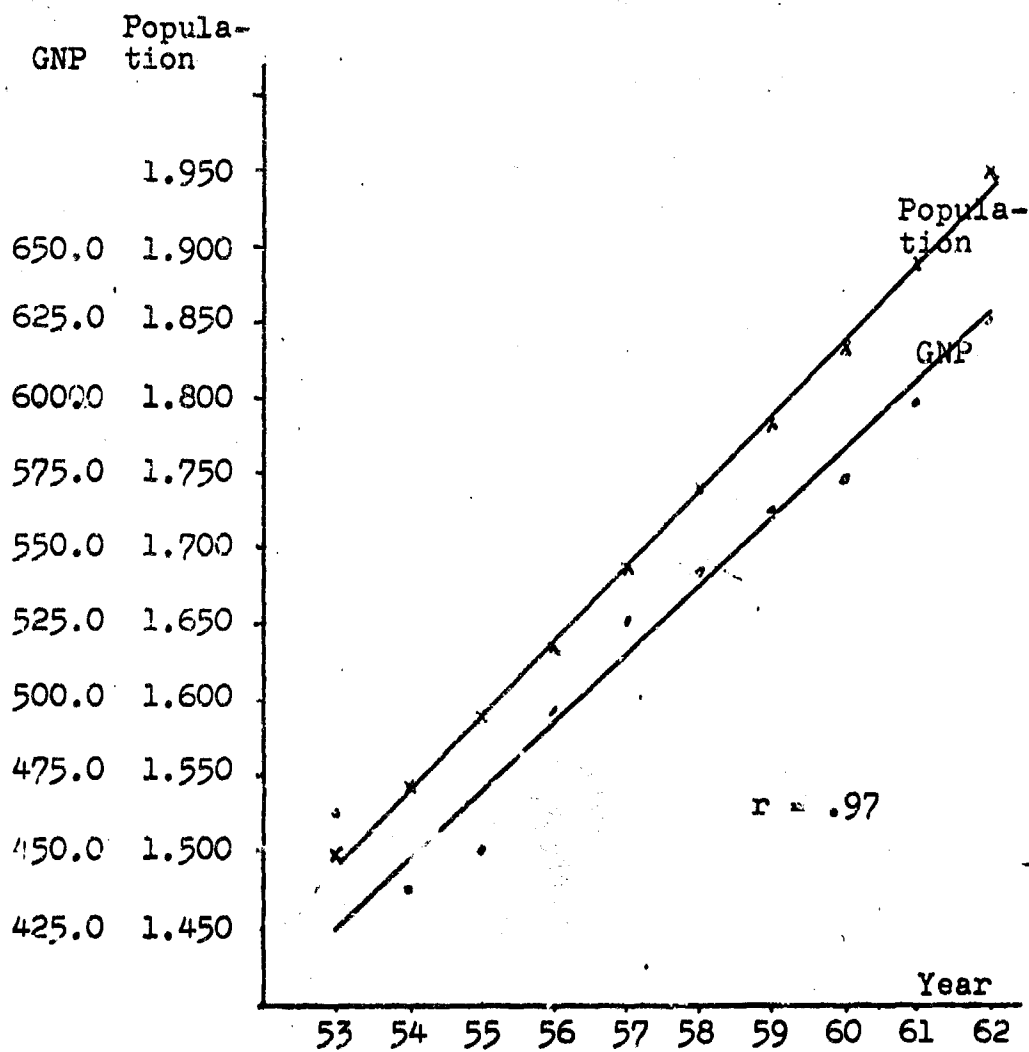PLOT OF POPULATION AND CONSUMPTION FOR HONDURAS

FIGURE 4

PLOT OF POPULATION AND GNP FOR HONDURAS

TABLE XI

SELECTED DATA FOR CHILE

Year	Expenditures on GNP*	Government and Private Consumption*	Gross Domestic Fixed Capital Formation*	Population**	Percentage Population Growth
1952	3944.0	3341.2		6.295	
1953	4103.1	3535.5	426.8	6.437	2.255
1954	4305.1	3891.3	420.2	6.597	2.485
1955	4452.6	3913.0	485.6	6.761	2.485
1956	4147.1	3675.4	423.9	6.944	2.706
1957	4429.9	4049.5	472.8	7.121	2.548
1958	4656.6	4181.5	436.2	7.298	2.485
1959	4686.8	4136.2	461.4	7.447	2.457
1960	4781.0	4342.0	405.0	7.637	2.561
1961	5023.0	4422.0	430.1	7.825	2.473
1962	5380.0	4577.0	451.7	8.009	2.356

* Source: United Nations, Yearbook of National Account Statistics 1960, 1963.
 In million Escudos adjusted to 1960 market price.
** Source: United Nations, Demographic Yearbook 1963. Midyear estimate given.

TABLE XII

SELECTED DATA FOR ECUADOR

Year	Expenditures on GNP*	Government and Private Consumption*	Gross Domestic Fixed Capital Formation*	Population**	Percentage Population Growth
1952	7944	6939	753	3.350	3.408
1953	8232	7283	910	3.464	2.973
1954	8940	7650	1214	3.567	3.467
1955	9165	7870	1312	3.691	2.955
1956	9444	8226	1352	3.800	3.394
1957	9949	8527	1335	3.929	3.054
1958	10249	8838	1289	4.049	3.260
1959	10725	9133	1473	4.181	3.252
1960	11385	9938	1547	4.317	3.196
1961	11680	10245	1612	4.455	2.828
1962	12099	10558	1753	4.581	

* Source: United Nations, Yearbook of National Account Statistics 1960, 1963.
  In million Sucres adjusted to 1950 market price.
**Source: United Nations, Demographic Yearbook 1963. Midyear population estimate.

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TABLE XIII

SELECTED DATA FOR HONDURAS

Year	Expenditures on GNP*	Government and Private Consumption*	Gross Domestic Fixed Capital Formation*	Population**	Percentage Population Growth
1952	435.9	435.9	73.3	1.452	2.961
1953	464.3	464.3	81.5	1.495	3.010
1954	434.8	434.8	60.1	1.540	2.987
1955	451.9	451.9	65.4	1.586	2.963
1956	493.4	430.8	66.5	1.633	3.000
1957	526.3	473.9	73.6	1.682	3.052
1958	539.1	483.1	66.3	1.733	3.000
1959	560.8	492.7	63.8	1.785	3.000
1960	570.6	506.8	67.9	1.838	2.969
1961	591.1	529.7	62.6	1.893	2.992
1962	626.7	551.6	81.2	1.950	3.011

* Source: United Nations, Yearbook of National Account Statistics 1960, 1963.
   In million Lempiras adjusted to 1948 market price.
** Source: United Nations, Demographic Yearbook 1963. Midyear population estimate.

TABLE XIV

SELECTED DATA FOR PARAGUAY

Year	Expenditures on GNP*	Government and Private Consumption*	Gross Domestic Fixed Capital Formation*	Population**	Percentage Population Growth
1952	15000	...	...	1.462	2.325
1953	15200	...	...	1.496	2.272
1954	15455	14360	1253	1.530	2.287
1955	16704	16020	1301	1.565	3.067
1956	15694	14029	1266	1.613	2.169
1957	16252	16070	1472	1.648	2.366
1958	16787	16028	2192	1.687	2.430
1959	15015	14412	1190	1.728	2.314
1960	15118	14732	1457	1.768	2.488
1961	15497	14340	1272	1.812	2.814
1962	15801	14655	1291	1.863	

* Source: United Nations, Yearbook of National Account Statistics 1960, 1963.
In million Guaranies adjusted to 1956 market price.

** Source: United Nations, Demographic Yearbook 1963. Midyear population estimate.

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